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Literature search results

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Search details

Management of prinzmetal's angina caused by coronary artery spasm.

Resources searched

NHS Evidence; TRIP Database; Cochrane Library; CINAHL; EMBASE; MEDLINE; Google Scholar

Database search terms: “prinzmetal’s angina”; “prinz-metal’s angina”; “prinz metal’s angina”; ANGINA PECTORIS, VARIANT; variant adj2 angina; vasospastic angina; PVA; VA; “prinzmetal’s variant angina”; “coronary spastic angina”; CSA; “coronary artery spasm”; CORONARY VASOSPASM; “coronary vasospasm”; management; therap*; treatment; exp THERAPEUTICS; THERAPY; PRINZMETAL ANGINA PECTORIS/

Google search string: (“coronary artery spasm” OR “coronary vasospasm”) (prinzmetal's OR "vasospastic angina" OR "variant angina") 1980..2011 / "coronary artery spasm" OR "coronary vasospasm" OR "prinzmetal's angina" OR "variant angina" OR "coronary spastic angina" OR "vasoplastic angina" 1980..2011

Summary

Given the 30 year time span, and the broad nature of the search, there is a tremendous amount of research on coronary artery spasm, prinzmetal’s angina and chest pain. Because of this, I limited the search to just coronary artery spasm and prinzmetal’s angina. Some definitions have coronary artery spasm as the cause of prinzmetal’s angina, whilst others located later have them as synonyms. My first search was for coronary artery spasm AND prinzmetal’s angina. I have added extra results to the end looking at treatment options for coronary artery spasm OR prinzmetal's angina. I have done my best to filter out duplicate results; even given the ones I may have missed, it still means several hundred unique results to work through. Enjoy.

Guidelines
In patients with pure vasospastic angina (Prinzmetal angina) without fixed obstructive lesions, beta-blockers are ineffective and may increase the tendency to induce coronary vasospasm from unopposed alpha-receptor activity (557); therefore, they should not be used.

**Clinical Immediate Reference**
- **Coronary Artery Vasospasm** 2010
- **Angina Pectoris** 2010

**Map of Medicine**
- **Stable angina - rapid access chest pain clinic** 2011

Patients with Prinzmetal (vasospastic) angina should be treated with dihydropyridine derivative calcium-channel blocker.

**Evidence-based reviews**

**Cochrane Central Register of Controlled Trials**

The short and long-term efficacy of diltiazem for the treatment of variant angina pectoris 1983

Thus, long-term follow-up of patients with CS treated with diltiazem revealed no mortality, low morbidity (12 per cent) and no adverse drug side effects.

**Published research**

*Results for coronary artery spasm AND prinzmetal's angina*

1. **Variant angina and coronary artery spasm: the clinical spectrum, pathophysiology, and management.**

**Author(s):** Kusama Y, Kodani E, Nakagomi A, Otsuka T, Atarashi H, Kishida H, Mizuno K

**Citation:** Journal of Nippon Medical School = Nihon Ika Daigaku Zasshi, 2011, vol./is. 78/1(4-12), 1345-4676;1347-3409 (2011)

**Publication Date:** 2011

**Abstract:** Variant angina is a form of angina pectoris that shows transient ST-segment elevation on electrocardiogram during an attack of chest pain. Ischemic episodes of variant angina show circadian variation and often occur at rest from midnight to early morning. Ischemic episodes also occur during mild exercise in the early morning. However, they are not usually induced by strenuous exercise in the afternoon. Other important clinical features of variant angina include the high frequency of asymptomatic ischemic episodes and the syncope that sometimes occur during the ischemic episodes. Syncope is due to severe arrhythmias, including ventricular tachycardia, ventricular fibrillation, and high-degree atrioventricular block. Coronary artery spasm is the mechanism of ischemic episodes in variant angina. The incidence of coronary artery spasm shows a racial difference and is higher in Japanese than in Caucasians. Coronary arteriograms are normal or near-normal in most Japanese patients with variant angina. Deficient basal release of nitric oxide (NO) due to endothelial dysfunction, and enhanced vascular smooth muscle contractility with the involvement of the Rho/Rho-kinase pathway are reported to play important roles in the pathogenesis of coronary artery spasm. Other precipitating factors of coronary artery spasm include imbalance in autonomic nervous activity, increased oxidative stress, chronic low-grade inflammation, magnesium deficiency, and genetic susceptibility. The genetic risk factors associated with coronary artery spasm...
include gene polymorphisms of endothelial NO synthase (NOS), paraoxonase, and other genes. Calcium channel blockers are extremely effective in preventing coronary spasm. The long-acting nitrate, nicorandil, and Rho-kinase inhibitor are also useful for inhibiting coronary artery spasm. Because variant angina can lead to acute myocardial infarction, fatal arrhythmias, and sudden death, early treatment is important. The prognosis of patients with variant angina is favorable, if early complications can be overcome. However, because coronary artery spasm cannot be suppressed in some patients, even with multiple medications, medications to suppress intractable coronary artery spasm must be developed.

Source: MEDLINE

2. A case of variant angina in a patient under chronic treatment with sorafenib

Author(s): Porto I., Leo A., Miele L., Pompili M., Landolfi R., Crea F.
Citation: Nature Reviews Clinical Oncology, August 2010, vol./is. 7/8(476-480), 1759-4774;1759-4782 (August 2010)
Publication Date: August 2010
Abstract: Background. A 63-year-old man with an unresectable multifocal hepatocellular carcinoma (HCC) presented with upper abdominal discomfort, nausea and vomiting. We report a case of variant angina in a patient affected by unresectable HCC under chronic treatment with sorafenib. Spontaneous spasm occurred during cardiac catheterization and was revealed during coronary angiogram with the unusual feature of a retrograde transient filling of a contralateral branch. Investigations. Electrocardiogram, cardiac catheterization, chest X-ray, emergency ECG. Diagnosis. Variant angina induced by sorafenib treatment mimicking infero-posterior ST-elevation myocardial infarction (STEMI). Management. High-dose calcium-antagonists and nitrates were initially given intravenously and then orally. Sorafenib therapy was then resumed without further symptoms. Restaging of the cancer revealed unexpected local recurrence and the patient died 1 month after receiving palliative care. We contend that the effects of sorafenib treatment were primarily responsible for the major cardiovascular event observed in this case, and it is important for clinicians to be aware of this possible severe complication of sorafenib therapy. 2010 Macmillan Publishers Limited.

Source: EMBASE

3. Prinzmetal-variant angina in a patient using zolmitriptan and citalopram.

Author(s): Acikel S, Dogan M, Sari M, Kilic H, Akdemir R
Citation: American Journal of Emergency Medicine, February 2010, vol./is. 28/2(257.e3-6), 0735-6757;1532-8171 (2010 Feb)
Publication Date: February 2010
Abstract: Prinzmetal-variant angina is a syndrome of chest pain caused by myocardial ischemia secondary to reversible coronary artery vasospasm, which may occur in angiographically normal and diseased coronary arteries. It typically occurs at rest and is accompanied by transient ST-segment elevation. Although the underlying pathophysiology is not well established, coronary spasm secondary to increased serotonergic activity as well as increased sympathetic activity may prevail. Coronary artery spasm can be invoked by antimigraine therapy and also by drugs having serotonergic activity such as ergonovine and ergotamine. Prinzmetal-variant angina may be complicated with acute myocardial infarction, ventricular arrhythmias as well as sudden cardiac death. We report a case of 48-year old woman presenting with chest pain and diffuse ST-segment elevation on electrocardiography during an episode of angina, while she was taking zolmitriptan 5 mg/d and citalopram 20 mg/d for migraine and depression, respectively. Coronary angiography (performed because of prolonged angina and presence of diffuse ST-segment elevation on electrocardiography) revealed that diffuse narrowing of left anterior descending coronary artery alleviated after intracoronary nitrate therapy. The most likely cause of myocardial infarction was coronary artery spasm because of the possible increased serotonergic activity secondary to concomitant use of zolmitriptan and citalopram.

Source: MEDLINE

Author(s): Khitri A, Jayasuriya S, Habibzadeh MR, Movahed MR

Citation: Reviews in Cardiovascular Medicine, 2010, vol./is. 11/4(264-70), 1530-6550;1530-6550 (2010)

Publication Date: 2010

Abstract: Formally described by Prinzmetal and colleagues in 1959, variant angina represents a syndrome of resting angina that results from severe coronary artery vasospasm associated with ST elevation. The majority of patients respond to nitrates or calcium channel blockers. However, medical treatment-resistant vasospasm can occur in up to 20% of cases, thus requiring further interventions. We present a rare instance of coronary vasospasm associated with complete heart block resistant to medical therapy that was successfully treated with stenting. This case example is followed by a detailed review of the literature with regard to percutaneous or surgical coronary revascularization of patients with medically resistant vasospasm.

Source: MEDLINE

5. Prognostic factors for the long-term survival in patients with vasospastic angina--analysis of effects of patients' characteristics and therapeutic drugs.


Citation: Journal of Cardiology, August 2009, vol./is. 54/1(10-20), 0914-5087;1876-4738 (2009 Aug)

Publication Date: August 2009

Abstract: OBJECTIVES: A retrospective study was conducted to elucidate contributing factors on the outcome of patients with vasospastic angina.SUBJECTS AND METHODS: Two hundred ninety-two patients with angina in whom coronary vasospasm was documented were followed up (mean 4.3+/3.6 years) to determine the relationship between the occurrence of cardiovascular events with available clinical factors including therapeutic drugs. Cardiovascular events were defined as fatal and non-fatal cardiovascular disorder events.RESULTS: Several clinical variables including age, elevated creatinine level, low high-density lipoprotein (HDL) cholesterol level, presence of severe coronary artery stenosis, low left ventricular ejection fraction, low cardiac index (CI), large left ventricular mass, and use of beta-blockers proved to be significant risk factors for cardiovascular events. Further analysis by a stepwise regression analysis revealed that, older age (hazard ratio (HR)=1.42), low HDL cholesterol level (HR=0.877), presence of severe coronary artery stenosis (HR=49.32), and decreased CI (HR=14.18) proved to be independent prognostic factors. Ca antagonists were prescribed to 261 patients (89.4%). Among four Ca antagonists, there were significant differences in the frequency of cardiovascular events (2.6% with benidipine, 4.2% with nifedipine, 6.0% with diltiazem, 23.1% with amlodipine; amlodipine vs. benidipine, P<0.05) although the background characteristics of the four different patient groups were non-equivalent.CONCLUSION: These results indicate that the morbidity of patients with vasospastic angina increased with older age, lower CI or HDL cholesterol, and presence of severe coronary artery stenosis, and that treatment with benidipine appeared to reduce cardiovascular events in patients with vasospastic angina.

Source: MEDLINE

6. Coronary vasospasm presenting as Prinzmetal's angina and life threatening Brady-arrhythmia independently at different times.

Author(s): Mansoor AH, Aggarwal P, Bhardwaj S, Tandon V, Kaul U

Citation: Indian Heart Journal, July 2009, vol./is. 61/4(389-91), 0019-4832;0019-4832 (2009 Jul-Aug)

Publication Date: July 2009

Abstract: A 65-years-old female presented with features suggesting acute coronary
syndrome, initially as non STEMI and later as classical Prinzmetal's angina. While being treated she also had recurrent episodes of dizziness and cardiac arrest due to complete heart block and asystole. These episodes occurred while on nitroglycerine infusion and were not accompanied by chest pain or ST-T segment changes. Coronary angiography revealed evidence of reversible multi-vessel coronary spasm. Electrophysiological studies were normal. She was treated with nitrates and calcium blockers and a permanent pacemaker implantation.

Source: MEDLINE

7. Improved myocardial perfusion preceding clinical response on bosentan treatment for coronary vasospasm.

Author(s): Vermeltfoort IA, Raijmakers PG, Kamphuisen PW

Citation: Acta Cardiologica, June 2009, vol./is. 64/3(415-7), 0001-5385;0001-5385 (2009 Jun)

Publication Date: June 2009

Abstract: Many patients suffer from persistent angina due to coronary vasospasm despite optimal medical treatment. We treated a 46-year-old patient with severe and treatment-resistant coronary vasospasm with the endothelin-receptor antagonist bosentan. Using oxygen-15-labelled water in conjunction with oxygen 15-labelled carbon monoxide positron emission tomography (PET), we measured an impaired coronary flow reserve (CFR) in 6 out of 13 segments directly before the start of bosentan therapy. A repeated PET measurement after 16 weeks of bosentan revealed a completely normalized CFR in this patient. Furthermore, the patient reported less frequent and less severe chest pain. Our data suggest a potential role of endothelin-receptor antagonists for patients with severe coronary vasospasms.

Source: MEDLINE


Author(s): Stern S, Bayes de Luna A

Citation: Circulation, May 2009, vol./is. 119/18(2531-4), 0009-7322;1524-4539 (2009 May 12)

Publication Date: May 2009

Source: MEDLINE

Full Text:
Available in fulltext at Highwire Press
Available in fulltext at Ovid


Citation: Circulation Journal, March 2009, vol./is. 73/3(512-5), 1346-9843;1346-9843 (2009 Mar)

Publication Date: March 2009

Abstract: BACKGROUND: Calcium-channel blockers (CCBs) are highly effective in suppressing coronary spasm and are widely used as the standard therapy for coronary spastic angina, but it is unclear if CCB treatment completely suppresses the symptoms.METHODS AND RESULTS: The clinical course of the symptoms caused by coronary spasm was investigated in patients taking CCBs: 90 patients were evaluated and 80 patients were followed. The mean follow-up period was 1,796+/−1,169 days. There were no cardiac deaths, but 3 patients were admitted to the hospital, 1 because of the onset of non-Q wave myocardial infarction and 2 because of repeat anginal attacks. In those 2 patients, medical therapy was discontinued at their discretion. In the follow-up analysis, we found that the incidence of symptoms caused by repeat anginal attacks was 37.0% (27/73)
in the first year and was increasing every year. CONCLUSIONS: CCBs are strongly recommended for improving the prognosis of coronary spasm, but in many cases they do not suppress completely symptoms.

Source: MEDLINE

10. Treatment of spontaneous left main coronary artery spasm with a drug-eluting stent
Author(s): Chou H.-H., Lim K.-E., Ko Y.-L.
Citation: Acta Cardiologica Sinica, March 2009, vol./is. 25/1(43-46), 1011-6842 (March 2009)
Publication Date: March 2009
Abstract: Variant angina due to spontaneous left main trunk spasm is rarely reported in the literature. Despite intensive medical treatment or surgical intervention, patients may still suffer from recurrent symptoms. We describe a 70-year-old male patient who had spontaneous left main coronary artery spasm with recurrent angina. The patient was successfully treated with a drug-eluting stent and remained free of symptoms at a 2-year clinical follow-up.

Source: EMBASE

11. Prinzmetal's variant angina associated with severe heart rhythm disturbances and syncope: a therapeutic dilemma.
Author(s): Ledakowicz-Polak A, Ptaszynski P, Polak L, Zielinska M
Citation: Cardiology Journal, 2009, vol./is. 16/3(269-72), 1898-018X;1897-5593 (2009)
Publication Date: 2009
Abstract: Prinzmetal's angina is a distinct syndrome characterized by episodes of chest pain and transient ST-segment elevation caused by coronary vasospasm. This variant form of angina is sometimes associated with complete atrioventricular block and ventricular arrhythmias. We report here a case of variant angina with documented severe heart rhythm disturbances and syncope in a 66 year-old woman. Due to recurrent episodes of high-degree atrioventricular block, a DDD pacemaker was implanted. No further symptoms of angina or cardiac arrhythmias were detected on optimal therapy.

Source: MEDLINE

12. Long-term prognosis and clinical characteristics of patients with variant angina
Author(s): Yoo S.-Y., Shin D.-H., Jeong J.I., Yoon J., Ha D.C., Cho S.-W., Cheong S.-S.
Citation: Korean Circulation Journal, December 2008, vol./is. 38/12(651-658), 1738-5520;1738-5555 (December 2008)
Publication Date: December 2008
Abstract: Background and Objectives: The overall prognosis of patients with vasospastic angina (VA) is relatively good. However, the long-term prognosis and its influencing factors are not well understood in Korean patients. Subjects and Methods: Between August 1996 and January 2007, 256 consecutive patients with VA were reviewed (215 men, 53+/-9 years). Coronary spasm was confirmed via intravenous ergonovine provocation in all study patients during coronary angiography. Major adverse cardiac events (MACEs) were defined as myocardial infarction (MI), resuscitation from cardiac arrest, or repeat hospitalization due to recurrent angina. Results: The 256 patients were followed for an average of 59 months (range, 5 months to 11 years). Thirty-one patients (12.1%) were lost to follow-up. Cardiac deaths occurred in 6 patients (2.3%), non-fatal MIs occurred in 3 patients (1.2%), and MACEs occurred in 52 patients (20.3%). The rates of survival at 1, 3, and 5 years were 99%, 97%, and 97%, respectively, and the rates of MI-free survival at 1, 3, and 5 years were 99%, 96%, and 95%, respectively. Rates of MACE-free survival at 1, 3, and 5 years were 91%, 81%, and 62%, respectively. MI at initial presentation and current smoking were factors significantly associated with MACEs; these factors were also independent predictors of MACE-free survival. Conclusion: Despite treatment with calcium
channel blockers, recurrent episodes of angina were frequently observed, whereas sudden cardiac death and non-fatal MI were rare. Smoking and myocardial infarction at admission were independent risk factors for cardiac death, non-fatal MI, and repeat hospitalization due to recurrent angina in patients with variant angina. Copyright 2008 The Korean Society of Cardiology.

Source: EMBASE

13. Variant (Prinzmetal's) angina as a less common cause of cardiac syncope [Czech] Variantni (Prinzmetalova) angina jako mene casta pricina kardialni synkopy

Author(s): Fedorco M., Skala T., Vaclavik J., Lukl J.

Citation: Cor et Vasa, September 2008, vol./is. 50/9(348-351), 0010-8650 (September 2008)

Publication Date: September 2008

Abstract: We present the case of a 62-year-old woman admitted for a syncope. During hospitalization, the syncope recurred with new ECG-documented signs of subendocardial ischemia and increased troponin levels, with the episode classified as suspected acute non-ST elevation myocardial infarction. Surprisingly, coronary angiography did not find any significant stenosis. While in a heart center, the patient experienced short episodes of chest tightness with transient junction rhythm, and subsequent anterolateral ST elevation with inferior ST depression. Based on her history, ECG and negative coronary angiograms, the patient was diagnosed to have variant angina pectoris. The syncope was due to junction rhythm caused by ischemia during a coronary artery spasm. Her beta-blocker therapy had been withdrawn and with her current combination therapy of a nitrate and a calcium-channel blocker, the patient has been asymptomatic without any further syncopes.

Source: EMBASE


Author(s): Tani S, Nagao K, Anazawa T, Kawamata H, Furuya S, Takahashi H, lida K, Fuji T, Matsumoto M, Kumabe T, Sato Y, Hirayama A

Citation: Journal of Cardiovascular Pharmacology, July 2008, vol./is. 52/1(28-34), 0160-2446;1533-4023 (2008 Jul)

Publication Date: July 2008

Abstract: Combined therapy with a statin and a calcium channel blocker, which can improve lipid metabolism and reduce oxidative stress, may attenuate coronary vasoconstriction in patients with coronary spastic angina (CSA). After 6 months of therapy with benidipine and pravastatin, an acetylcholine provocation test was performed a second time in 25 patients with CSA. The patients were divided into 2 groups according to whether the result of this second test was positive (n = 13) or negative (n = 12). The test was designated as positive when the intracoronary injection of acetylcholine induced angiographically demonstrable total or subtotal occlusion (positive-test group). In the negative-test group, significant decrease in the plasma levels of low-density lipoprotein (LDL) cholesterol (-20.7 +/- 11.1%, P < 0.01 versus baseline) were observed along with a dramatic increase in the serum level of high-density lipoprotein (HDL) cholesterol (26.8 +/- 13.2%, P < 0.01 versus baseline). Furthermore, a significant decrease of the malondialdehyde-modified low-density lipoprotein (MDA-LDL) level, a marker of oxidative stress, was also observed (-22.6 +/- 14.1%, P < 0.01 versus baseline) in this group. In the positive-test group, however, no significant changes were found in any of the aforementioned parameters. The results showed that improvement of lipid metabolism, especially an increase of HDL cholesterol level and a reduction of MDA-LDL, may inhibit vascular contractility.

Source: MEDLINE

15. Multivessel variant angina after a radical nephrectomy operation.

Author(s): Ural E, Kilic T, Kahraman G, Dillioglugil O, Ural D, Komsuoglu B

Citation: Canadian Journal of Cardiology, June 2008, vol./is. 24/6(e36-7), 0828-
A case of multivessel variant angina after an open radical nephrectomy (RNO) is presented. A 52-year-old man was admitted to the coronary care unit with recurrent chest pain and dynamic ST-T wave changes on electrocardiogram early after an RNO. The first diagnosis of the clinical condition was non-ST segment elevation acute coronary syndrome. However, recurrent angina with ST segment elevation occurred after the standard medical therapy, which included beta-blockers. Emergency coronary angiography showed diffuse and multiple narrowing of all the three major coronary arteries during the chest pain, which was relieved by intracoronary nitroglycerine injection. Variant angina was suspected, and beta-blocker therapy was replaced with calcium channel blocker treatment. No angina attacks were observed during the clinical follow-up. Although a direct relationship between the type of surgery and variant angina was not established, coronary vasospasm after an RNO should be kept in mind, especially in the differential diagnosis of a patient with recurrent angina and dynamic ST-T changes on electrocardiogram. Although beta-blocker therapy is a first-line treatment for all acute coronary syndromes, it can be harmful in patients with variant angina and should be stopped immediately after verification of diagnosis.

Source: MEDLINE

Full Text:
Available in fulltext at National Library of Medicine


Citation: Coronary Artery Disease, March 2008, vol./is. 19/2(105-10), 0954-6928;0954-6928 (2008 Mar)

Publication Date: March 2008

Abstract: BACKGROUND: The Rho/Rho-kinase signaling pathway is known to be involved in the pathogenesis of coronary artery spasm. Previous studies reported the efficacy of the Rho-kinase inhibitor, fasudil, in the prevention and relief of coronary spasm. The usefulness of fasudil in combination with conventional vasodilating agents, however, has not been fully examined in patients with vasospastic angina.METHODS AND RESULTS: A total of 26 patients (mean age, 61+/-11 years) with documented vasospasm in the left anterior descending coronary artery were examined by the acetylcholine stress test. Coronary diameter at the spasm site was measured at baseline and after the administration of vasodilator agents in the following order: intracoronary nitroglycerin (NTG) (300 microg), intravenous fasudil (30 mg, n=15, fasudil group) or saline (n=11, saline group), and again NTG during coronary angiography. The increase in diameter observed following the first NTG administration was found to be similar in the fasudil and saline groups (38.3+/-23.5% and 42.3+/-17.1%, respectively). The additional change in diameter on fasudil treatment (16.9+/-11.2% increase over the diameter after the first NTG administration) was significantly larger than that with saline (-2.8+/-7.6%, P<0.001). The second administration of NTG did not affect the diameter of the spasm site in either group.CONCLUSIONS: Fasudil further dilated the site of coronary spasm, which had already been treated with NTG in patients with vasospastic angina. These findings support and extend the previous results that showed the feasibility of employing fasudil as a novel therapeutic approach for coronary spasm.

Source: MEDLINE

17. Prognostic effects of benidipine in patients with vasospastic angina: Comparison with diltiazem and amlodipine

Author(s): Fukumoto Y., Yasuda S., Ito A., Shimokawa H.

Citation: Journal of Cardiovascular Pharmacology, March 2008, vol./is. 51/3(253-257), 0160-2446 (Mar 2008)
Abstract: We have previously reported the changing clinical characteristics of patients with vasospastic angina (VSA) before and after the introduction of new calcium channel blockers (benidipine and amlodipine) in 1990. In this subanalysis study, we compared the prognostic effects of 3 calcium channel blockers (benidipine, diltiazem, and amlodipine) on the incidence of cardiovascular events in patients with VSA in our cohort study, where 527 patients (318 men and 209 women) enrolled after 1990 (from January 1990 to December 2002) were followed-up for a mean period of 5.2 years. There was no significant difference in the clinical characteristics among the 3 calcium channel blocker groups. Multivariate analysis demonstrated that 4 factors, including smoking, hypertension, diabetes mellitus and reduced left ventricular ejection fraction, were significant risk factors for cardiovascular events. Among the 3 calcium channel blockers examined, benidipine (n = 148) tended to be associated with a lower incidence of total events, cardiovascular events, and cerebral infarction, compared with diltiazem (n = 313) and amlodipine (n = 111). Furthermore, benidipine significantly reduced the incidence of vascular infarction events, a possible indicator of atherosclerosis, as compared with diltiazem. These results suggest that benidipine may be more useful for the treatment of VSA as compared with diltiazem and amlodipine. 2008 Lippincott Williams & Wilkins, Inc.

Source: EMBASE


Author(s): Aomar Millan IF, Candel Erenas JM, Ramirez Hernandez JA, Candel Delgado JM

Citation: Revista Clinica Espanola, February 2008, vol./is. 208/2(94-6), 0014-2565;0014-2565 (2008 Feb)

Publication Date: February 2008

Abstract: Vasospastic or Prinzmetal's variant angina as it is also known is a special type of ischemic heart disease characterized by spontaneous episodes of chest pain accompanied by transitory ST segment elevations during the episodes. These alterations are essential for its diagnosis and it is difficult to diagnose it in their absence. If clinical suspicion is high, it should be confirmed by coronary vasospasm provocation tests, since, on the contrary, there may be cases that are not diagnosed or considered to be other types of diseases. Furthermore, progression of this type of angina to a myocardial infarction due to coronary stenosis is a relatively uncommon event.

Source: MEDLINE

19. Stent implantation for diffuse and multiple coronary spasm in a patient with variant angina refractory to optimal medical therapy.

Author(s): Sugimoto A, Morino Y, Ikari Y

Citation: Journal of Invasive Cardiology, November 2007, vol./is. 19/11(E320-3), 1042-3931;1557-2501 (2007 Nov)

Publication Date: November 2007

Abstract: A patient with variant angina presented complaining of frequent morning chest pain refractory to maximal doses of 5 vasodilator agents. His condition was complicated by a drug eruption due to a side effect of the calcium antagonist. Coronary angiography showed no organic stenosis, but a challenge test revealed multiple and diffuse coronary artery spasms at the right coronary artery and the left anterior descending artery. A total of 5 stents were implanted for full coverage of the spastic segments. Spasm could not be provoked by repeating the challenge test after stenting. He has been asymptomatic for 8 months since the procedure.

Source: MEDLINE

20. Polymorphic ventricular tachycardia induced by coronary vasospasm: a malignant case of variant angina.
Abstract: Variant angina is generally a benign disease with self-limiting symptoms. But in some cases, serious ventricular arrhythmias which can lead to death can be seen. In this paper, we present a case of variant angina who subsequently developed polymorphic ventricular tachycardia and was treated successfully with long-acting nitrate and calcium channel blockade therapy.

Source: MEDLINE
characteristics and prognosis of these patients. Methods: From January 1991 to December 2002, 202 patients (57.1 +/- 12 years; 166 men) were diagnosed to have variant angina at our Institute. Detailed clinical findings and clinical events were prospectively collected for each patient. Results: The median time from the first angina attack to diagnosis was 2 months (range 1-276), with diagnosis requiring > 6 months in 31.7% of patients. Coronary angiography (n = 183) showed normal coronary arteries in 42.1% of patients and significant coronary stenoses (> 50%) in 44.3%, with multi-vessel disease in 8.7%. Diagnosis of variant angina was done during coronary angiography in 3% of cases during the first half of the study period, but in 42% of patients in the second half of the study period. Major cardiac events (MCE, i.e., death, resuscitation from cardiac arrest, myocardial infarction) occurred in 41 patients (20.3%), with 43.9% of events occurring within 1 month of symptom onset. The only variable significantly associated with MCE was the detection during angina of ST segment elevation in both anterior and inferior ECG leads (odds ratio 3.24; 95% confidence interval 1.43-7.36; P = 0.005). Conclusion: Our data suggest that variant angina is still a frequently overlooked diagnosis, and a timely diagnosis would be crucial to prevent early life-threatening events. Patients with diffuse ST segment elevation on ECG are those at the highest risk of MCE, independently of angiographic findings. 2006 Elsevier Ireland Ltd. All rights reserved.

Source: EMBASE


Author(s): Sueda S, Oshita A, Izoe Y, Kohno H, Fukuda H, Ochi T, Uraoka T

Citation: Annals of Nuclear Medicine, February 2007, vol./is. 21/2(85-92), 0914-7187;0914-7187 (2007 Feb)

Publication Date: February 2007

Abstract: BACKGROUND: Calcium antagonists (Ca) have been effective in reducing angina attacks in patients with variant angina. However, there are no reports regarding the effectiveness of Ca on myocardial fatty acid metabolic images in patients with pure coronary spastic angina (CSA).OBJECTIVES: This study sought to examine the correlation between myocardial fatty acid metabolic images and the medical treatment of Ca in patients with pure CSA.METHODS AND RESULTS: This study included 35 consecutive patients (28 men, mean age of 66 +/- 10 years) with angiographically confirmed coronary spasm and no fixed stenosis. Long-acting Ca was administered to all 35 patients. Isosorbide dinitrate/nicorandil/another Ca/beta-blocker were administered when chest pain was not controlled. Using an iodinated fatty acid analogue, 15-(p-[iodine-123]iodophenyl)-3-(R,S)methylpentadecanoic acid (BMIPP), myocardial scintigraphies with intravenous adenosine triphosphate infusion were performed before cardiac catheterization and 12 mo after medical therapy. According to the medical control states, these 35 patients were classified into 3 groups; response (disappearance of angina attacks, 12 pts, 60 +/- 11 years), partial response (angina attacks < 4/mo, 12 pts, 67 +/- 10 years), and no response to therapy (angina attacks > or = 4/mo, 11 pts, 71 +/- 6 years). Reduced BMIPP uptake was observed in 24 (69%) of 35 patients before the treatment. Reduced BMIPP uptake was also found in 18 patients (51%) after 12 mo. Normal BMIPP uptake after 12 mo therapy was observed in about half (response; 42%, partial response; 58%, no response: 45%) of patients among the 3 groups. There was no difference regarding the value of washout rate (WOR) (response; 10 +/- 7 (before), 14 +/- 8% (12 mo)), partial response; 11 +/- 7, 10 +/- 5%, no response; 13 +/- 9, 14 +/- 8%) among the 3 groups. The defect scores of BMIPP in the three groups were not different during at least one year medical therapy. No difference regarding the distribution of other medical therapies (angiotensin converting enzyme inhibitors/angiotensin receptor blockers/beta-blockers/statins) was found. The administration of Ca and isosorbide dinitrate/nicorandil and 2 Ca was significantly higher in the poor than in the good control patients.CONCLUSIONS: Long-acting Ca over one year did not improve myocardial fatty acid metabolic images in patients with pure CSA. This may be related to silent ischemia.

Source: MEDLINE


Author(s): Suzuki H, Yokoyama K, Akimoto Y, Daida H
BACKGROUND: Most patients with vasospastic angina who have no significant organic coronary arterial stenosis are well controlled by medical therapy and the prognosis is almost satisfactory. Calcium channel (Ca) blockers are used as the first choice and effective agents for vasospastic angina pectoris. However, they do not always work well. Some uncontrolled coronary vasospasms would happen to cause prolonged occlusion of coronary artery resulting in myocardial infarction, life-threatening arrhythmias and sudden death. Therefore, it is very important to pay attention to such a refractory coronary spasm and choose the most effective agent out of Ca blockers for the treatment of each patient with vasospastic angina attacks. This study was designed to evaluate the anti-vasospastic efficacy of benidipine, a long acting dihydropyridine (DHP) Ca blocker, in patients with other Ca blockers-resistant angina.

METHODS: Patients treated with diltiazem but not enough to control angina attacks were enrolled in the present study. Treatment with diltiazem (CAS 33286-22-5, 42399-41-7) was changed to treatment with benidipine (CAS 91599-74-5) and the parameters such as angina frequency, duration, blood pressure, heart rate, electrocardiogram and hematological parameters (serum NO(x), plasma cGMP) were measured and compared.

RESULTS: Fifteen patients with vasospastic angina were enrolled. After switching from diltiazem to benidipine, angina attacks were completely disappeared in six patients. Although the frequency was not decreased, the average duration of attacks was shorter than before in three patients. Four patients did not improve and two patients obviously worsened. In the improved nine patients, serum nitrite/nitrate (NO(x)) levels showed a significant increase from 37.6 +/- 15.3 to 54.5 +/- 26.7 pmol/L (p < 0.05) and cGMP levels subsequently elevated from 2.2 +/- 0.8 to 2.5 +/- 0.6 micromol/L (p = 0.05) after benidipine therapy started. Adverse effects such as hypotension and bradycardia were not observed.

CONCLUSION: This study suggests that benidipine may be helpful in Japanese patients with vasospastic or variant angina pectoris, if diltiazem was not successful.

Source: MEDLINE

Available in fulltext at EBSCO Host

26. Stent implantation in variant angina refractory to medical treatment

Author(s): Marti V., Ligero C., Garcia J., Kastanis P., Guindo J., Dominguez De Rozas J.M.

Citation: Clinical Cardiology, December 2006, vol./is. 29/12(530-533), 0160-9289 (Dec 2006)

Publication Date: December 2006

Abstract: Background: Vasospastic angina usually responds well to medical treatment. Hypothesis: The present study describes our experience in patients who received a coronary stent because of recurrent variant angina refractory to medical treatment and evaluates stent implantation as an alternative treatment. Materials and methods: Between March 1998 and February 2005, recurrent variant angina was diagnosed in 22 patients admitted to our coronary care unit. Of these, five patients (22.7%), were refractory to pharmacologic treatment. Coronary angiography and coronary stents were indicated. Clinical follow-up was 29 +/- 6 months. Results: Stenting was performed during diagnostic coronary angiography in two patients. In the other three patients, the stent was implanted 24-48 h later. We observed coronary spasm recurrences proximal or distal to the stent in four patients-two during the stent implantation procedure and the other two in the coronary care unit within 48 h post angioplasty. Three patients where treated with additional stenting and the fourth patient improved with pharmacologic treatment. During follow-up three patients remained asymptomatic. The fourth patient had diffuse in-stent restenosis in the third month, and the fifth patient showed a de novo lesion in the treated segment 2 years later. Conclusions: Stent implantation in patients with recurrent variant angina refractory to medical treatment may be an alternative treatment in carefully selected, clinically unstable patients. Spasm recurrences may occur in other segments of the treated artery, probably due to the diffuse nature of the disease. Immediate and continued surveillance is recommended because of the risk of adverse clinical events. 2006 Wiley Periodicals, Inc.
27. Coronary artery stent placement as a treatment of acute coronary syndrome in course of variant angina

Author(s): Sosnowski C., Dabrowski R., Wiernikowski A., Rewicki M., Ruzyllo W.

Citation: International Journal of Cardiology, April 2006, vol./is. 108/2(259-261), 0167-5273 (04 Apr 2006)

Publication Date: April 2006

Abstract: High doses of calcium antagonists and nitrates are the treatment of choice in vasospasm angina when no stenosis or mild stenosis is present. In ca. 5-30% patients this kind of treatment is not effective. We present five cases of variant angina with acute coronary syndrome in patients despite standard pharmacological treatment. These patients also did not respond for intracoronary nitroglycerine injection. They were successfully treated with stent implantation in place of vasospasm. Our observations indicate that early enough interventional treatment prevent myocardial infarction. In one case in which stent placement was performed 12 h after clinical manifestation myocardial infarction with Q waves and enzymes release occurred. In others, accurately treated with stent implantation, coronary spasm did not produce myocardial damage. We did not see any clinical and biochemical evidence of myocardial infarction. 2005 Elsevier Ireland Ltd. All rights reserved.

Source: EMBASE

28. Syncope as a first manifestation of Prinzmetal's angina in a 49-year-old woman. A case report [Polish] Utraty przytomności jako pierwszy objaw dławicy Prinzmetal... Opis przypadku

Author(s): Krzciuk M., Wozakowska-Kaplon B.

Citation: Kardiologia Polska, 2006, vol./is. 64/7(728-731), 0022-9032;0022-9032 (2006)

Publication Date: 2006

Abstract: A case of a 49-year-old woman with episodes of syncopeces as a first manifestation of variant angina is presented. She was admitted to cardiology ward because of recurrent angina associated with marked ST segment elevation in the inferior and anterior electrocardiographic leads. Previously she was diagnosed at a neurological ward because of nocturnal syncopeces without accompanying chest pain but with associated hypotonia and bradycardia of about 36 beats/min. Coronary arteriography revealed non-significant coronary stenosis of two vessels (left and right coronary artery) and coronary spasm close to these obstructions. Therapy with calcium channel blockers as well as giving up smoking eliminated the episodes of chest pain and syncope in a twelve-month follow-up.

Source: EMBASE

29. Internal mammary revascularization in patients with variant angina and normal coronary arteries

Author(s): Ono T., Ohashi T., Asakura T., Shin T.

Citation: Interactive Cardiovascular and Thoracic Surgery, October 2005, vol./is. 4/5(426-428), 1569-9293;1569-9293 (01 Oct 2005)

Publication Date: October 2005

Abstract: Patients with variant angina refractory to medical therapy pose a difficult management problem. In patients with discrete obstructive lesions, coronary revascularization may be helpful. However, it has been widely accepted that coronary revascularization is contraindicated in patients with isolated coronary spasm without evidence of obstructive disease. Here we describe the two patients with life-threatening, medically intractable Prinzmetal's angina and angiographically normal coronary arteries, both of whom underwent coronary-artery-bypass surgery with the internal-mammary-artery (IMA) graft. These operations resulted in rapid, complete remission of coronary spastic attacks in both patients. Postoperative angiography reveals how the IMA graft works during...
spastic attacks.

Source: EMBASE

Full Text:
Available in fulltext at Highwire Press

30. Autonomic antecedents to variant angina exacerbation after beta-blockade withdrawal.

Author(s): Chiladakis JA, Alexopoulos D

Citation: Journal of Electrocardiology, January 2005, vol./is. 38/1(82-4), 0022-0736;0022-0736 (2005 Jan)

Publication Date: January 2005

Abstract: We describe a patient with nonsignificant coronary artery disease who experienced variant angina after beta-blockade withdrawal. Standard therapy with nifedipine and nitrates aimed at suppressing symptoms and typical transient ST-segment elevations was superseded by the reinstatement of metoprolol. The autonomic alternations before and after readministration of metoprolol were analyzed by time and spectral indices of heart rate variability (HRV). Metoprolol reduced the HRV and reversed the low-frequency/high-frequency power ratio toward a more physiological autonomic balance. We conclude that the reinstitution of beta-blocker acted protectively by preventing surges of sympathetic activity on an underlying basis of parasympathetic predominance.

Source: MEDLINE


Author(s): Athanasiadis A, Sechtem U

Citation: Deutsche Medizinische Wochenschrift, December 2004, vol./is. 129/49(2648-50), 0012-0472;0012-0472 (2004 Dec 3)

Publication Date: December 2004

Abstract: HISTORY AND PHYSICAL EXAMINATION: A 70-year-old woman with recurrent angina at rest and dyspnea was admitted for coronary angiography. Prior to the admission, an ECG showed new negative T-waves in the precordial leads, which have completely disappeared the day after. Clinical examination revealed a low systolic murmur over the aortic valve and a low murmur over the left groin artery. The other examination findings were normal. INVESTIGATIONS: Exercise ECG revealed no signs of ischemia. In the coronary angiography a plaque in the left circumflex artery without significant lumen reduction could be detected. Intracoronary administration of acetylcholine induced a spasm in the left circumflex artery with total lumen occlusion with reproduction of intense chest pain. After injection of nitroglycerin coronary spasm and chest pain were reversible. TREATMENT AND CLINICAL COURSE: After the diagnosis of vasospastic angina pectoris medical treatment with isosorbide dinitrate and amlodipine was initiated. Additionally ACE- and CSE-inhibitors were prescribed to improve endothelial dysfunction. After one year the patient was free of symptoms. CONCLUSION: Coronary spasm can cause angina at rest. After confirmation of diagnosis an appropriate medical therapy could be applied and other unnecessary examinations including further coronary angiographies could be prevented.

Source: MEDLINE

32. Prinzmetal's angina

Author(s): Keller K.B., Lemberg L.

Citation: American Journal of Critical Care, July 2004, vol./is. 13/4(350-354), 1062-3264 (July 2004)

Publication Date: July 2004

Abstract: Prinzmetal's angina, often referred to as "variant" angina, is a temporary increase in coronary vascular tone (vasospasm) causing a marked, but transient reduction
in luminal diameter. This coronary vasospastic state is usually focal at a single site and can occur in either a normal or diseased vessel. Patients are predominantly younger women who may not have the classical cardiovascular risk factors (except for cigarette use). PVA has been associated with vasospastic disorders such as Raynaud's phenomenon and migraine headaches. Arrhythmias are common and may be life threatening especially when the effects of vasospasm are seen in those ECG leads that reflect the potential variations of the epicardial surface of the left ventricle. Endothelial dysfunction has been considered as primarily responsible for PVA. The diagnosis is made by observing transient ST-segment elevation during the attack of angina. Since PVA is not a "demand" induced symptom, but rather a supply (vasospastic) abnormality, exercise treadmill stress testing is of no value in the diagnosis of PVA. The most sensitive and specific test for PVA is the administration of ergonovine intravenously. Fifty micrograms at 5-minute intervals is given until a positive result or a maximum dose of 400 mug has been administered. When positive, the symptoms and associated ST-segment elevation should be present. Nitroglycerin rapidly reverses the effects of ergonovine if refractory spasm occurs. Medical therapy classically employs vasodilator drugs, which include nitrates and calcium channel blockers. The prognosis is good when there is no significant coronary artery stenosis. Treatment of associated coronary atherosclerosis in elderly patients with PVA is advised. When PVA is associated with coronary atherosclerosis, the prognosis is determined by the severity of the underlying disease. beta-Blockers and large doses of aspirin are contraindicated in PVA.

Source: EMBASE

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33. Prinzmetal's angina associated with nicergoline therapy [Hungarian]
Nicergoline altal indukált Prinzmetal-angina. Fejfajas helyett "szivfajas"

Author(s): Tomcsanyi J., Vecsey T., Tatrai T.
Citation: Orvosi Hetilap, January 2004, vol./is. 145/1(31-32), 0030-6002 (Jan 2004)
Publication Date: January 2004

Abstract: A 56 year old woman was admitted to our hospital with crescendo chest pain in the last ten days. Her past history included hypertension treated by 100 mg metoprolol for more than ten years and right carotid endarterectomy. She complained headache and a treatment of 20 mg nicergoline (ergoline derivative) daily was started. Her chest pains started always one hour after the nicergoline intake. The chest pain was accompanied by breathing difficulties and sweating of 5 min duration at first but the next days it lasted longer and longer. Next morning following her admission, one hour after the nicergoline administration she had severe chest pain again. The ECG showed ST-segment elevation in inferior leads resolved after nitroglycerin administration. The angiogram revealed normal coronary artery. Nicergoline was stopped. The patient was treated with felodipine and remains free of symptoms. Nicergoline was good for head but worse for heart in this case.

Source: EMBASE

34. Beneficial effects of betaxolol, a selective antagonist of beta-1 adrenoreceptors, on exercise-induced myocardial ischemia in patients with coronary vasospasm.

Author(s): Suzuki J, Watanabe K, Tsuruoka T, Sueda S, Funada J, Kitakaze M, Sekiya M
Citation: International Journal of Cardiology, October 2003, vol./is. 91/2-3(227-32), 0167-5273;0167-5273 (2003 Oct)
Publication Date: October 2003

Abstract: Although beta-blockers can not be used for the treatment of vasospastic angina, the effect of beta-blockers with vasorelaxant property on coronary vasospasm remains uncertain. In this study, we evaluated the effect of betaxolol, a new beta-blocker with calcium antagonistic property, as an additional therapy on vasospastic angina (VSA) with anginal attacks on effort. We enrolled 12 patients with VSA and anginal attacks with ST
segment depression during exercise stress test. All patients received 1.25-5 mg of betaxolol for 3 months. Treadmill exercise stress test and adenosine triphosphate stress thallium-201 myocardial scintigraphy were performed before and 3 months after the onset of the betaxolol treatment. The other drugs including calcium antagonists, nitrates and nicorandil were continued. No patients experienced the exacerbation of angina during the betaxolol treatment. Exercise time to chest pain (317.5+/−72.1-454.2+/−75.5 s, P<0.01) and maximal ST segment depression (1.67+/−0.67-1.16+/−0.46 mm, P<0.01) obtained by exercise stress test, the defect score (8.6+/−2.7-5.3+/−2.1, P<0.01), the extent score (14.8+/−5.8-8.8+/−4.6%, P<0.01), the severity score (17.5+/−7.3-11.3+/−5.2, P<0.01) and washout rate (31.4+/−5.6-37.6+/−5.0%, P<0.01) obtained by the scintigraphy were improved by betaxolol. Our results suggest that betaxolol increases regional myocardial blood flow and improves exercise capacity in patients with VSA. Betaxolol may become a drug for a new potential therapy for VSA.

Source: MEDLINE

35. Treatment and prognosis of vasospastic angina

Author(s): Kijima M.

Citation: Nippon rinsho. Japanese journal of clinical medicine, May 2003, vol./is. 61 Suppl 5/(159-166), 0047-1852 (May 2003)

Publication Date: May 2003

36. Usefulness of massive oral nicorandil in a patient with variant angina refractory to conventional treatment

Author(s): Kurisu S., Inoue I., Kawagoe T., Ishihara M., Shimatani Y., Nishioka K., Nakamura S., Umemura T., Yoshida M.

Citation: Internal Medicine, February 2003, vol./is. 42/2(163-167), 0918-2918 (01 Feb 2003)

Publication Date: February 2003

Abstract: A 67-year-old man, who was previously diagnosed with vasospastic angina and treated with standard therapy, was admitted to our hospital because of recurrent chest pain refractory to sublingual nitroglycerin. Admission electrocardiography revealed ST segment elevation in II, III and aVf, and his symptoms were relieved by intravenous bolus administration of nicorandil. He was diagnosed to have active variant angina, and remained symptomatic even after treatment with calcium antagonists and nitrates at optimal doses. Intravenous bolus administration of nicorandil was consistently effective to relieve his symptoms. Anginal attack was finally prevented by massive oral nicorandil in addition to conventional treatment.

Source: EMBASE

37. Limitations of medical therapy in patients with pure coronary spastic angina.

Author(s): Sueda S, Kohno H, Fukuda H, Watanabe K, Ochi N, Kawada H, Uraoka T

Citation: Chest, February 2003, vol./is. 123/2(380-6), 0012-3692;0012-3692 (2003 Feb)

Publication Date: February 2003

Abstract: OBJECTIVES: To assess the efficacy of medication for the treatment of pure coronary spastic angina, 71 consecutive patients with this diagnosis who had undergone coronary arteriography in a hospital with a follow-up of at least 2 years were studied. Methods and results: All 71 patients without significant organic stenosis were treated with long-acting calcium antagonists. The disappearance of chest pain attacks while receiving medical therapy was observed in 27 patients (38%), whereas the remaining 44 patients (62%) had chest pain attacks. Of special interest, 30 patients had more than one attack per month irrespective of the administration of calcium antagonists or isosorbide dinitrate. Medical treatment showed a good response in female patients (63% vs 31%, respectively; p < 0.05) and those with ST-segment elevation during selective spasm provocation tests (63% vs 30%, respectively; p < 0.05). In contrast, patients with a longer history of chest
pain attacks before hospital admission and those with diffuse spasms (77% vs 34%, respectively; p < 0.01) had poor responses to medical treatment. In this study, neither sudden death nor acute myocardial infarction was observed during the follow-up periods.

CONCLUSION: The limitations of medical therapy, including the administration of long-acting calcium antagonists, were observed in 30 of 71 patients (42%) with pure coronary spastic angina. Medical treatment was effective in only 38% of patients with pure coronary spastic angina in Japan.

Source: MEDLINE

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Available in print at Grantham Hospital Staff Library
Available in print at Lincoln County Hospital Professional Library

Author(s): Seniuk W, Mularek-Kubzdela T, Grygier M, Grajek S, Cieslinski A
Citation: Journal of Internal Medicine, October 2002, vol./is. 252/4(368-76), 0954-6820;0954-6820 (2002 Oct)
Publication Date: October 2002
Abstract: We present three patients with variant angina pectoris and episodes of cardiac arrest. All of them had typical clinical symptoms, ST-segment changes in electrocardiogram, and coronary artery spasm confirmed by arteriography. They were treated with high doses of calcium antagonists and nitrates. An automatic cardioverter-defibrillator was implanted in the patient who developed ventricular fibrillation despite therapy with calcium antagonists. In another patient a DDD pacemaker was implanted because of high-degree atrioventricular block.

Source: MEDLINE

Full Text:
Available in fulltext at EBSCO Host

Author(s): Masumoto A, Mohri M, Shimokawa H, Urakami L, Usui M, Takeshita A
Citation: Circulation, April 2002, vol./is. 105/13(1545-7), 0009-7322;1524-4539 (2002 Apr 2)
Publication Date: April 2002
Abstract: BACKGROUND: Increased activity of Rho-kinase causes hypercontraction of vascular smooth muscle and has been implicated as playing a pathogenetic role in divergent cardiovascular diseases such as coronary artery spasm. We examined whether an intracoronary infusion of fasudil, a selective Rho-kinase inhibitor, would attenuate coronary vasoconstrictor responses to acetylcholine (ACh) in patients with vasospastic angina.METHODS AND RESULTS: We studied 20 consecutive patients in whom coronary artery spasm was provoked by intracoronary ACh. The patients underwent a second ACh challenge after pretreatment with intracoronary saline (n=5) or fasudil (n=15; 300 mcrog/min for 15 minutes). Angina and coronary vasospasm were reproducibly induced by the second testing in patients who received saline. In contrast, fasudil markedly attenuated the coronary constriction induced by ACh (P<0.001) and prevented the occurrence of chest pain and ischemic ECG changes in all treated patients (both P<0.01 versus saline). Fasudil, at the dose used in this study, did not significantly change systemic hemodynamics or baseline coronary blood flow.CONCLUSIONS: Fasudil was effective in preventing ACh-induced coronary artery spasm and resultant myocardial ischemia in patients with vasospastic angina. We suggest that this Rho-kinase inhibitor may be a novel
therapeutic intervention to treat ischemic coronary syndromes caused by coronary artery spasm.

Source: MEDLINE

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Available in print at Lincoln County Hospital Professional Library

40. Denopamine, a selective beta1-receptor agonist and a new coronary vasodilator

Author(s): Ishide T.

Citation: Current medical research and opinion, 2002, vol./is. 18/7(407-413), 0300-7995 (2002)

Publication Date: 2002

Abstract: Up until now, it has been suggested that nitrate and/or calcium channel blockers were effective against variant angina pectoris. On the other hand, it is known that about 20% of variant angina pectoris was refractory to both nitrate and calcium channel blockers. In Japan, it has been reported that denopamine, which is an oral beta1-adrenoceptor selective agonist developed by the Japanese pharmaceutical industry (Tanabe Seiyaku), is effective in those refractory cases. To date, in Japan nine cases have been recognized of patients with vasospastic angina pectoris whose symptoms were relieved by taking denopamine, including one case in which the author has had personal experience. Eight of these nine cases were refractory, and were not relieved by combined therapy using both nitrate and a calcium channel blocker. It was also documented that denopamine was effective in cases where attacks were not relieved by prazosin or magnesium, which have been documented as effective in other refractory cases. In a study of canine coronary arteries, localization of beta-adrenoceptor subtypes was documented, with the beta1-adrenoceptor predominantly found in the conduit coronary artery. In recent years it has been emphasized that the principal role of sympathetic nerves was not associated with the constrictive action of alpha-adrenoceptors, but with the coronary dilative action of beta-adrenoceptors. It would therefore be worthwhile to determine whether denopamine is able to relieve vasospastic angina pectoris in many more cases.

Source: EMBASE

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Available in print at Lincoln County Hospital Professional Library

41. Antiischemic properties of fasudil in experimental models of vasospastic angina.

Author(s): Sato S, Ikegaki I, Asano T, Shimokawa H

Citation: Japanese Journal of Pharmacology, September 2001, vol./is. 87/1(34-40), 0021-5198;0021-5198 (2001 Sep)

Publication Date: September 2001

Abstract: We studied the antiischemic properties of fasudil, a Rho-kinase inhibitor, in conscious rabbits with coronary vasospasm induced by vasopressin and endothelin. Pretreatment with fasudil (0.3 and 3 mg/kg) attenuated the maximum elevation of the T-wave elicited by endothelin. Pretreatment with fasudil inhibited the T-wave elevation elicited by vasopressin. Fasudil and hydroxy fasudil, an active metabolite of fasudil, relaxed the endothelin-, U-46619-, 5-hydroxytryptamine- or histamine-induced contraction in swine coronary arterial strips. Fasudil and hydroxyfasudil significantly prevented the reduction in coronary flow by vasopressin in the Langendorff perfused rat heart. Fasudil was effective in protecting the heart against vasopressin and endothelin-induced myocardial ischemic change in conscious rabbits, and this beneficial effect can be attributed to its action of ameliorating the severe contraction of arteries. The inhibition of Rho-kinase may have
implications for the development of novel therapeutic strategies for vasospastic angina in patients.

Source: MEDLINE

42. Comparative results of coronary intervention in patients with variant angina versus those with non-variant angina

Author(s): Sueda S., Suzuki J., Watanabe K., Mineoi K., Kondou T., Yano K., Ochi T., Ochi N., Kawada H., Hayashi Y., Uraoka T.

Citation: Japanese Heart Journal, 2001, vol./is. 42/6(657-667), 0021-4868 (2001)

Publication Date: 2001

Abstract: Coronary angioplasty is reported to be feasible and safe in patients with coronary spasm and fixed stenosis. However, the long-term results are not positive. We compared the results of coronary angioplasty in 20 patients with variant angina versus 17 patients with non-variant angina among 231 consecutive patients with vasospastic angina. Coronary angioplasty was performed successfully in all 37 patients without any complications. Stenting for coronary dissection or recoil was performed in 8 patients, directional coronary atherectomy was selected for ostial lesion of left anterior descending coronary artery stenosis in 2 patients, and standard balloon angioplasty was performed in 27 patients. There were no clinical differences between the two groups. The restenosis rate in patients with variant angina was similar to that in patients with non-variant angina (30% vs 29%, ns). There was no relationship between the provoked spasm and restenosis. During the follow-up period, no major complications were observed in patients with variant angina or those with non-variant angina. In conclusion, full medication with calcium channel antagonists and isosorbide dinitrate, and treatment by coronary angioplasty including the use of new devices, were useful treatments for patients with coronary vasospasm and significant organic stenosis. There was no difference concerning the results of coronary intervention between the patients with variant angina and those with non-variant angina.

Source: EMBASE

43. Eosinophil counts and plasma fibrinogen in patients with vasospastic angina pectoris.


Citation: American Journal of Cardiology, March 2000, vol./is. 85/6(715-9), 0002-9149:0002-9149 (2000 Mar 15)

Publication Date: March 2000

Abstract: Epidemiologic studies have suggested a relation between white blood cell (WBC) counts and the incidence of coronary heart disease. However, the relation between vasospastic angina pectoris (VAP) and WBC counts remains to be elucidated. To clarify the relation between differential and WBC counts in VAP, we compared the hematologic values, blood chemical values, plasma fibrinogen levels, C-reactive protein levels, and coronary risk factors in patients with spontaneous attacks of VAP (n = 39) with those in patients with stable effort angina pectoris (EAP, n = 35) and in control subjects (n = 19). Patients with VAP were further divided into mild VAP (n = 22) and severe VAP groups (n = 17). There were no differences in the coronary risk factors, body temperature, total WBC counts, and C-reactive protein levels among the control, EAP, mild VAP, and severe VAP groups, except that the high-density lipoprotein cholesterol in the EAP group was significantly lower than that in the control group (p <0.01). In contrast, the eosinophil counts were significantly higher in the severe VAP group than in the other 3 groups (p <0.01). Plasma fibrinogen levels were also significantly higher in the severe VAP group than in the other 3 groups (p <0.05). The follow-up study for differential and WBC counts in patients with VAP (n = 23) demonstrated that, after medical therapy, the eosinophil counts were significantly decreased to the same level as those in the control group (p <0.0001). Thus, the eosinophil counts and plasma fibrinogen levels could predict the severity of VAP. Furthermore, a follow-up study in patients with VAP suggests that coronary vasospasm could result in an increase in eosinophil counts.

Source: MEDLINE
44. Refractory vasospasm with a malignant course.

Author(s): Kumar A, Chandna H, Santhanam V, Denes P

Citation: Clinical Cardiology, February 2000, vol./is. 23/2(127-30), 0160-9289;0160-9289 (2000 Feb)

Publication Date: February 2000

Abstract: We present a patient with two rare disorders, recurrent vasospastic angina leading to cardiac transplant and acute aortic occlusion. The patient had recurrent episodes of coronary vasospasm presenting with unstable angina, acute myocardial infarction, and sudden cardiac death in spite of adequate therapy with nitrates and calcium-channel blockers. He went on to have a cardiac transplant. The patient later presented with acute aortic occlusion with concomitant renal and mesenteric artery spasm. The circumstances of the presentation raise the possibility of a generalized vasospastic predisposition that is responsible for both events. Smoking, the only known major risk factor other than atherosclerosis, was noted to be temporally related to both events in our patient.

Source: MEDLINE

45. Heart rate variability in patients with variant angina: Effect of the presence of significant coronary stenosis

Author(s): Meloni C., Stazi F., Ballarotto C., Margonato A., Chierchia S.L.

Citation: Italian Heart Journal, 2000, vol./is. 1/7(470-474), 1129-471X (2000)

Publication Date: 2000

Abstract: Background. The syndrome of variant angina occurs in patients with a wide spectrum of coronary disease ranging from angiographically normal coronary arteries to severe three-vessel disease. Survival and choice of therapy for these patients are determined by the extent of underlying fixed coronary obstruction. We examined whether heart rate variability (HRV) due to reduced vagal outflow may correlate with the severity of coronary stenoses in such patients. Methods. Fifteen men and 2 women with clinically unstable variant angina underwent 24-hour Holter monitoring from which low and high-frequency power, standard deviation of mean 24-hour RR interval, proportion of adjacent RR intervals that differed by more than 50 ms, and mean root square of differences between successive RR intervals were extracted by power spectral analysis. Coronary angiography was later performed to determine coronary pathology and verify variant angina. As controls we studied an age-matched control group of 8 subjects (5 men, 3 women) with no clinical and/or electrocardiographic evidence of coronary heart disease or spasm as shown by negative treadmill exercise and hyperventilation tests. Results. All measured components of HRV were significantly lower in the 9 patients with severe coronary artery disease compared to the 8 patients with normal coronary arteries or < 40% stenosis. The two groups were otherwise similar in terms of age and clinical parameters. Conclusions. These preliminary findings on a small but carefully selected group of patients with variant angina indicate that the analysis of HRV can select patients with severe disease for a more intensive approach. These findings require confirmation on a larger patient series.

Source: EMBASE

46. Severe myocardial stunning in a female patient with variant angina - A case report [Polish] Ciezkie ogłuszenie miesnia sercowego u chorej z dusznica bolesna prinzmetal

Author(s): Wilczewski P., Glanowska G., Fudal M., Nowalany-Kozielska E., Kawecki D., Jachec W.

Citation: Kardiologia Polska, 2000, vol./is. 52/3(206-210), 0022-9032 (2000)

Publication Date: 2000

Abstract: We present a case of very severe myocardial stunning in a 48-year-old female patient who suffered from variant angina. Coronary angiography showed normal arteries.
After a small laryngological procedure, the patient developed acute left ventricular failure. Echocardiography showed significant wall motion abnormalities with a decrease of ejection fraction to 25% and left ventricular enlargement. Repeated coronary angiography showed normal coronary arteries with good contrast flow. After one week of therapy with calcium channel blockers and nitrates, a complete recovery of left ventricular function and morphology was noticed. The data in literature on severe myocardial stunning in the course of variant angina are scarce.

Source: EMBASE

47. Effect of tongxinluo capsule in treating variant angina pectoris patients and its influence on endothelial function

Author(s): Jia Z., Gu F., Xue Y.

Citation: Zhongguo Zhong xi yi jie he za zhi Zhongguo Zhongxiyi jiehe zazhi = Chinese journal of integrated traditional and Western medicine / Zhongguo Zhong xi yi jie he xue hui, Zhongguo Zhong yi yan jiu yuan zhu ban, November 1999, vol./is. 19/11(651-652), 1003-5370 (Nov 1999)

Publication Date: November 1999

Abstract: OBJECTIVE: To assess the efficacy of Tongxinluo capsule (TXLC) in treating variant angina pectoris and its effect on endothelial function. METHODS: Sixty-four patients with variant angina pectoris were enrolled in the study for four weeks by a randomized clinical trial treatment with TXLC or isosorbide mononitrate. RESULTS: (1) The symptoms of both groups were significantly improved, the total effective rate of TXLC and isosorbide were 86.67% and 87.10% respectively; (2) The level of serum nitric oxide was increased, and the serum endothelin was decreased after treatment, there was no significant difference between these two groups. CONCLUSION: TXLC could effectively improve the symptoms of variant angina pectoris, the mechanism of which may likely be mediated by nitric oxide and endothelin.

Source: EMBASE

48. An uncommon case of variant angina

Author(s): Stazi F., Meloni C., Ballarotto C.

Citation: Giornale Italiano di Cardiologia, October 1999, vol./is. 29/10(1208-1211), 0046-5968 (Oct 1999)

Publication Date: October 1999

Abstract: This case report describes a 48-year-old woman patient with variant angina who died because of severe myocardial ischemia and cardiogenic shock, in spite of chronic therapy with nitrates and calcium-antagonists and acute intravenous administration of nitrates, calcium-antagonists and tissue-type plasminogen activator. Her Holter monitoring showed a reduction of time domain measures of heart rate variability. The hemodynamic study exhibited a normal ventriculography and angiographically normal epicardial coronary arteries. The provocative testing, performed (during intravenous therapy with nitrates and diltiazem) by intracoronary injection of progressively increasing doses of ergonovine, induced only a mild vasoconstriction of proximal left anterior descending artery, without symptoms or ST-T segment changes. This case reminds us that variant angina can be a lethal disease, confirms that a negative result of intracoronary ergonovine testing performed during intravenous therapy with nitrates and calcium-antagonists does not assure the prevention of new episodes during chronic oral therapy with the same drugs, suggests a possible prognostic value of the reduction of heart rate variability indexes and shows an unusual response to nitrate administration.

Source: EMBASE


Author(s): Gaspardone A, Tomai F, Versaci F, Ghini AS, Polisca P, Crea F, Chiariello L, Gioffre PA

Citation: American Journal of Cardiology, July 1999, vol./is. 84/1(96-8, A8), 0002-
We performed a prospective study to establish the efficacy of coronary stent placement in a highly selected group of patients with focal coronary artery spasm in whom anginal attacks could not be prevented by full medical therapy. The results of this study indicate that intracoronary stent placement may represent an alternative and feasible treatment for patients with vasospastic angina refractory to aggressive medical therapy.

Prinzmetal's variant angina: Three case reports and a review of the literature

Prinzmetal's variant angina is a rare entity. When angina-like symptoms occur at rest, mostly at a specific hour in the early morning, together with transient ST segment elevations and angiographically normal arteries, provocative tests with ergonovine or acetylcholine should be performed. Endothelial dysfunction, a strong thrombotic tendency, an increased platelet aggregation together with changes in autonomic tone can trigger coronary vasospasms. Once treated with calcium antagonists and nitrates the prognosis is excellent and severe complications such as arrhythmias, myocardial infarction or sudden death are extremely rare. Coronary stenting can be useful for refractory coronary spasm, CABG can be used for important coronary atherosclerosis. This review is illustrated with three typical presentations of variant angina: a myocardial infarction without significant organic coronary atherosclerosis, an ergonovine-induced coronary spasm with a non-significant coronary lesion and a multivessel spasm complicated by ventricular arrhythmia. All these three patients became asymptomatic after a treatment with calcium antagonists and nitrates.

Limited efficacy of magnesium for the treatment of variant angina

Some patients with variant angina show both ST segment elevation at rest and
exercise-induced ST segment elevation. Magnesium deficiency has also been observed in patients with variant angina. This study investigated the correlation between the degree of magnesium deficiency and the efficacy of intravenous administration of magnesium in patients with variant angina. Fifteen patients with angiographically confirmed variant angina were assessed for magnesium deficiency and whether intravenous administration of magnesium (19.2mEq/l) suppressed exercise-induced ST segment elevation. All 15 patients were studied with a magnesium retention test (0.2 mEq/kg over 4 hr) to analyze magnesium deficiency. In our study, magnesium retention rate in patients with variant angina was not higher than that of controls (57+/−24% vs 45+/−10%, NS). All 15 patients had anginal attacks during accelerated exercise combined with hyperventilation after placebo infusion, whereas only 8 patients had anginal attacks after magnesium administration. ST segment elevation occurred in 14 patients after placebo infusion, but in only 4 patients after magnesium administration. There were no correlations between disease activity, degree of magnesium deficiency or failure of suppression of ST elevation by the intravenous administration of magnesium. Intravenous administration of magnesium can suppress exercise-induced coronary spasms in some patients with variant angina, but the degree of magnesium deficiency did not correlate with the suppressions of exercise-induced ST elevation after magnesium administration. Intravenous administration of magnesium had limited efficacy in patients with variant angina and exercise-induced ST segment elevation.

Source: EMBASE

53. Coronary stent for variant angina: atypical presentation.

Author(s): Gupta S, Schiele F, Vuillemenot A, Appfel F, Bassand JP

Citation: Catheterization & Cardiovascular Diagnosis, December 1998, vol./is. 45/4(439-41), 0098-6569;0098-6569 (1998 Dec)

Publication Date: December 1998

Abstract: Pharmacological therapy remains the treatment of choice for Prinzmetal angina. We report an unconventional approach of coronary artery stenting to treat coronary artery spasm in variant angina refractory to triple drug therapy. Favorable clinical and angiographic results and a negative Ergonovine test, under less aggressive medical therapy, are valuable arguments for stenting. Four-month angiographic follow-up showed absence of intrastent restenosis with a negative Ergonovine test. However, long-term follow-up is necessary before advocating this as a systematic approach.

Source: MEDLINE

54. High-density lipoprotein particles are large in patients with variant angina

Author(s): Miwa K., Yoshida N., Nakagawa K., Inoue H.

Citation: Cardiovascular Research, March 1998, vol./is. 37/3(729-737), 0008-6363 (Mar 1998)

Publication Date: March 1998

Abstract: Objective: Dyslipidemia in patients with coronary vasospasm may be characterized by low level of high-density lipoprotein (HDL)-cholesterol as well as apolipoprotein (apo) A-I but not high level of low-density lipoprotein-cholesterol. This study sought to examine the HDL particle size in patients with variant angina. Methods: The HDL particle size was examined by analyzing serum lipid levels in 38 patients with variant angina to compare with those of 40 control subjects and 30 normocholesterolemic patients with stable effort angina. Also, actual HDL size distribution was assessed by electrophoresis. Results: The HDL-cholesterol, apoA-I and apoA-II levels were all lower (P < 0.01 for each) in patients with variant angina and patients with stable effort angina as compared with control subjects. The apoA-II level was lower (P < 0.01) in patients with variant angina than in patients with stable effort angina. The apoA-I/apoA-II ration was lower (P < 0.01) in patients with stable effort angina, but not in patients with variant angina as compared with control subjects. In contrast, the HDL-cholesterol/apoA-I ratio was higher in patients with variant angina than in control subjects (P < 0.01) and also patients with stable effort angina (P < 0.01). The slope of the regression line, comparing HDL-cholesterol and apoA-I levels, was greater in patients with variant angina than in control subjects (P <
0.05) and patients with stable effort angina (P < 0.05), suggesting an increase in larger HDL particles. Native polyacrylamid gel electrophoresis revealed that HDL particles in patients with variant angina were skewed towards larger sizes compared with control subjects (P < 0.01) and patients with stable effort angina (P < 0.01). The abnormal serum lipid values were normalized in the patients with variant angina after the medical treatment and inactivation of the coronary spasm. Conclusion: High HDL-cholesterol/apoA-I levels associated with low serum HDL-cholesterol and apoA-I levels were characteristic in patients with variant angina, in whom HDL particles were larger, cholesterol-rich and possibly malfunctioning.

Source: EMBASE

Full Text:
Available in fulltext at Highwire Press

55. A case of refractory vasospastic angina in which alpha₁-blocker was effective

Author(s): Kobayashi T., Usui T., Yakuwa H., Himeno H., Terada K., Ogawa H., Kashiwagi M.

Citation: Respiration and Circulation, 1998, vol./is. 46/1(93-97), 0452-3458 (1998)

Publication Date: 1998

Abstract: A 45-year-old woman had suffered from frequent anginal episodes. She was treated with isosorbide dinitrate, nicorandil and diltiazem, which were ineffective. During coronary angiography, she had anginal attacks with ST elevation in II, III, aV(F) leads. Simultaneously her right coronary artery, 1 was obstructed. Intracoronary injection of isosorbide dinitrate was effective. We diagnosed her complaint as variant angina. Since prazosin therapy was initiated, frequency of the attacks diminished. Coronary artery vasoconstriction is mediated via adrenergic alpha receptors. So prazosin, alpha₁-blocker has possible effectivity against vasospasm. Prazosin therapy should be tried in refractory variant angina.

Source: EMBASE

56. Coronary NIR stent implantation for refractory variant angina

Author(s): Kuppens C., Put P., Mertens D., Jaspers L., Dendale P., Benit E.

Citation: Acta Cardiologica, 1998, vol./is. 53/3(169-171), 0001-5385 (1998)

Publication Date: 1998

Abstract: A 44-year-old woman with severe variant angina refractory to maximal medical therapy and at risk of sudden death was successfully treated by a NIR stent implantation on a moderate lesion of LAD. Six months later she was asymptomatic, without in-stent restenosis. This procedure represents an alternative treatment for patients with refractory vasospastic angina.

Source: EMBASE

57. Variant angina in isolated adrenocorticotropin deficiency, inappropriate vasopressin secretion and Hashimoto's thyroiditis

Author(s): Nishikawa M., Toyoda N., Miyaji M., Higuchi M., Yonemoto T., Ogawa Y., Sakaguchi N., Tokoro T., Iwasaka T., Inada M.

Citation: Internal Medicine, 1998, vol./is. 37/4(398-402), 0918-2918 (1998)

Publication Date: 1998

Abstract: We reported a 62-year-old male patient who had variant angina and isolated adrenocorticotropic hormone (ACTH) deficiency. His serum sodium concentration was low and vasopressin was inappropriately high for the low osmolality. Serum free thyroxine (FT₄) was low and thyroid stimulating hormone (TSH) was high with positive anti-thyroperoxidase antibodies, compatible with Hashimoto's thyroiditis. Treatment with Amiodapine and hydrocortisone relieved chest symptoms and hyponatremia, and hypothyroidism was also normalized. It is suggested that coronary artery spasm may be related to cortisol deficiency
and/or inappropriately high vasopressin secretion and that hypothyroidism was ameliorated
because the reduced responsiveness to TSH returned to normal due to hydrocortisone
supplement.

Source: EMBASE

58. Heart period variability in patients with variant angina

Author(s): Tsuchiya T., Okumura K., Yasue H., Kugiyama K., Ogawa H.

Citation: American Journal of Cardiology, May 1996, vol./is. 77/11(932-936), 0002-9149
(01 May 1996)

Publication Date: May 1996

Abstract: To clarify how cardiac autonomic control is affected in variant angina, we
analyzed heart period variability in 35 patients with variant angina and in 19 control
subjects. Patients with variant angina were divided into 1-vessel (group S, n = 17) and
multivessel spasm groups (group M, n = 18) according to the site(s) of ST elevation on the
electrocardiogram during attacks. The 24- hour Holter electrocardiogram recorded 6 +/- 3
days after the treatment with calcium antagonist was analyzed to avoid the possible
influence of spontaneous attacks. In 5 group M patients, the electrocardiogram recorded 1
month after the treatment was also analyzed. There was no difference in the number of
spontaneous attacks between groups S and M. The standard deviation of all normal RR
intervals (SDNN) and the percentage of differences between adjacent normal RR intervals
>50 (pNN50) in variant angina were slightly but significantly lower than those in controls.
There were no differences in other indexes between variant angina and controls. When the
data were analyzed separately in groups S and M, averaged RR intervals (MN), SDNN,
pNN50, high-frequency power, and low-frequency power in group M were significantly
lower than those in group S and controls, and the ratio of low- to high-frequency power in
group M was significantly higher than that in group S and controls. There was no difference
in any index between group S and controls. All abnormal indexes in group M recovered to
levels similar to those in controls 1 month after the treatment. In conclusion, depressed
cardiac vagal control and sympathetic-dominant sympathovagal interaction were present in
patients with variant angina, especially in those with multivessel spasm.

Source: EMBASE

59. Calcium channel antagonists in the management of anginal syndromes: changing concepts in relation to the role of coronary vasospasm.

Author(s): Opie LH

Citation: Progress in Cardiovascular Diseases, January 1996, vol./is. 38/4(291-314),
0033-0620;0033-0620 (1996 Jan-Feb)

Publication Date: January 1996

Abstract: Despite the increasing evidence that alterations in coronary vascular tone can
and do occur in patients with anginal syndromes, only in a minority of such patients with
Prinzmetal's angina is there decisive evidence that the coronary vasodilation induced by
calcium channel antagonists (CCAs) plays a specific therapeutic role. CCAs may also give
therapeutic benefit in a number of conditions in which coronary vasoconstriction may
contribute to ischemia, such as hyperventilation, cold-induced angina, or silent ischemia
not caused by an increase in heart rate. Thus, the decision of whether or not to use CCAs
in angina syndromes will often have to be made on grounds other than what appears to be
a minor role of vasospasm in the overall spectrum of angina. There are preliminary
indications that the long-term prognosis may be different among different categories of
CCAs.

Source: MEDLINE

60. Management of vasospastic angina--role of nicorandil.

Author(s): Kaski JC

Citation: Cardiovascular Drugs & Therapy, March 1995, vol./is. 9 Suppl 2/(221-7), 0920-
3206;0920-3206 (1995 Mar)
Clinical and experimental observations have confirmed that an episodic increase in the vasomotor tone of a major coronary artery may play a pathogenetic role not only in "variant angina" but also in other, more common anginal syndromes. In chronic stable angina, dynamic changes of vascular smooth muscle tone at the site of eccentric atheromatous plaques are responsible for "mixed angina." Abnormal coronary vasomotion contributes to myocardial ischemia in acute coronary syndromes as well. Studies have shown that a "primary" reduction of coronary blood flow, usually associated with plaque fissuring and thrombus formation, causes infarction and unstable angina. Abnormal vasoconstriction associated with the release of vasoactive substances by platelets and other constituents of the thrombus can contribute to coronary flow reduction in patients with unstable angina and myocardial infarction. Better understanding of the complex interactions among atherosclerotic coronary obstructions, the vascular smooth muscle, and the vascular endothelium has resulted in novel therapeutic approaches and has stimulated the search for more efficacious and safer coronary vasodilators. Recently interest has focused on vasodilator agents such as nicorandil that influence coronary arterial tone by acting through potassium channel activation. Nicorandil appears to be effective for treatment of vasospastic angina, as suggested by studies in Japan and Europe. In addition to its "antivasospastic" properties, nicorandil dilates coronary artery stenoses in patients with stable angina pectoris. (ABSTRACT TRUNCATED AT 250 WORDS)
the prognosis for variant angina even during a relatively short follow-up period.

Source: EMBASE

63. Refractory vasospastic angina relieved by denopamine

Author(s): Inoue S., Miyazawa Y., Iguchi N., Kasahara S., Kodama S., Haruta S., Katou J., Hiroseawa K., Hosada S.

Citation: Respiration and Circulation, 1994, vol./is. 42/4(387-391), 0452-3458 (1994)

Publication Date: 1994

Abstract: A 78-year-old man was admitted with severe chest pain not relieved by nitroglycerine, and ST elevation appeared in leads II, III, (a)V(F) of the ECG. Emergent coronary angiography showed total obstruction in the distal portion of the right coronary artery (Seg. 4), and 90% stenosis in the proximal portion of the left anterior descending branch (Seg. 7). After intracoronary administration of isosobide dinitrate, obstruction and stenosis disappeared and no organic stenosis was seen in coronary arteries. It proved to be spasm. The patient was refractory to conventional treatment with calcium antagonists (nifedipine, diltiazem and benidipine), nitrates and nicorandil. Prazosin was also unsuccessful in preventing the attacks. But denopamine, an adrenergic beta-1 agonist, abolished anginal attacks completely. After a month of attack-free period under denopamine treatment, intracoronary injection of 1 mug noradrenaline (NA) dilated the coronary artery, but spasms were provoked by 5 mug NA. These findings suggest that both adrenergic alpha and beta-1 receptors play an important role in the production of spasm, and denopamine is a useful therapeutic agent for refractory vasospastic angina which is used without lowering blood pressure.

Source: EMBASE

64. Potassium channel activators in vasospastic angina.

Author(s): Lablanche JM, Bauters C, McFadden EP, Quandalle P, Bertrand ME

Citation: European Heart Journal, July 1993, vol./is. 14 Suppl B/(22-4), 0195-668X;0195-668X (1993 Jul)

Publication Date: July 1993

Abstract: Activation of potassium channels induces relaxation of vascular smooth muscle, and experimental studies have demonstrated that potassium channel activators have potent coronary vasodilator properties. In humans, nicorandil, a potassium channel blocker, causes vasodilatation not only in angiographically normal segments but also at sites of dynamic coronary stenosis, where coronary spasm has been provoked by methylergometrine as well as at sites of spontaneous spasm. The efficacy of nicorandil in relieving ergometrine-induced spasm is comparable to that of nifedipine. Oral administration of nicorandil significantly reduces the frequency of anginal episodes in patients with vasospastic angina, and either as monotherapy, or in conjunction with other agents is a novel therapeutic option in patients with vasospastic angina.

Source: MEDLINE

65. Cardiac arrest and sudden unexpected death in variant angina: complications of coronary spasm that can occur in the absence of severe organic coronary stenosis.

Author(s): MacAlpin RN

Citation: American Heart Journal, April 1993, vol./is. 125/4(1011-7), 0002-8703;0002-8703 (1993 Apr)

Publication Date: April 1993

Abstract: Experiences in 81 patients with variant angina were reviewed with the goal of determining which clinical features were associated with the greatest risk of angina-linked cardiac arrest (13 patients) or sudden unexpected death (9 patients). The risk of occurrence of one of these actually or potentially fatal events was approximately tripled by the presence of either a history of angina-linked syncope or documentation of serious arrhythmia complicating attacks. An unexpected finding was that the risk was increased
1.5-fold by the absence of high-grade organic coronary stenosis. Cardiac arrest and sudden death are important risks of variant angina, which can occur without the presence of severe organic coronary stenosis. These risks can be reduced by adequate vasodilator therapy that includes a calcium channel blocker.

Source: MEDLINE

66. Efficacy of denopamine, a beta 1 adrenoceptor agonist, in preventing coronary artery spasm.

Author(s): Shimizu H, Lee JD, Ogawa KB, Shimizu K, Yamamoto M, Hara A, Nakamura T

Citation: Japanese Circulation Journal, March 1993, vol./is. 57/3(175-82), 0047-1828;0047-1828 (1993 Mar)

Publication Date: March 1993

Abstract: The selective beta 1 adrenoceptor agonist denopamine was studied for its effectiveness in abolishing active vasospastic angina in 10 patients without obstructive coronary artery stenosis. All patients had anginal attacks at least once a day during the 3-day placebo period. Denopamine, 40 mg/day, completely abolished the attacks in 7 patients (efficacy 70%). Denopamine reduced the mean daily number of anginal attacks and nitroglycerin consumption in comparison with placebo (0.56 +/- 1.23 vs 2.20 +/- 1.27; p < 0.005 and 0.10 +/- 0.24 vs 1.60 +/- 1.93; p < 0.05, respectively). Aggravation of anginal attacks was not seen in any patient. During placebo period, anginal attacks were provoked in 6 of the 10 patients who received exercise stress test, and in 6 of the 7 patients who received the cold pressor test in combination with hyperventilation. Denopamine prevented anginal attacks induced by exercise stress tests in 4 of the 6 patients (67%) and that induced by the cold pressor test in 4 of the 6 patients (67%). There were no severe adverse effects during denopamine therapy. These results suggest that 1) denopamine is a safe and effective medication for vasospastic angina; 2) beta 1 adrenoceptors may play an important role in the prevention of coronary artery spasm.

Source: MEDLINE

67. Clinical characteristics of patients with spontaneous remission of variant angina

Author(s): Tashiro H., Shimokawa H., Koyanagi S., Takeshita A.

Citation: Japanese Circulation Journal, 1993, vol./is. 57/2(117-122), 0047-1828 (1993)

Publication Date: 1993

Abstract: To determine the factors influencing the spontaneous remission of variant angina, clinical characteristics were examined in 75 Japanese patients with variant angina. Spontaneous remission was defined as an absence of angina at rest for at least 3 months after withdrawal of treatment with calcium antagonists. This remission occurred in 12 patients (16%) (remission group), while angina persisted despite treatment with calcium antagonists and nitrates in 33 patients (44%) (persistent angina group). The remaining 30 patients (40%) were angina-free under treatment with calcium antagonists and/or nitrates (angina free on treatment group). The prevalence of significant coronary artery stenosis (>75%) was significantly higher in the remission group than in the persistent angina group (44% vs 7%, p < 0.05). The prevalence of cessation of smoking was significantly higher in the remission group than in the persistent angina group (92% vs 39%, p < 0.01). Age, gender, other coronary risk factors, disease activity of variant angina and site of myocardial ischemia during anginal attacks were not statistically different among the 3 groups. There data indicate that remission of variant angina occurs more frequently in patients with than in those without significant coronary artery stenosis and that cessation of smoking is an important factor for remission of variant angina.

Source: EMBASE

68. Effect of nisoldipine on variant angina: Assessment by 24-hour Holter monitoring

Author(s): Morimoto S.-I., Mizuno Y., Hirasawa K., Hosoda S., Hiramori K., Haze K., Hayasaki K., Hirosawa K.
**Abstract:** Nisoldipine, a newly developed coronary vasodilating agent, was administered to 12 patients with variant angina to assess its efficacy in this condition. A placebo was administered during an observation period of >= 2 days, after which nisoldipine 10 mg/day was administered as a single daily dose during a 3- to 4-day treatment period. The number of angina attacks significantly decreased from 5.4 +/- 1.4 times/day/patient during the observation period to 1.1 +/- 0.4 times/day/patient during the treatment period (P < 0.05). On 24-hour Holter monitoring, the number of ST segment deviations in the total group decreased from 91 times/day during the observation period to 19 times/day during the treatment period, and ST segment deviations were no longer observed in 7 of the 12 patients. The number of ST segment elevations also significantly decreased from 6.5 +/- 1.7 times/day/patient to 1.5 +/- 0.9 times/day/patient (P < 0.01). Side effects were limited to epigastric discomfort and lower leg numbness in one patient. These results suggest that once-daily administration of nisoldipine 10 mg is of benefit in the treatment of variant angina.

**Source:** EMBASE

69. The anesthetic management for a hypertrophic obstructive cardiomyopathy with variant angina

**Author(s):** Shimizu Y., Miyamoto Y., Hayashi M.

**Citation:** Hokuriku Journal of Anesthesiology, 1992, vol./is. 26/1(63-66), 0367-5947 (1992)

**Publication Date:** 1992

**Source:** EMBASE

70. Magnesium content of erythrocytes in patients with vasospastic angina

**Author(s):** Tanabe K, Noda K, Mikawa T, Murayama M, Sugai J

**Citation:** Cardiovascular Drugs & Therapy, August 1991, vol./is. 5/4(677-80), 0920-3206;0920-3206 (1991 Aug)

**Publication Date:** August 1991

**Abstract:** The possibility that a magnesium deficiency might be the underlying cause of vasospastic angina (VA) and the efficacy of Mg administration in its treatment were studied. Subjects included 15 patients with VA and 18 healthy subjects as the control group. The erythrocyte Mg content was measured by atomic absorption, and serum Mg was measured by conventional chemical assay. The efficacy of Mg administration was studied in seven patients with VA. The results were as follows: a) The mean erythrocyte Mg content was less in the group with frequent episodes of angina (1.59 +/- 0.11 mg/dl) than in the group without angina (2.11 +/- 0.38 mg/dl, p less than 0.01) and in the control group (2.22 +/- 0.29 mg/dl, p less than 0.01). There was no significant difference between the control group and patients of each group with respect to serum Mg. b) Coronary arterial spasm was induced by ergonovine maleate in seven patients and was completely inhibited by the administration of Mg sulfate (40-80 mEq, hourly) in six of these patients; in the remaining patient neither obvious ST change nor chest pain occurred. Thus, it was concluded that the measurement of erythrocyte Mg content is useful to determine how easily vasospasm might occur in VA and that the administration of Mg might be developed as a new therapy for spasm associated with a low erythrocyte Mg content.

**Source:** MEDLINE

71. The calcium antagonists in vasospastic angina

**Author(s):** Chahine RA

**Citation:** Journal of Cardiovascular Pharmacology, 1991, vol./is. 17 Suppl 1/(S40-2), 0160-2446;0160-2446 (1991)

**Publication Date:** 1991
Abstract: Coronary vasospasm is an important pathophysiologic mechanism of angina at rest. Because the calcium antagonists are potent vasodilators, they have become widely used and are now considered the treatment of choice for vasospastic angina. Practically all currently available calcium antagonists in the United States have been shown to be efficacious and safe for the therapy of vasospastic angina. However, because spontaneous remissions are common and angina attacks can frequently occur during the nighttime, considerations such as the duration of action of a given agent, the duration of treatment, and patient compliance have become important in the selection of the most appropriate therapy. Amlodipine is a long-acting dithydropyridine derivative that is suitable for use as a once-daily calcium antagonist. There is preliminary evidence that amlodipine is efficacious and well tolerated in vasospastic angina. Amlodipine, therefore, has the potential to become the preferred calcium antagonist for this condition.

Source: MEDLINE

72. Felodipine (once daily) versus nifedipine (four times daily) for Prinzmetal's angina pectoris

Author(s): Ardissino D., Savonitto S., Mussini A., Zanini P., Rolla A., Barberis P., Sardina M., Specchia G.

Citation: American Journal of Cardiology, 1991, vol./is. 68/17(1587-1592), 0002-9149 (1991)

Publication Date: 1991

Abstract: In 30 consecutive patients with Prinzmetal's angina pectoris, the antiischemic effect of felodipine, a new long-acting vasoselective calcium antagonist, administered at doses of 10 and 20 mg once daily was compared with that of the well-established therapeutic regimen with nifedipine administered at a dose of 20 mg 4 times daily. Twenty-four-hour Holter monitoring was performed during a 2-day placebo run-in and at the end of each of 3 consecutive 6-day periods during which the 3 active treatments were administered in randomized sequence. Three patients withdrew, whereas 27 completed the study. The therapeutic regimens tested proved to be similarly effective; primary end points (ischemic episodes recorded by Holter monitoring, and anginal attacks reported on diary cards) occurred in 5 patients (19%) during nifedipine treatment, and in 7 (26%) and 3 (11%) during felodipine treatment with 10 and 20 mg, respectively (p = not significant). The distribution of residual ischemic episodes demonstrated that treatment with felodipine once daily provides 24-hour antiischemic protection. Twenty-six patients were followed up with 20 mg of felodipine once daily for a mean of 6 +/- 5 months, and 21 of them (81%) remained free of symptoms and Holter-recorded ischemic attacks. It is concluded that for Prinzmetal's angina pectoris, 24-hour antiischemic protection may be achieved with administration of felodipine once daily. The availability of a simplified therapeutic approach may constitute a real advantage in terms of patient compliance and improving the quality of life.

Source: EMBASE

73. A new strategy for the reduction of acute myocardial infarction in variant angina

Author(s): Kishida H., Tada Y., Tetsuoh Y., Yamazaki Y., Saito T., Fukuma N., Hata N., Yasutake M., Hayakawa H.

Citation: American Heart Journal, 1991, vol./is. 122/6(1554-1561), 0002-8703 (1991)

Publication Date: 1991

Abstract: To study the effects of stepwise early treatment in variant angina pectoris, frequencies of cardiac events and complications were examined after three different types of treatment. The subjects of the study consisted of 159 consecutive patients with variant angina pectoris, who were in need of hospitalization. The three treatment modalities were the introduction of calcium antagonists, nicorandil and nitroglycerin infusion, and percutaneous transluminal coronary angioplasty (PTCA), respectively. The cardiac event rate for this series of patients was 16% (25 of 159). The cumulative cardiac event rate was 22% at 1 year and 23% at 3 years in the first treatment period; 11% at the same intervals in the second treatment period; and 6% at the same intervals in the third treatment period.
Our results suggest that it is important in the treatment of variant angina pectoris not only to prevent anginal attacks by the use of fast-acting coronary vasodilators, but also to initiate early revascularization.

Source: EMBASE

74. Efficacy of slow-release nifedipine on myocardial ischemic episodes in variant angina pectoris

Author(s): Morikami Y., Yasue H.

Citation: American Journal of Cardiology, 1991, vol./is. 68/6(580-584), 0002-9149 (1991)

Publication Date: 1991

Abstract: To evaluate the efficacy of slow-release nifedipine (a single dose of 20 mg given at 10 P.M. or 2 doses of 20 mg at 10 P.M. and 6 A.M.) on ischemic episodes in patients with variant angina, a single-blind crossover study with ambulatory electrocardiographic monitoring was performed in 15 patients (13 men and 2 women, mean age 63 years). In all, there were 646 ischemic episodes detected with ambulatory electrocardiographic monitoring during the study period, and 618 episodes of them occurred during placebo periods with a circadian variation. Sixty-nine percent of the episodes in placebo periods were asymptomatic. The number of anginal attacks, nitroglycerin tablets taken, ST-segment elevation and the total ischemic duration significantly decreased during nifedipine therapy compared with results after the placebo therapy period, respectively (p < 0.01 or 0.05). Twenty-eight ischemic episodes occurred during nifedipine therapy when the plasma level of nifedipine was low. Thus, asymptomatic ischemic episodes more frequently occur than symptomatic episodes and the administration of slow-release nifedipine is highly effective in suppressing not only symptomatic but also asymptomatic myocardial ischemia in patients with variant angina. The timing of the administration of slow-release nifedipine is an important factor in suppressing ischemic episodes.

Source: EMBASE

75. Refractory variant angina relieved by denopamine. A case report


Citation: Japanese Circulation Journal, 1991, vol./is. 55/7(692-694), 0047-1828 (1991)

Publication Date: 1991

Abstract: A 48-year-old man with severe variant angina refractory to conventional treatment with calcium antagonists and nitrates, or prazosin, or trihexyphenidyl hydrochloride, became symptom free rapidly when treated with denopamine, a adrenergic beta-1 agonist. Denopamine may prove to be an additional therapeutic agent in the management of severe variant angina. Therefore the response to denopamine and the lack of response to prazosin in this patient suggests that not only the adrenergic alpha receptor but also the adrenergic beta-1 receptor plays an important role in the production of coronary spasm, at least in some patients.

Source: EMBASE

76. Gallopamil infusion for treatment of Prinzmetal angina [Italian] Il gallopamil in infusione nel trattamento dell'angina di Prinzmetal

Author(s): Carlon R., Cappelletti F., Ometto R., Maiolino P., Vincenzi M.

Citation: Cardiologia (Rome, Italy), May 1990, vol./is. 35/5(407-414), 0393-1978 (May 1990)

Publication Date: May 1990

Abstract: The efficacy of a new calcium channel blocker, gallopamil, has been tested via a single blind, self-controlled versus placebo protocol in 9 consecutive patients admitted to our Coronary Care Unit because of repeated daily attacks of Prinzmetal variant angina. Exclusion criteria were age (greater than 65 years) bradycardia (less than 50 beats/min), recent myocardial infarction, heart failure, sinoatrial or atrioventricular block. After a 24 hours run-in period on saline drip, gallopamil was administered as 0.03 mg/kg bolus
followed by continuous infusion at 0.02 mg/kg/h for the first 24 hours and 0.03 mg/kg/h for the last 48 hours. Treatment was then stopped and the patients were again kept on saline infusion for the next 30 hours. Holter monitoring was recorded during run-in, on third day of treatment and 6 hours after gallopamil withdrawal. Anginal attacks were significantly reduced in number by therapy (-63%, -91%, -84% in the 3 days of treatment). Holter monitoring during gallopamil infusion showed a statistically significant reduction in silent (-98%) and symptomatic (-93%) ischemic episodes (IE). During the last 24 hours of the washout period we observed a statistically significant increase in silent ischemic episodes. While no transient ST segment elevation was recorded in 3 patients, in 1 patient symptomatic IE were increased of 150% with respect to the run-in period. On the whole we observed complete suppression of IE in 7 patients (78%) at the third day of treatment with gallopamil. In 2 patients (22%) a greater than 75% reduction was observed.

Source: EMBASE

77. A case of variant angina. Provocative testing with acetylcholine to evaluate the efficacy of treatment with nifedipine


Citation: Japanese Archives of Internal Medicine, 1990, vol./is. 37/6(151-155), 0021-4809 (1990)

Publication Date: 1990

Source: EMBASE

78. Randomized double-blind comparison of isosorbide dinitrate and nifedipine in variant angina pectoris

Author(s): Aschermann M., Bultas J., Karetova D., Kolbel F., Kozakova M., Simper D.

Citation: American Journal of Cardiology, 1990, vol./is. 65/21(46J-49J), 0002-9149 (1990)

Publication Date: 1990

Abstract: The antianginal and anti-ischemic effect of isosorbide dinitrate (ISDN), 120 mg once daily, and nifedipine, 20 mg twice daily, both in slow-release formulations, were compared in 17 patients with variant angina pectoris in a randomized, double-blind trial. The design included a placebo run-in period and two 6-week crossover periods of active treatment. Mean frequency of angina decreased significantly from 43 attacks per week during the placebo period to 4 per week with ISDN and 8 with nifedipine (p <0.001). Sublingual nitroglycerin consumption decreased significantly from 37 tablets per week with placebo to 3 tablets per week with ISDN and 7 with nifedipine (p <0.001). Both drugs reduced the silent and symptomatic ST-segment deviations on ambulatory electrocardiographic recording and increased maximal exercise tolerance. Episodes of coronary spasm could be provoked, by hyperventilation, in all patients during the placebo phase but in no patient during therapy with either active drug. Thus, both ISDN and nifedipine, in their slow-release formulations, are effective in the treatment of variant angina pectoris

Source: EMBASE

79. Magnesium deficiency detected by intravenous loading test in variant angina pectoris

Author(s): Goto K., Yasue H., Okumura K., Matsuyama K., Kugiyama K., Miyagi H., Higashi T.

Citation: American Journal of Cardiology, 1990, vol./is. 65/11(709-712), 0002-9149 (1990)

Publication Date: 1990

Abstract: To study whether magnesium (Mg) deficiency is present in patients with variant angina, 24-hour Mg retention of low dose Mg (0.2 mEq/kg lean body weight) administered intravenously over 4 hours in 20 patients with variant angina was examined. No patient had received calcium antagonists before or during the study. All had attacks of chest pain
associated with ST elevation on electrocardiograms. Twenty-one subjects without ischemic heart disease were studied as control subjects. Ten patients with variant angina were restudied 10 to 529 days (mean 235 +/- 30) after the treatment with calcium antagonists (diltiazem 120 to 240 or nifedipine 40 to 80 mg/day), which resulted in complete suppression of anginal attacks. The mean serum Mg concentrations in the patients with variant angina and the control subjects were 2.1 +/- 0.05 and 2.1 +/- 0.03 mg/dl, respectively (difference not significant). However, 24-hour Mg retention in the patients with variant angina was 60 +/- 5%, while that in the control subjects was 36 +/- 3% (p < 0.001), suggesting that Mg deficiency is present in at least some patients with variant angina. The mean serum Mg concentrations before and after calcium antagonist treatment in 10 patients with variant angina were 2.1 +/- 0.09 and 2.1 +/- 0.07 mg/dl, respectively (difference not significant). However, 24-hour Mg retention decreased significantly (p < 0.01) from 60 +/- 6 to 34 +/- 7% after the treatment. There is Mg deficiency in many patients with variant angina and it is corrected after treatment with calcium antagonists.

Source: EMBASE


Citation: Revista portuguesa de cardiologia : orgao oficial da Sociedade Portuguesa de Cardiologia = Portuguese journal of cardiology : an official journal of the Portuguese Society of Cardiology, November 1989, vol./is. 8/11(785-790), 0870-2551 (Nov 1989)

Publication Date: November 1989

Abstract: A case of a male 66 years-old patient who presented with a clinical picture of Prinzmetal's variant angina early in the evolution of an acute myocardial infarction is reported. Transient elevation of ST-segment was documented on Holter monitoring in association with angina at rest as well as asymptomatic episodes of ST-segment changes. Significant two-vessels obstructive lesions (left anterior descending and circumflex arteries) was present. As variant angina had several recurrences in spite of medical therapy with nitrates and calcium antagonists, the patient was submitted to coronary by-pass surgery associated to plexectomy. A Thallium myocardial scintigraphy suggests that a peroperative infarction had occurred. The patient was asymptomatic at six months follow-up.

Source: EMBASE

81. Comparison of isosorbide dinitrate and nifedipine in the treatment of variant angina pectoris. Randomized study [Czech] Srovnani isosorbid dinitratu a nifedipinu v lecbe variantni anginy pectoris. Randomizovana studie

Author(s): Aschermann M., Bultas J., Karetova D., Kolbel F., Simper D., Kozakova M.

Citation: Casopis lekaru ceskych, September 1989, vol./is. 128/37(1178-1181), 0008-7335 (8 Sep 1989)

Publication Date: September 1989

Abstract: The effects of isosorbide dinitrate single dose 120 mg daily and nifedipine 20 mg twice daily were studied in 17 patients with variant angina pectoris due to coronary artery spasm. After a placebo phase the patients were randomized to treatment with either isosorbide dinitrate or nifedipine. After six weeks the patients were crossedover for another six weeks period of treatment. There was significant decrease of number of angina attacks during both treatment regimens. Using 24 hours Holter monitoring we also proved significant decrease of number of ST segment elevation or depression, either symptomatic or asymptomatic. There was increase of performed work during exercise tests after both treatment periods. The efficacy of Isoket 120 mg and Adalat Retard 2 x 20 mg daily in the treatment of patients with active variant angina pectoris was comparable in our study. 3 patients suffered untolerable headache during isosorbide dinitrate phase and had to terminate treatment after first day only.

Source: EMBASE
82. **Spastic angina** [Norwegian] **Spasmeangina**

**Author(s):** Snaprud T., Amlie J.P.

**Citation:** Tidsskrift for den Norske laegeforening, May 1989, vol./is. 109/13(1387-1390), 0029-2001 (10 May 1989)

**Publication Date:** May 1989

**Abstract:** The article reports a case of vasospastic angina. The disease is caused by a spasm in a large epicardial coronary artery which may otherwise be normal or show variable degrees of atherosclerosis. The diagnosis must be differentiated from acute myocardial infarction, unstable angina of arteriosclerotic origin and extracardial diseases. ECG may show transient elevation of the ST-segments and coronary arteriography can directly visualize the spasm during a spontaneous attack. Aggressive therapy with calcium antagonists and long-acting nitrates often has an excellent symptomatic effect and may improve the prognosis.

**Source:** EMBASE

83. **Surgical treatment of Wolff-Parkinson-White syndrome combined with variant angina pectoris**

**Author(s):** Kawasuji M., Misaki T., Mukai K., Iwa T.

**Citation:** Journal of Cardiovascular Surgery, 1989, vol./is. 30/5(735-739), 0021-9509 (1989)

**Publication Date:** 1989

**Source:** EMBASE

84. **Randomized double-blind comparison of isosorbide dinitrate and nifedipine in the treatment of variant angina pectoris**

**Author(s):** Aschermann M., Bultas J., Karetova D., Kolbel F., Simper D., Kozakova M.

**Citation:** Casopis Lekaru Ceskych, 1989, vol./is. 128/37(1178-1181), 0008-7335 (1989)

**Publication Date:** 1989

**Source:** EMBASE

85. **Combined nifedipine and diltiazem in the treatment of refractory spastic angina** [French] **ASSOCIATION DE LA NIFEDIPINE ET DU DILTIAZEM DANS LE TRAITEMENT DE L’ANGOR SPASTIQUE REFRACTAIRE**

**Author(s):** Bory M., Joly P., Bonnet J.L., Coutelen N.

**Citation:** Archives des Maladies du Coeur et des Vaisseaux, 1989, vol./is. 82/4(581-584) (1989)

**Publication Date:** 1989

**Abstract:** Both diltiazem (D) and nifedipine (N) have been shown to be effective in the treatment of spastic angina, but they sometimes prove inadequate, even in high doses. These two drugs have been given in combination on the grounds of a possible synergistic action, but the results obtained were limited by side-effects. We decided to administer the combined treatment in half doses to patients with spastic angina and normal coronary vessels in order to assess its effectiveness and acceptance. The trial was conducted on 13 patients: 11 men and 2 women aged from 37 to 71 years (mean 53 years) with normal or subnormal coronary arteriography. In the absence of any treatment, these patients responded to the ergonovine test by a coronary spasm which we were subsequently unable to prevent with either D or N. Each patient underwent, at the same hours, 4 ergonovine tests, the product being injected intravenously every 3 minutes in incremental doses of 1, 2, 3 and 6 mug/kg. These tests were performed without treatment, after 3 days of treatments with D alone (360 mg/kg), after 3 days of treatment with N alone (60 mg/kg) and after 3 days of treatment with D (180 mg/kg) plus N (30 mg/kg). Without treatment, ergonovine triggered the coronary spasm in all 13 patients at a mean threshold dose of 2.7 mug/kg. Under treatment with D or N given separately, no test became negative, but the
threshold doses of ergonovine rose to 4.5 and 4.6 mug/kg respectively (p < 0.01). With the D + N combination, 8 tests became negative with a mean threshold dose of 6 mug/kg, and 5 tests remained positive with a mean threshold dose of 5.2 mug/kg, significantly higher than previously (p < 0.02). After a follow-up period of 23 months on average, among the 8 patients whose ergonovine test had initially been made negative by the D + N combination, 5 remain asymptomatic, 2 are improved and 1 still is considerably impaired. Three of these 8 patients developed side-effects which required withdrawal of treatment in one of them. We conclude that in diltiazem-nifedipine combination is more effective against spastic angina than the two drugs administered separately in doses twice as high.

**Source:** EMBASE

86. Calcium antagonists in the treatment of Prinzmetal's angina and unstable angina pectoris

**Author(s):** Beller G.A.

**Citation:** Circulation, 1989, vol./is. 80/6 SUPPL.(IV-78-IV-87), 0009-7322 (1989)

**Publication Date:** 1989

**Abstract:** Calcium antagonists block the entry of calcium into vascular smooth muscle cells, producing pharmacological vasodilation. Thus, it is not surprising that these drugs are effective in treating unstable angina that is often characterized by increased vasomotion and dynamic obstruction at the site of atheromatous plaques. Nifedipine, diltiazem, and verapamil are all highly and equally effective in reducing painful and painless ischemia episodes in Prinzmetal's variant angina. In patients with unstable angina who have known or suspected significant underlying coronary artery disease, a multipharmacological approach to therapy is warranted. Nifedipine used with beta-blocker drugs is more effective than nifedipine as monotherapy. Diltiazem and verapamil have been shown to be effective when given without beta-blockers in unstable angina patients. In many patients, thrombus formation rather than vasospasm is the major pathophysiological event resulting in progression of the syndrome to infarction or sudden death. In these patients, antiplatelet, antithrombotic, or antiplatelet and antithrombotic therapy is of utmost importance to maintain adequate coronary flow. Nonresponders to medical therapy with unstable angina have a high prevalence of eccentric and multiple coronary stenoses with a high incidence of thrombi. The best responders to calcium antagonist therapy are patients with concentric coronary stenoses. In summary, calcium antagonists are highly effective in reducing ischemic episodes in patients with Prinzmetal's angina and effective for therapy for unstable angina when used in conjunction with other forms of medical treatment aimed at the processes of platelet activation and thrombus formation.

**Source:** EMBASE

**Full Text:**

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87. Early evolution of symptoms and long-term prognosis in variant angina: importance of the functional component of coronary arterial disease.

**Author(s):** MacAlpin RN

**Citation:** American Journal of Medicine, July 1988, vol./is. 85/1(19-28), 0002-9343;0002-9343 (1988 Jul)

**Publication Date:** July 1988

**Abstract:** PURPOSE: Most investigations describing the long-term outcome of large groups of patients with variant angina pectoris have focused on such endpoints as myocardial infarction, coronary artery surgery, and death, and have asked how the risk of these events is related to the severity of existing organic coronary disease. It is also possible to ask what is the relative importance of organic and functional components in causation of symptoms and outcomes, as was done in this study.PATIENTS AND METHODS: The early and long-term clinical course was observed in a group of 80 patients with variant angina and a low prevalence of severe organic coronary disease (diameter stenosis greater than 70 percent of one vessel in 28.3 percent, of two or more vessels in
2.7 percent). Patients were seen at the UCLA Medical Center between July 1963 and June 1985. RESULTS: The following observations were made: Compared with those experiencing a first episode of angina at rest, subjects whose first episode of vasospastic angina occurred during strenuous effort were more likely subsequently to have a positive exercise test result and a more stable but long-term anginal course. A good initial response to vasodilator therapy indicated a likelihood of being alive and symptom-free without an intervening myocardial infarction by five years after diagnosis, which was twice the rate as if initial response to such treatment was poor. The presence or absence of severe coronary artery obstruction as detected by angiography could not be predicted from the nature or severity of angina, the historical presence of effort angina, or the occurrence of a positive result on an exercise test. The existence of severe coronary stenosis in at least one vessel was not associated with an increased incidence of myocardial infarction, cardiac arrest, or death in the first nine years after diagnosis. CONCLUSION: These findings are consistent with the hypothesis that manifestations of ischemic heart disease in these patients were more directly caused by coronary vasospasm than by the degree of organic coronary obstruction seen by coronary arteriography. In addition, the presence of severe organic stenosis in one coronary artery did not appear to be associated with measurably increased adverse effects on clinical course or survival over the first nine years after diagnosis.

Source: MEDLINE

88. Effect of a new calcium antagonist, nilvadipine, on variant angina pectoris evaluated by 24-hour Holter electrocardiography

Author(s): Kishida H., Toyama S., Yanaga T., Suzuki K.

Citation: Japanese Heart Journal, 1988, vol./is. 29/6(781-793), 0021-4868 (1988)

Publication Date: 1988

Abstract: The clinical effect of nilvadipine, a new calcium antagonist, was investigated in a single blind trial in 19 patients with variant angina pectoris. The efficacy of the drug was evaluated on the basis of frequency of anginal attacks and Holter electrocardiographic findings during observation periods and during two treatment periods when the drug was given in doses of 4 mg twice a day or 4 mg 3 times a day. The frequency of anginal attacks and the consumption of sublingual nitroglycerin tablets decreased significantly in both treatment periods in comparison with those in the observation period before treatment, but in the observation period after treatment tended to increase in comparison with those during the second treatment period. The frequency and duration of ST-segment elevation and the maximum ST-segment elevation confirmed by Holter electrocardiography also improved significantly in both treatment periods, compared with those in the observation period before treatment. Our findings show that nilvadipine is effective for variant angina pectoris at doses of 4 mg twice a day.

Source: EMBASE

89. Prinzmetal's angina during cyclophosphamide therapy

Author(s): Stefenelli T., Zielinski C.C., Mayr H., Scoheithauer W.

Citation: European Heart Journal, 1988, vol./is. 9/10(1155-1157), 0195-668X (1988)

Publication Date: 1988

Abstract: The first case of cyclophosphamide-induced myocardial ischaemia with electrocardiographically documented ST-segment elevation, T-wave inversion, arrhythmias, angina pectoris and cardiac decompensation is reported. The data suggest that cyclophosphamides induces myocardial ischaemia by eliciting coronary artery spasm.

Source: EMBASE

90. Refractory variant angina relieved by guanethidine and clonidine

Author(s): Frenneaux M., Kaski J.C., Brown M., Maseri A.

Citation: American Journal of Cardiology, 1988, vol./is. 62/10 PART I(832-833), 0002-9149 (1988)

Publication Date: 1988
Abstract: Coronary spasm may be provoked by a variety of physiologic and pharmacologic stimuli but specific receptor blockade has not been consistently shown to prevent attacks. Most patients with variant angina respond well to treatment with calcium antagonists and nitrates. A small proportion of patients, however, are refractory to this therapy to the extent that some have had cardiac denervation and even autotransplantation. We report the case of a patient with a 7-year history of variant angina who became refractory to extremely high doses of calcium antagonists and nitrates. The repeated addition of guanethidine or clonidine was consistently effective in abolishing both symptoms and objective evidence of myocardial ischemia in this patient.

Source: EMBASE

91. The contribution of ventricular tachyarrhythmias to the genesis of cardiac pain during transient myocardial ischaemia in patients with variant angina

Author(s): Biagini A., Emdin M., Michelassi C., Mazzei M.G., Carpeggiani C., Testa R., Andreotti F., L’Abbate A.

Citation: European Heart Journal, 1988, vol./is. 9/5(484-488), 0195-668X (1988)

Publication Date: 1988

Abstract: The 24-h ambulatory electrocardiograms of 15 patients with both variant angina and ischaemia-related arrhythmias were analyzed to correlate cardiac pain with the following variables: site, type, duration and magnitude of ischaemic attacks during the 24-h. Apart from sublingual nitrate therapy, Holter monitoring was performed in the Coronary Care Unit (CCU), in the drugfree state in all patients. During a total of 79 days of monitoring, patients had 1385 ischaemic episodes, of which only 30% were painful. The site of ischaemia did not predict the occurrence of pain. Pain was more frequently associated with ST-segment elevation, longer ischaemic duration, increased time to peak ECG change, and greater ST-segment shift and arrhythmias. When the 259 attacks in association with ventricular arrhythmias were compared to the arrhythmia-free episodes, they were more frequently painful the same duration and magnitude of ECG ischaemic changes. Furthermore, the complexity of arrhythmias increased the probability of cardiac pain. Most ischaemic episodes occurred at night and a decrease in the frequency of painful episodes (apart from those associated with arrhythmias) was apparent. Thus, in addition to electrocardiographic severity and duration of ischaemia, the presence of ventricular arrhythmias and the time of occurrence seem to influence pain perception during ischaemia.

Source: EMBASE

92. Long-term prognosis of medically treated patients with vasospastic angina and no fixed significant coronary atherosclerosis

Author(s): Scholl J.-M., Veau P., Benacerraf A., Brau J., Hennetier G., Achard F.

Citation: American Heart Journal, 1988, vol./is. 115/3(559-564), 0002-8703 (1988)

Publication Date: 1988

Abstract: The clinical course of 48 consecutive patients with vasospastic angina and minor coronary atherosclerosis (no stenoses >50%) was analyzed during an average follow-up period of 47 months. The study group consisted of 37 men and 11 women. Patients were treated with usual doses of calcium antagonists. One patient died (2%) and three had myocardial infarctions (6%). Seventy-one percent were asymptomatic or had infrequent angina; 13% had recurrences but had periods of remission lasting at least 10 months. Only 16% had persistent angina. None of the clinical or angiographic findings at the time of diagnosis were predictive of myocardial infarction or death, and they could not separate angina-free patients from those with recurrences. Thus, vasospastic angina without fixed coronary narrowing has a good prognosis despite the possibility of recurrences. However, there is a slight risk of myocardial infarction and death. This fact should be considered if there are plans to discontinue treatment.

Source: EMBASE

93. Clinical aspects, diagnosis, therapy and course of unstable angina pectoris
Abstract: It is reported on 27 patients aged 32-77 years with an unstable angina pectoris, including coronary spasm. All patients showed an anamnesis of less than 3 months, nearly the half of less than 24 hours. The resting electrocardiogram during the attack was pathological in 22 patients, 7 patients showed a Prinzmetal reaction and 11 patients showed intermittent ventricular dysrhythmias. The exercise electrocardiogram in the stable phase was pathological in 16 of 17 patients. Of 23 patients who underwent a selective coronary angiography with laevocardiography 9 patients each showed a disease of one vessel and three vessels, respectively, and 5 patients a disease of two vessels. Only nearly 50% of the patients could be stabilized medicamentously (nitrates, calcium antagonists, rarely beta-blockers). In three patients still during the unstable phase a surgical revascularization was carried out, in 11 patients after stabilization. Five patients suffered an early infarction; one of them died. Altogether, the unstable angina pectoris is even nowadays to be regarded as a clinical picture with a relatively bad prognosis, which demands rapid action.

Source: EMBASE

94. Calcium channel blockers cannot prevent pure vasospastic myocardial infarction.

Abstract: Coronary artery spasm is a recognized cause of myocardial infarction. This report describes a case of myocardial infarction attributed to pure coronary spasm which was halted by a double perfusion with streptokinase and nitroglycerin. Further coronary artery spasm leading to a myocardial infarction could not be avoided several weeks later, although the patient was left on calcium channel blocker therapy. The two attacks were not preceded by warning angina pectoris, contrary to accepted belief. The best objective of end-point drug therapy and its assessment in vasospastic angina are discussed.

Source: MEDLINE

95. Calcium antagonists for Prinzmetal's variant angina, unstable angina and silent myocardial ischemia: therapeutic tool and probe for identification of pathophysiologic mechanisms.

Abstract: The calcium antagonists provide a unique tool to reduce myocardial oxygen demand and prevent increases in coronary vasomotor tone. For patients with Prinzmetal's variant angina, diltiazem, nifedipine and verapamil are extremely effective in preventing episodes of coronary vasospasm and symptoms of ischemia. Unstable angina pectoris is a more complex pathophysiologic syndrome with episodes of ischemia due to increases in coronary vasomotor tone, intermittent platelet aggregation or alterations in the underlying
atherosclerotic plaque. Each of the calcium antagonists is effective as monotherapy in decreasing the frequency of angina at rest. Nifedipine is the only calcium antagonist that has been studied in a combination regimen with beta blockers and nitrates for patients with unstable angina, and control of angina is better with the combination regimen than with either form of therapy alone. Although symptoms of myocardial ischemia in unstable angina are reduced by calcium antagonists, these agents do not seem to decrease the incidence of adverse outcomes. Antiplatelet therapy appears to improve morbidity and mortality in patients with unstable angina, suggesting that thrombus formation may play a central role in that disorder. Episodes of silent or asymptomatic myocardial ischemia, identified by ST-segment monitoring, occur in a variety of disorders of coronary disease. Among patients with Prinzmetal's variant angina and unstable angina, episodes of silent ischemia appear to be as frequent as episodes of angina and the calcium antagonists are effective in decreasing episodes of ischemia regardless of the presence or absence of symptoms. Persisting episodes of silent ischemia among patients with unstable angina despite maximal medical therapy identify patients at high risk for an early unfavorable outcome. Among patients with stable exertional angina, episodes of silent ischemia may be up to 5 times as frequent as episodes of angina, and may be due to increases in coronary vasomotor tone, transient platelet aggregation or increases in myocardial oxygen demand. Preliminary experience suggests that calcium antagonists and beta blockers are effective in decreasing episodes of silent ischemia in patients with stable exertional angina and that a combination regimen may be more effective than either form of therapy alone.

Source: MEDLINE

96. Long-term prognosis of vasospastic angina without significant atherosclerotic coronary artery disease

Author(s): Egashira K., Kikuchi Y., Sagara T., Sugihara M., Nakamura M.

Citation: Japanese Heart Journal, 1987, vol/is. 28/6(841-849), 0021-4868 (1987)

Publication Date: 1987

Abstract: Long-term prognosis of 90 patients with vasospastic angina without significant coronary artery disease (less than 50% reduction in luminal diameter) was examined for a mean follow-up period of 4 years. All patients had episodes of angina at rest and were treated with calcium antagonists. One patient developed myocardial infarction and 2 died suddenly during the follow-up period. In the patient with myocardial infarction, there was an abrupt worsening of angina prior to the infarction despite therapy with a calcium antagonist. One of the sudden death patients discontinued his calcium antagonist before his death. Of the sudden death patients, one had ventricular tachycardia and the other had a complete atrioventricular block during an anginal attack. The incidence of such serious arrhythmias was higher (p <0.01) in sudden death patients (2/2) than that in survivors (6/88). The treatment with calcium antagonists reduced the severity and frequency of angina in all patients. These results suggest that long-term prognosis of vasospastic angina without significant coronary artery disease is good as characterized by the low incidence of myocardial infarction and death and the favorable response to treatment with calcium antagonists.

Source: EMBASE

97. The post-ischemic ventricular dysfunction in PRINZMETAL's variant angina: Radionuclide evaluation

Author(s): Picozzi R., Baroffio R., Palagi B.

Citation: NUC Compact, 1987, vol/is. 18/5(238-242), 0344-3752 (1987)

Publication Date: 1987

Abstract: We studied by equilibrium radionuclide angiography 15 patients admitted to our coronary care unit because of PRINZMETAL's variant angina. Patients were examined mostly in the absence of symptoms. The incidence of Ejection Fraction abnormabilities was low, while Regional Wall Motion was always impaired at the site corresponding to ST-segment elevation at the time of the anginal attack. In 7 patients who underwent coronary angiography, we found an almost complete agreement between the site of atherosclerotic lesions and that of Regional Wall Motion abnormalities. The patients were re-studied during
intravenous perfusion of nitroglycerin: a detectable improvement of Regional Wall Motion was found in 8 of them. We concluded that equilibrium radionuclide angiography appears to be a suitable tool for identifying reliably, in patients affected with PRINZMETAL's variant angina, the regional ventricular dysfunction remaining after the remission of symptoms in the presence of normalized ECG or signs of non-transmural ischemia. Equilibrium radionuclide angiography performed during nitroglycerin perfusion allowed us to evaluate in advance the importance of the vasospastic component and hence the efficacy of pharmacologic treatment.

Source: EMBASE

98. Long-term prognosis of patients with variant angina

Author(s): Walling A., Waters D.D., Miller D.D., Roy D., Pelletier G.B., Theroux P.

Citation: Circulation, 1987, vol./is. 76/5(990-997), 0009-7322 (1987)

Publication Date: 1987

Abstract: The long-term prognosis of variant angina and the factors influencing it were assessed in 217 consecutive patients hospitalized in our coronary care unit and followed for a mean of 65 months (range 2 to 123). Cardiac death occurred in 30 patients and an additional 54 experienced a nonfatal myocardial infarction. Survival at 1 and 5 years was 95% and 89%, respectively; survival without infarction was 83% and 69%. Coronary disease and the degree of disease activity were strong predictors of survival by Cox analysis. Survival at 1 year was 99%, and that at 5 years was 95% and 94%, respectively, for patients with one-vessel disease (n = 81) and for those without stenoses of 70% or greater (n = 87). Survival at 1 and 5 years was only 87% and 77% for those with multivessel disease (n = 40). The Cox analysis selected left ventricular function, initial treatment, extent score, duration of angina at rest, and disease activity as multivariate predictors of survival without infarction. Coronary disease was a strong predictor (p < .0001) of survival without infarction by univariate analysis. Treatment with nifedipine, diltiazem, or verapamil improved survival without infarction compared with other medical treatment (p = .002). Myocardial infarction occurred most commonly soon after diagnosis in patients with a short history of angina at rest. Late coronary events were almost never preceded by resting angina.

Source: EMBASE

Full Text:

Available in fulltext at Highwire Press

Available in fulltext at Ovid

99. Findings from long-term electrocardiographic monitoring of patients with variant angina in a coronary care unit

Author(s): Carpeggiani C., Michelassi C., Biagini A.

Citation: American Journal of Cardiology, 1987, vol./is. 60/1(36-39), 0002-9149 (1987)

Publication Date: 1987

Abstract: Eleven patients with frequent episodes of variant angina underwent 24-hour electrocardiographic monitoring in a coronary care unit for a total of 70 days to assess circadian variation in ischemic episodes and its correlation with circadian heart rate (HR) rhythm. In each patient a series of 4 to 13 consecutive days, in the absence of therapy, with 8 or more ischemic episodes per day were analyzed. Harmonic regression models were fitted to the hourly number of ischemic episodes and the hourly values of HR. Out of 54 days, with 8 or more episodes per day for a total of 1,357 episodes, a circadian rhythm was observed for 34 days (64%), in at least 1 day in all patients and during the entire period of observation in only 3. Its presence was independent of the number of episodes; the peak of periodic functions occurred at 2.9 +/- 2.7 AM. A cardiac rhythm for HR was observed in 61 of the 70 days (87%), consistently in 7 patients; the nadir occurred at 2.4 +/- 1.5 AM; simultaneous cycling in HR and transient ischemia was found on 32 days. The intrapatient difference between the peak and the nadir of the ischemic and the HR function was, on average, 2.6 +/- 3.3 hours. Thus, a circadian rhythm of ischemic episodes was present in all patients, although it was not consistently present; simultaneous occurrence of
circadian variation in ischemic episodes and HR was observed only in 60% of the days with a sufficiently high number of attacks and when this occurred, a significant phase shift was observed; occasional loss of HR cycling was observed in some patients, without an apparent cause.

**Source:** EMBASE

100. **Factors influencing the clinical course and the long-term prognosis of patients with variant angina**

**Author(s):** Kishida H., Hata N., Kusama Y.

**Citation:** Japanese Heart Journal, 1987, vol./is. 28/3(293-306), 0021-4868 (1987)

**Publication Date:** 1987

**Abstract:** The purpose of this study was to clarify the factors influencing the clinical course and prognosis in variant angina. Also, the mechanism of acute myocardial infarction in variant angina is reviewed. The subjects were 110 patients with variant angina who, after the initial visit or admission, were observed for a period of at least 2 months, the average observation period being 68 +/- 49 months (range: 2 months - 16 years). The incidence of acute myocardial infarction was 21.8% of these patients and 87.5% of the infarctions occurred within 1 month of the initial visit or admission. In variant angina, the average rate over 1 year was 2.2%; however, in classical angina the rate was 3.7% and in postinfarction angina 5.0%. The mortality rate was 5.5%, with death in the majority of cases occurring within 1 month, as in myocardial infarction. When treatment was stopped, spontaneous remission occurred in at least 26 of the 110 cases (23.6%). Beyond 3 months, the remission continued in 19 of these 26 cases. Seven cases had acute myocardial infarction in spite of the suppression of anginal attacks with administration of calcium antagonists. Apparently coronary spasm is the cause of anginal attacks, and the cause of acute myocardial infarction in patients with variant angina appears to be coronary thrombus formation.

**Source:** EMBASE

101. **Pheochromocytoma presenting with Prinzmetal's angina.**

**Author(s):** Goldbaum TS, Henochowicz S, Mustafa M, Blunda M, Lindsay J Jr

**Citation:** American Journal of Medicine, November 1986, vol./is. 81/5(921-2), 0002-9343;0002-9343 (1986 Nov)

**Publication Date:** November 1986

**Abstract:** A patient with a pheochromocytoma presented with profound hypertension and the clinical syndrome of coronary artery spasm after the initiation of beta blockade therapy. It is postulated that intense unopposed alpha receptor stimulation can precipitate coronary artery spasm in susceptible persons with this tumor.

**Source:** MEDLINE

102. **Usefulness and limitations of the ergonovine maleate test in the evaluation of calcium-antagonist therapy in Prinzmetal variant angina [Italian] Utilita e limiti del test con ergonovina maleato nella valutazione della terapia calcio-antagonista nell'angina variante di Prinzmetal**

**Author(s):** Previtali M., Salerno J.A., Panciroli C., Moizi M., Chimienti M., Montemartini C., Bobba P.

**Citation:** Giornale italiano di cardiologia, October 1986, vol./is. 16/10(863-871), 0046-5968 (Oct 1986)

**Publication Date:** October 1986

**Abstract:** Ergonovine testing was carried out in a selected group of 25 patients with Prinzmetal's variant angina treated with calcium-antagonists in order to: define its usefulness in the evaluation of the short-term effectiveness of calcium-antagonist treatment; compare the results of the test with those of Holter monitoring; verify if the results of the test during the acute phase are correlated with the long-term response to treatment. In all patients a control period lasting 2-6 days was carried out, after which a
treatment period with calcium-antagonists (nifedipine, diltiazem, verapamil), lasting 2-8 days, was instituted. In 20 patients only 1 calcium-antagonist was evaluated, in 1 patient 2 calcium-antagonists and in 4 all of them. Scalar ergonovine test was carried out in control conditions and repeated during each calcium-antagonist treatment period. During both control and treatment periods all patients underwent Holter monitoring for evaluation of frequency of the spontaneous attacks. After the acute phase 21 of the 25 patients were discharged on calcium-antagonist treatment and followed-up for a mean period of 11 +/- 7 months. In control conditions ergonovine test was positive in 24 patients at a mean dose of 0.11 +/- 0.09 mg.

Source: EMBASE

103. Selective thromboxane A2 synthetase inhibition in vasospastic angina pectoris

Author(s): Yui Y., Hattori R., Takatsu Y., Kawai C.

Citation: Journal of the American College of Cardiology, January 1986, vol./is. 7/1(25-29), 0735-1097 (Jan 1986)

Publication Date: January 1986

Abstract: To investigate whether thromboxane A2 is responsible for the initiation of vasospastic angina pectoris, thromboxane B2 levels were measured in the great cardiac vein and the arterial blood of 12 patients with clinically and angiographically proved vasospastic angina and therapeutic trials were performed with selective thromboxane A2 synthetase inhibitor OKY-046, an imidazole derivative. During ergonovine-provoked (11 cases) and spontaneous (1 case) anginal attacks, great cardiac vein thromboxane B2 increased from 121 +/- 27 to 430 +/- 382 pg/ml (p less than 0.05, n = 12), arterial thromboxane B2 increased from 93 +/- 18 to 122 +/- 33 pg/ml (NS, n = 12) and thromboxane B2 production increased from 3.18 +/- 1.88 to 25.16 +/- 22.32 ng/min (p less than 0.05, n = 6). Subsequently, OKY-046, 400 mg/day orally, was administered to 7 of the 12 patients, while a continuous electrocardiogram was recorded on a dual channel Holter monitor during a 3 day placebo period and the 3 day OKY-046 regimen. Although peripheral plasma thromboxane B2 levels decreased significantly from 98 +/- 15 to 12 +/- 8 and 28 +/- 10 pg/ml (1 and 6 hours after ingestion, respectively) (p less than 0.05 for both), 6-keto-prostaglandin F1 alpha production in serum increased significantly from 0.48 +/- 0.22 to 2.3 +/- 0.72 (1 hour) and 1.8 +/- 0.46 ng/ml (6 hours) (p less than 0.05 for both) during OKY-046 administration. (ABSTRACT TRUNCATED AT 250 WORDS)

Source: EMBASE

104. The effects of medical treatment on the long-term prognosis of variant angina pectoris

Author(s): Aizawa T., Fujii J., Ogasawara K., Nishimura K., Kato K.

Citation: Journal of cardiology. Supplement, 1986, vol./is. /10(3-12), 0386-2887 (1986)

Publication Date: 1986

Abstract: To investigate the changing aspect of the long-term prognosis of patients with medically-treated variant angina, we studied 253 consecutive patients treated from January 1963 to August 1984. The patients were categorized into two groups according to the year of first admission to our hospital; 88 patients hospitalized before January 1975 and mainly treated with nitrates (group I), and 165 patients admitted thereafter and treated with calcium antagonists (group II). The average follow-up period was 63.1 months (ranged from one to 136) in the group I, and 32.4 months (ranged from one to 116) in the group II. Coronary arteriography was performed in 146 patients of the group II. In 82 patients (56%), no fixed coronary artery stenoses of greater than or equal to 75% of the luminal diameter was present; 47 patients (32%) had one-vessel disease, and 17 (12%) had multi-vessel involvement. Seventy-eight patients having both rest and effort angina showed a higher prevalence of fixed coronary artery stenoses (50 of 78 patients) compared with the patients without effort angina (14 of 68 patients) (p less than 0.001). The group II showed a significantly good long-term efficacy of medical treatment for anginal attacks (124 of 165 patients compared with 54 of 88 group I patients: p less than 0.05). Complete remission over three months or more occurred in 56% of the group II compared with 45% of the
group I. Fourteen patients (16%) of the group I suffered from myocardial infarction (10 were within six months of onset of angina); whereas, only five (3%) of the group II developed myocardial infarction (two were within six months of initial anginal attack) (p less than 0.001). Cardiac death occurred in five patients (6%) of the group I in contrast to four patients (2%) of the group II. The patients having significantly effective medical treatment for anginal attack were 80%, 62% and 64% in those without significant stenosis, with one-vessel disease, and with multi-vessel disease, respectively. Myocardial infarction occurred in two of 17 patients with multi-vessel disease. Spontaneous remission of angina over at least three years without medical treatment occurred in seven of 32 patients who were followed for more than 10 years. It was concluded that the long-term prognosis of patients with variant angina who received calcium antagonists was reasonably improved compared with patients treated with nitrates.(ABSTRACT TRUNCATED AT 400 WORDS)

Source: EMBASE

105. Abnormal heart rate control in vasospastic angina: effects of calcium antagonists.

Author(s): Sato I, Hasegawa Y, Funahashi T, Tomobuchi Y, Ohe T, Haze K, Shimomura K

Citation: International Journal of Cardiology, July 1985, vol./is. 8/3(313-25), 0167-5273;0167-5273 (1985 Jul)

Publication Date: July 1985

Abstract: We examined the effects of administration of calcium antagonists on the heart rate response to treadmill exercise in 11 patients with vasospastic angina and 8 healthy young volunteers. The exercise test was performed by walking on a treadmill at a constant speed and grade according to a scheme of pseudo-randomized sequence for 19 min. The dynamic property of heart rate response to exercise was evaluated by using a frequency analytic procedure. The exercise test was also studied in 21 age-matched normal controls without drug administration. Administration of calcium antagonists revealed no significant effects on heart rate and blood pressure at rest in young healthy subjects or in patients with vasospastic angina. Young volunteers showed the same normal properties of heart rate response to exercise before and after calcium antagonists. Vasospastic angina showed abnormal heart rate response to exercise and revealed characteristically different transfer function from that in normal controls. These characteristics were not affected by treatment with calcium antagonists except for a slight, uniform decrease of gain of the system over the whole frequency range. Accordingly, the present exercise test can feasibly be used in the diagnosis and management of vasospastic angina even when calcium antagonists are administered to the patients.

Source: MEDLINE

106. Isosorbide dinitrate and nifedipine in variant angina pectoris.

Author(s): Conti CR, Hill JA, Feldman RL, Conti JB, Pepine CJ

Citation: American Heart Journal, July 1985, vol./is. 110/1 Pt 2(251-6), 0002-8703;0002-8703 (1985 Jul)

Publication Date: July 1985

Abstract: The efficacy of isosorbide dinitrate (ISDN) in variant angina is enhanced by the addition of a calcium antagonist. A prospective double-blind, crossover trial of ISDN, 40 to 120 mg/day, and nifedipine, 40 to 120 mg/day, in 19 patients with variant angina and various degrees of coronary atherosclerosis showed that although both agents were equally effective in controlling angina of vasospastic origin, some patients responded better to one or the other drug. Such response could not be predicted by demographic factors, ECG changes, or degree of coronary atherosclerosis. Since quantitative angiography done in a similar group of patients showed that intracoronary nitroglycerin, 200 micrograms, was a more potent vasodilator than sublingual nifedipine, 10 mg (p less than 0.01), the calcium antagonists may have a different mechanism of preventing variant angina attacks and may act in an additive or synergistic fashion when administered in combination with long-acting nitrates. Such a combination will increase coronary blood flow, reduce ventricular volume and end-diastolic pressure, and reduce systemic arterial resistance. Coronary vasospasm may be directly prevented by a general inhibition of smooth muscle contraction by the
calcium antagonist. Clinical studies suggest that combination therapy significantly improves the long-term prognosis of patients with variant angina and reduces the need for bypass surgery. Thus combining ISDN with a calcium antagonist is a rational and effective treatment for variant angina.

Source: MEDLINE


Author(s): Corcos T, David PR, Bourassa MG, Val PG, Robert J, Mata LA, Waters DD

Citation: Journal of the American College of Cardiology, May 1985, vol./is. 5/5(1046-54), 0735-1097;0735-1097 (1985 May)

Publication Date: May 1985

Abstract: Among 268 patients undergoing percutaneous transluminal coronary angioplasty between February 1980 and January 1983, a total of 21 patients had variant angina, documented before angioplasty in 14 and after angioplasty in 7. Before angioplasty, all 21 patients had rest angina and 17 also had effort angina; single vessel coronary artery disease with 60 to 95% stenosis was present in all patients and the left anterior descending coronary artery was involved in all but 3 patients. Coronary angioplasty was successful in 19 patients (90%). Eight of the 19 patients remained symptom-free without coronary restenosis after successful angioplasty; in the other 11 patients, angina reappeared within 4 months, usually in association with restenosis. Of the nine patients with coronary restenosis, six had repeat angioplasty (five successful procedures and one failure), two received medical therapy and one underwent coronary bypass surgery. Patients in whom calcium channel antagonists were discontinued immediately after angioplasty had an exceedingly high coronary restenosis rate (8 [80%] of 10 successful attempts), but when calcium antagonists were continued for an average of 6 +/- 4 months after angioplasty, the restenosis rate was low (3 [21%] of 14 successful attempts). After a mean (+/- SD) follow-up period of 33 +/- 13 months, 1 patient had died and the 20 others (95%) were symptom-free; among these 20, 15 patients (75%) had been taking no antianginal drugs for more than 1 year, 2 still received calcium channel antagonists and 3 had had coronary bypass surgery. Repeat coronary arteriography performed 14 +/- 7 months after angioplasty in the 17 patients without angioplasty-related infarction or surgery showed 50% or less coronary stenosis in 13 patients. (ABSTRACT TRUNCATED AT 250 WORDS)

Source: MEDLINE

108. Failure of ketanserin, a serotonin inhibitor, to prevent spontaneous or ergonovine-induced attacks of variant angina.

Author(s): Mata-Bourcart LA, Waters DD, Bouchard A, Miller DD, Theroux P

Citation: Canadian Journal of Cardiology, May 1985, vol./is. 1/3(168-71), 0828-282X;0828-282X (1985 May-Jun)

Publication Date: May 1985

Abstract: Six patients hospitalized with active variant angina were treated for 3 days with the serotonin antagonist ketanserin after a 3 day control period on no medication. The number of variant angina episodes per patient per day was 1.52 +/- 1.42 during the control period and 2.05 +/- 2.30 during ketanserin therapy (p = NS). Ergonovine was administered in incremental doses of 0.0125 mg to 0.4 mg in the control period, during intravenous ketanserin administration and after 3 days of oral treatment. All 6 patients developed ST elevation during all 3 ergonovine tests. The ergonovine dose at which ST elevation developed was similar in each of the 3 periods. It is concluded that ketanserin is of no value in the treatment of variant angina and that both spontaneous and ergonovine-induced coronary spasm in man are unlikely to be mediated by a serotonergic mechanism.

Source: MEDLINE

109. Surgical treatment of medically refractory variant angina pectoris: Segmental coronary resection with aortocoronary bypass and plexectomy

Author(s): DiPaolo C., Kerin N.Z., Rubenfire M., Levine F.
110. Surgical treatment of variant angina with positive cold pressor test

Author(s): Amano J., Okamura T., Sunamori M., Suzuki A.

Abstract: Coronary artery spasm is provoked by exercise, cold pressor test and pharmacological agents during cardiac catheterization. We describe a patient in whom the coronary artery was excessively sensitive to cold pressor test, and who was treated by coronary artery bypass grafting (CABG) combined with cardiac denervation. Postoperative coronary arteriogram showed decreased sensitivity to cold pressor test with patent graft. These observations suggest that combined CABG with cardiac denervation is indicated for patients with fixed organic coronary artery narrowing and positive provocative test, and that postoperative cold pressor test during coronary arteriography is a useful, low risk method for the evaluation of the efficacy of cardiac plexectomy.

Source: EMBASE

111. Abnormal heart rate response to exercise in vasospastic angina: pathophysiologic mechanism in the provocation of coronary spasm.

Author(s): Sato I, Shimomura K, Hasegawa Y, Ohe T, Matsuhashi M, Kamakura S, Haze K, Nakajima K

Abstract: To examine the alteration in control function of the heart, which may account for the pathophysiologic condition precipitating coronary arterial spasm, the dynamic property of heart rate response to exercise in vasospastic angina was evaluated by using our previously developed frequency analytic procedure. We studied 21 patients with vasospastic angina, divided into two groups (active angina and inactive angina) and 12 normal control subjects. When compared with the transfer function of the heart rate control system in normal control subjects, the transfer function in patients with active vasospastic angina showed moderately lower gain, especially in the middle frequency range, and significantly delayed phase angle over the whole frequency range, especially in the middle and high frequency ranges. These abnormalities were not observed in inactive vasospastic angina. The present exercise test to detect abnormal heart rate control can feasibly be used in the detection and management of vasospastic angina.

Source: MEDLINE


Author(s): De Caterina R, Carpeggiani C, L'Abbate A

Abstract: This study was designed to test the hypothesis of a possible role of serotonin in the pathogenesis of myocardial ischemia in patients with pure vasospastic angina, since serotonin is known to cause contraction in isolated coronary arteries. This effect, as well as serotonin-induced platelet aggregation, is reversed by ketanserin, a specific S2-receptor blocker. Five male patients (49 to 68 years old) with more than six episodes/day of myocardial ischemia at rest as characterized by ST segment elevation on the electrocardiogram (ECG) were selected for the study after a 2 day run-in period of continuous ECG Holter monitoring in the absence of any therapy except that with
sublingual nitrates. In a double-blind crossover protocol they received consecutive infusions of 6 hr each of ketanserin (2 mg/hr iv, preceded by a 10 mg bolus in three patients) and placebo in the following sequence: ketanserin-placebo-ketanserin-placebo in the first and placebo-ketanserin-placebo-ketanserin in the second 24 hr period. The efficacy of the infused drug was tested by exposing platelet-rich plasma, obtained from the study patients at a fixed morning time before and during ketanserin infusions, to a series of serotonin concentrations from 10(-5) to 10(-8)M in a conventional aggregometer. A complete suppression of aggregation curves in the range of serotonin concentrations tested resulted during administration of ketanserin. The efficacy of the drug in preventing ischemic episodes was assessed by computing the ischemic episodes (recorded by Holter monitoring) and nitroglycerin consumption in each 6 hr ketanserin period and in the corresponding placebo period. A total of 171 ischemic episodes were recorded, 33 of which (19%) were symptomatic.

Source: MEDLINE

Full Text:
Available in fulltext at Highwire Press
Available in fulltext at Ovid

113. Magnesium sulfate in the treatment of variant angina

Author(s): Cohen L., Kitzes R.
Citation: Magnesium, 1984, vol./is. 3/1(46-49), 0252-1156 (1984)
Publication Date: 1984
Abstract: 41 episodes of anginal attacks were promptly terminated by a bolus of Mg sulfate administered intravenously in 15 patients with variant angina. Pretreatment with parenterally administered Mg sulfate in four of these patients prevented further attacks.
Source: EMBASE

114. Variant angina: Comparison of patients with and without fixed severe coronary artery disease

Author(s): Bott-Silverman C., Heupler Jr. F.A., Yiannikas J.
Citation: American Journal of Cardiology, 1984, vol./is. 54/10(1173-1175), 0002-9149 (1984)
Publication Date: 1984
Abstract: To determine if the clinical features of variant angina are predictive of the severity of underlying coronary artery disease, 43 patients with variant angina who had less than 50% fixed coronary luminal diameter narrowing (group 1) were compared with 65 patients with variant angina who had 70% or greater diameter narrowing (group 2). Statistically significant differences were found in 3 clinical features between group 1 and group 2; (1) a more than 3-month history of angina at rest before diagnosis (80% vs 23%, p <0.001); (2) an abnormal electrocardiogram at rest (19 vs 48%, p <0.01); and (3) an abnormal stress test (26% [8 of 30] vs 84% [15 of 18], p < 0.01). However, these features were not clinically reliable in separating patients with variant angina with and without fixed severe obstructions because of overlap between the 2 groups. No difference was found between the 2 groups in age, sex, predominant symptoms at the time of catheterization, history of exertional angina, syncope with angina, prolonged angina, previous myocardial infarction or risk factors for coronary artery disease. There was also no difference in the location of ST elevation or occurrence of major arrhythmias during angina. Thus, the patients with Prinzmetal's variant angina, those with normal or mildly abnormal coronary arteriograms cannot be differentiated reliably by clinical features from those with fixed severe coronary obstructions. Coronary arteriography should be performed to define the underlying coronary anatomy and to determine optimal therapy in patients with variant angina.
Source: EMBASE

115. Prevention of cardiovascular events in variant angina by long-term
In 43 patients with variant angina, the cardiovascular event rate during diltiazem therapy was compared with that in an equal time period before initiation of therapy. Cardiovascular events, that is, myocardial infarction, sudden death and hospitalization for prolonged angina, were decreased significantly (p less than 0.01) during the initial 6 months and mean 19.6 months of therapy. Based on the binomial principle, there were 22 events during the mean 19.6 months before therapy and 2 events during the equal time period on therapy. No patient died during follow-up. The frequency of angina was decreased by 94%. Diltiazem was well tolerated by all patients and no patient had to discontinue therapy because of adverse effects. It is concluded that long-term diltiazem therapy reduces cardiovascular events in patients with variant angina.

Source: MEDLINE


Author(s): Winniford MD, Filipchuk N, Hillis LD

Citation: Circulation, June 1983, vol./is. 67/6(1185-8), 0009-7322;0009-7322 (1983 Jun)

Publication Date: June 1983

Abstract: Recent reports have shown that beta-adrenergic blockade may exacerbate variant angina. On theoretical grounds, alpha-adrenergic blockade may be beneficial in these patients. To test this hypothesis, we assessed the efficacy of prazosin, an alpha-adrenergic blocking agent, in six men, mean age 49 years, with variant angina. Prazosin, 14.0 +/- 2.4 mg/day (mean +/- SD) in three equal doses, was compared with placebo in a double-blind, randomized, double-crossover trial lasting 4 1/2 months: 2 weeks of open-label prazosin followed by four 1-month periods of blinded alternating therapy. No other vasoactive medications were administered during the study. Prazosin reduced sitting systolic arterial pressure from 145 +/- 18 to 127 +/- 16 mm Hg (p = 0.02), but exerted no effect on diastolic arterial pressure or heart rate. Prazosin did not change the weekly number of episodes of chest pain (2.5 +/- 2.3 with placebo vs 3.1 +/- 3.0 with prazosin, NS), nitroglycerin tablets used (3.9 +/- 3.7 with placebo vs 4.6 +/- 4.2 with prazosin, NS), or transient ST-segment deviations (by calibrated two-channel Holter monitoring for 24 hours/week throughout the study) (6.5 +/- 10.1 with placebo vs 11.8 +/- 17.4 with prazosin, NS). During prazosin therapy, three patients had orthostatic dizziness and one patient had headache. Thus, in a long-term, randomized, double-blind trial, prazosin exerted no obvious beneficial effect in patients with variant angina.

Source: MEDLINE

Full Text:
Available in fulltext at Highwire Press
Available in fulltext at Ovid

117. Ergonovine provocation to assess efficacy of long-term therapy with calcium antagonists in Prinzmetal's variant angina.

Author(s): Winniford MD, Johnson SM, Mauritsen DR, Hillis LD

Citation: American Journal of Cardiology, March 1983, vol./is. 51/5(684-8), 0002-9149;0002-9149 (1983 Mar 1)

Publication Date: March 1983

Abstract: In the patient with Prinzmetal's variant angina, the response to therapy with calcium antagonists may be assessed symptomatically, electrocardiographically (that is, by ambulatory electrocardiographic monitoring), or by response to ergonovine provocation. Although some studies have suggested a good relation between anginal frequency and
ergonovine responsiveness in these patients, none has compared ambulatory electrocardiographic activity with the results of ergonovine provocation during the long-term administration of calcium antagonists. Therefore, the present study was performed to compare ergonovine responsiveness with both clinical and ambulatory electrocardiographic activity in patients with Prinzmetal's variant angina during long-term therapy with placebo, verapamil, and nifedipine. Accordingly, 27 patients with variant angina (19 men and 8 women, mean age 52 years) received placebo and verapamil for 2 months each, after which 23 of the 27 also received nifedipine for 2 months. All patients kept a diary of chest pains, and all had weekly 24-hour 2-channel ambulatory electrocardiographic (Holter) monitoring, from which episodes of transient S-T segment deviation were quantitated. During the final week of therapy with each agent, ergonovine was administered, beginning at 0.025 mg and incrementally increasing to 0.20 mg. It was discontinued when the patient had chest pain with S-T segment elevation greater than or equal to 0.1 mV or received a total dose of 0.50 mg. Of the 74 tests, 59 were negative; 6 of the negative tests occurred during a treatment period in which the patient had greater than 10 chest pains/week and greater than 25 episodes of S-T segment deviation/week. Of the 15 positive tests, 8 became positive during administration of less than 0.20 mg ergonovine; 5 of the positive tests occurred during a treatment period in which the patient had no chest pain or S-T segment deviation. Thus, in patients with variant angina, disease activity cannot be monitored reliably by ergonovine provocation because some patients have negative ergonovine tests at a time of marked clinical and electrocardiographic activity, whereas others have positive tests at a time of little (or no) disease activity.

Source: MEDLINE

118. Strategy of the treatment of vasospastic angina pectoris [French] Strategie du traitement de l'angine de poitrine vasospastique

Author(s): Bertrand M.E., Lablanche J.M., Tilmant P.Y., Thieuleux F.A.

Citation: Archives des maladies du coeur et des vaisseaux, February 1983, vol./is. 76 Spec No/(169-174), 0003-9683 (Feb 1983)

Publication Date: February 1983

Abstract: The strategy of treatment in vasospastic angina is mainly based on the results of coronary angiography. In a series of 165 patients with coronary spasm documented by angiography, 51 patients (31 per cent) had angiographically normal arteries and 69 per cent had organic atherosclerotic lesions. Patients with fixed atherosclerotic lesions were divided in two subgroups depending on whether the lesions were operable. The first subgroup (47 cases) comprised patients with operable lesions and coronary spasm. They underwent aorto-coronary bypass associated with a procedure to prevent spasm (plexectomy) (40 cases). Depending on the site of the lesions, some patients with operable lesions may benefit from coronary angioplasty followed by treatment with calcium antagonist drugs. Patients in the second subgroup (67 cases) with inoperable fixed atherosclerotic lesions were treated with calcium antagonists. Betablockers, which may be considered in organic coronary artery disease, are theoretically contra-indicated because of the vasospastic factor. The remaining patients with "angiographically normal" vessels (51 cases) were treated with nitrate derivatives and calcium antagonists. Treatment should be directed to the suppression of the clinical symptoms and, above all, of ECG signs of ischemia as proved by repeated Holter monitoring. The clinical course may also be assessed by repeated provocation tests. Results may depend on the doses and their timing during the 24 hour period. Duration of treatment in patients with angiographically normal vessels has not yet been established. Isolated cardiac denervation may be indicated in these patients who fail to respond to medical treatment (8 cases).

Source: EMBASE

119. Must the medical treatment of vasospastic angina be continued indefinitely? [French] Faut-il poursuivre indefiniment le traitement medical dans l'angine vasospastique?

Author(s): Waters D.D., Chaitman B.R., Szlachcic J., Theroux P.

Citation: Archives des maladies du coeur et des vaisseaux, February 1983, vol./is. 76 Spec No/(161-168), 0003-9683 (Feb 1983)
Abstract: A subgroup of 22 patients with Prinzmetal angina and a good clinical response to treatment with calcium inhibitors was studied to determine whether the ergonovine provocation test could help decide when to stop treatment. Before treatment, all patients had ST elevation during the ergonovine test which was performed in the coronary care unit. After 9.4 +/- 4.7 months' treatment, all 22 patients were asymptomatic. Their treatment was discontinued and the ergonovine test repeated. Twelve of the 22 patients had no anginal pain or ST segment changes during the test. Without therapy, none of these 12 patients have experienced recurrence of angina during a follow up period of 4.2 +/- 2.9 months. Angina with ST elevation occurred in 7 patients during the ergonovine test, as observed during their initial provocation tests. In 3 other patients, ergonovine induced ST depression in the leads in which ST elevation had been recorded during their initial tests. Treatment was restarted in these 10 patients with positive tests. There were no complications. Spontaneous remissions of symptoms and negative ergonovine tests may be observed in some patients with Prinzmetal angina. Without treatment this group of patients may remain asymptomatic for several months.

Source: EMBASE

120. Prazosin therapy for refractory variant angina.

Author(s): Tzivoni D, Keren A, Benhorin J, Gottlieb S, Atlas D, Stern S

Citation: American Heart Journal, February 1983, vol./is. 105/2(262-6), 0002-8703;0002-8703 (1983 Feb)

Abstract: The selective alpha blocker prazosin was used to abolish Prinzmetal's variant angina in six patients. All had had an acute transmural myocardial infarction, after which the anginal attacks with transient ST segment elevation developed, and three of them had already suffered from variant angina prior to the infarction. Therapeutic trials with high doses of nifedipine, verapamil, nitrates, beta blockers, and (in one case) phenoxybenzamine were ineffective in all six patients. Prazosin, 8 to 30 mg/day combined with low-dose nitrates or nifedipine completely abolished the attacks in four patients, markedly reduced their frequency and intensity in one patient, and had to be stopped in the sixth one because of hypotension and dizziness. Except for this last patient, the drug was well tolerated by all the others, and no changes in blood pressure were observed. In four patients discontinuation or reduction of prazosin resulted in exacerbation of symptoms, but its renewal was followed by disappearance of the attacks. Since the mean follow-up period in this study was 4 to 6 months, further evaluation appears necessary concerning the long-term effects of this drug in Prinzmetal's variant angina.

Source: MEDLINE

121. Exercise-induced S-T segment elevation in variant angina.

Author(s): Gottlieb S, Tzivoni D, Keren A, Benhorin J, Stern S

Citation: Cardiology, 1983, vol./is. 70/1(15-23), 0008-6312;0008-6312 (1983)

Abstract: 3 patients with co-existing effort angina and Prinzmetal's variant angina are described, who had also 'atypical' manifestations of variant angina, i.e. chest pain and S-T segment elevation also during treadmill exercise testing. Because of these unusual manifestations the proper diagnosis was delayed and the patients continued with inappropriate therapy (propranolol and only low-dose nitrates). After the correct diagnosis of variant angina with 'atypical' manifestations was made, application of high-dose nitrates and nifedipine resulted in complete relief of symptoms. Repeat treadmill testing during this therapy did not provoke attacks of chest pain with S-T elevation.

Source: MEDLINE

Two cases of Prinzmetal angina with normal coronary arteries are reported: coronary spasm was demonstrated in the left anterior descending artery in the first, and in the right coronary artery in the second case. Invalidating angina persisted despite maximal medical treatment with nitrite derivatives, nifedipine, verapamil and amiodarone. Homolateral thoracic sympathectomy led to long term remission of symptoms in one case and a short remission in the other, who then had to undergo complete denervation by plexectomy. Two hours after reoperation a refractory spasm of the right coronary artery led to the death of the patient. The possible causes of refractory coronary spasm and possible therapeutic approaches are discussed with reference to these cases.

Source: MEDLINE

123. Verapamil therapy for Prinzmetal's variant angina: comparison with placebo and nifedipine.

This study was performed (1) to assess the efficacy and safety of verapamil in patients with variant angina, and (2) to compare verapamil and nifedipine in patients with this clinical syndrome. In 27 patients, placebo and verapamil were administered in a long-term randomized, and double-blind study of 9 months' duration. In comparison to placebo, verapamil reduced the frequency of angina, nitroglycerin usage, transient episodes of electrocardiographic S-T segment deviation (as assessed by 2-channel Holter monitoring), and hospitalizations required for clinical instability. Subsequently, 23 patients were treated with nifedipine in a nonblind fashion for 2 months, and this agent exerted a beneficial effect similar to that of verapamil. Finally, gated equilibrium blood pool scintigraphy, performed in 10 patients at rest and during exercise during treatment with placebo, verapamil, and nifedipine, demonstrated that neither calcium antagonist caused a deterioration of left ventricular performance. Thus, (1) long-term oral verapamil and nifedipine are each superior to placebo and are of similar efficacy in patients with variant angina, and (2) neither agent adversely influences left ventricular performance in patients with relatively normal left ventricular function.

Source: MEDLINE

124. [Outcome of vasospastic angina with normal or near-normal coronary arteries (author's transl)]. [French] Dvenir de l'angor spastique a coronaires normales ou peu alterees.

The outcome of vasospastic angina with normal or near-normal coronary arteries was investigated in 48 patients followed up for periods of 3 to 55 months (mean: 19.1 months). The course of the disease was unfavorable in 13 patients, of whom 3 died, 5 developed myocardial infarction and 5 refractory angina. It was favourable in 16 patients who remained asymptomatic for at least 6 months, and intermediate in 16 patients whose anginal attacks became less frequent. Three patients were lost sight of. Calcium antagonists were administered to 32 patients; they proved superior to beta-blockers but imperfectly controlled the course of the disease: the anginal attacks completely ceased in 12 patients, became less frequent in 11 and persisted or became worse in 5. A close correlation was found between long-term outcome and the results of provocation tests.
performed at the beginning of treatment, and it is proposed that these tests should be used as therapeutic guide-lines.

**Source:** MEDLINE

125. *Surgical therapy for Prinzmetal’s variant angina.*

**Author(s):** Schick EC Jr, Davis Z, Lavery RM, McCormick JR, Fay M, Berger RL

**Citation:** Annals of Thoracic Surgery, April 1982, vol./is. 33/4(359-64), 0003-4975;0003-4975 (1982 Apr)

**Publication Date:** April 1982

**Abstract:** Fifty-two patients underwent coronary artery bypass grafting between 1973 and 1979 for variant angina, defined as pain, usually at rest, associated with S-T segment elevation. Only patients with fixed occlusive coronary artery disease, defined as greater than 70% narrowing in diameter, were included. When fixed coronary artery stenosis is present, variant angina—whether presenting as stable, unstable, or postinfarction angina, and regardless of the number of vessels diseased—is effectively treated by myocardial revascularization. Preoperative intraaortic balloon pumping is a useful therapeutic adjunct in the unstable subset refractory to medical therapy. The results of revascularization in patients with Prinzmetal's variant angina and fixed coronary disease were no different from those in patients with classic angina pectoris of comparable clinical categories.

**Source:** MEDLINE

126. *Clinical characteristics of patients with variant angina complicated by myocardial infarction or death within 1 month*

**Author(s):** Waters D.D., Szlachcic J., Miller D., Theroux P.

**Citation:** The American journal of cardiology, March 1982, vol./is. 49/4(658-664), 0002-9149 (Mar 1982)

**Publication Date:** March 1982

**Abstract:** Of 132 consecutive patients hospitalized during a 5 year period because of active variant angina, 18 died or had a myocardial infarction within 1 month. In 4 patients an episode of pain and S-T elevation unrelieved by calcium antagonist drugs and intravenous nitroglycerin persisted for more than 1 hour, inducing cardiogenic shock and death before the appearance of Q waves and elevated serum enzyme levels. In the other 14 patients myocardial infarction developed in the electrocardiographic leads in which S-T elevation had occurred during attacks of variant angina. Clinical features were not helpful in distinguishing the 18 patients with complications from the other 114. Angina at rest had been present for less than 1 month in 7 of the 18 patients with infarction compared with 31 of 114 in the other group (probability [p] not significant [NS]). Before infarction the artery presumed to be perfusing the involved territory contained a fixed stenosis of 70 percent or more of luminal diameter in 8 of the 14 patients with complications who had coronary arteriograms compared with 50 of 112 in the other group (p = NS). In 13 of the 18 patients, complications occurred in spite of large doses of calcium antagonist drugs. In 11 of these 13, attacks of variant angina were monitored for 3 to 17 days both before and during treatment. All 11 had fewer attacks with treatment and 5 had no attacks. Daily attacks per patient decreased from 4.6 +/- 4.3 to 0.5 +/- 0.7 (mean +/- standard deviation) (p less than 0.01). It is concluded that in variant angina of recent onset myocardial infarction occurs frequently and unpredictably. Myocardial infarction may occur in the absence of severe fixed lesions and in spite of apparent clinical improvement with administration of calcium antagonist drugs.

**Source:** EMBASE


**Author(s):** Girotti LA, Crosatto JR, Messuti H, Kaski JC, Dyszel E, Rivas CA, Araujo LI, Vetulli HD, Rosenbaum MB

**Citation:** American Journal of Cardiology, March 1982, vol./is. 49/4(834-41), 0002-
Publication Date: March 1982

Abstract: In 10 cases of Prinzmetal's angina in which episodes of myocardial ischemia were easily and reproducibly induced by hyperventilation, this test was performed 111 times, 41 times under control conditions and 70 times during treatment with one or more of the following drugs: phentolamine, isosorbide dinitrate, propranolol, verapamil, nifedipine and amiodarone. Seventeen of 18 negative tests performed under the influence of a long-acting drug coincided with total remission of the patient's anginal episodes when this drug was administered on a short- or long-term basis. No patient died or sustained infarction during a follow-up period of 10.9 months. A negative test was thus a good indication that the clinical response to the corresponding drug would be favorable. The electrocardiographic changes and chest pain provoked by hyperventilation occurred not when alkalosis was greatest (hydrogen ion [pH] change from 7.42 to 7.58, p less than 0.001), but when pH was approaching normal or control values. The onset of electrocardiographic changes occurred an average of 175 seconds after the end of hyperventilation and, in two cases, the time lag was as much as 480 and 705 seconds, respectively. This raises several questions regarding the true mechanism triggering coronary spasm under such conditions. The hyperventilation test appears to be a useful and safe procedure for selecting the best possible drug for long-term treatment of Prinzmetal's angina as well as for comparing the relative efficacy of different drugs.

Source: MEDLINE

128. Multiclinic controlled trial of diltiazem for Prinzmetal's angina.

Author(s): Schroeder JS, Feldman RL, Giles TD, Friedman MJ, DeMaria AN, Kinney EL, Mallon SM, Pt B, Meyer R, Basta LL, Curry RC Jr, Groves BM, MacAlpin RN

Citation: American Journal of Medicine, February 1982, vol./is. 72/2(227-32), 0002-9343;0002-9343 (1982 Feb)

Publication Date: February 1982

Abstract: To assess the efficacy of a new calcium entry blocker, diltiazem (Cardizem), for prophylaxis of Prinzmetal's angina, 48 patients were studied in randomized, multiple crossover multiclinic study (2 weeks single-blind, 8 weeks double-blind). Diltiazem dosage in one crossover phase was 120 mg per day; in the other, 240 mg per day. Therapeutic response was measured by patients' diary records of angina frequency and nitroglycerin tablet consumption. Treatment with 120 mg of diltiazem per day reduced angina by 41 percent from the entry placebo period and 20 percent from the paired placebo period (p less than 0.005). Treatment with 240 mg of diltiazem per day reduced angina frequency by 68 percent from the entry placebo period and 43 percent from the paired placebo period (p less than 0.01). There were similar reductions in nitroglycerin consumption. Adverse experiences that may have been related to the medication were noted in only 5 percent of patients. There were no alterations in blood pressure or heart rate. The PR interval increased 3 percent at the 240 mg dosage level. We conclude that diltiazem is an effective and safe agent for control of symptoms of Prinzmetal's angina.

Source: MEDLINE

129. Short- and long-term responses to diltiazem in patients with variant angina.

Author(s): Feldman RL, Pepine CJ, Whittle J, Conti CR

Citation: American Journal of Cardiology, February 1982, vol./is. 49/3(554-9), 0002-9149;0002-9149 (1982 Feb 18)

Publication Date: February 1982

Abstract: Short- and long-term effects of diltiazem on angina frequency were studied in 12 patients with variant angina (pain at rest with S-T elevation). Each patient first entered a double-blind short-term trial. Either diltiazem, in two dosage schedules (120 and 240 mg/day), or placebo was administered in a randomized double-blind program over 10 weeks. Significant decreases in frequency of angina were observed when diltiazem treatment periods were compared with placebo periods. Six patients were asymptomatic, one had 50 percent or greater decrease, and two had a smaller decrease in angina
frequency. Two patients showed no important improvement during short-term diltiazem therapy. One patient experienced ventricular fibrillation in the placebo period and was advanced to treatment with open label diltiazem before responses could be ascertained in the double-blind trial. All other patients were then advanced to open label diltiazem therapy and followed up for an average of 16 months (range 8 to 23). Responses during the short-term trial accurately predicted responses during long-term therapy. Of the six patients who were asymptomatic during short-term therapy, five remained asymptomatic and one had rare episodes of angina. One other patient continued to have a good response (50 percent or greater decrease in angina frequency) and two other patients had a partial response. The two patients who did not respond during short-term therapy did not respond during long-term therapy.

Source: MEDLINE

130. Randomized double-blind comparison of nifedipine and isosorbide dinitrate therapy in variant angina pectoris due to coronary artery spasm.

Author(s): Ginsburg R, Lamb IH, Schroeder JS, Hu M, Harrison DC

Citation: American Heart Journal, January 1982, vol./is. 103/1(44-9), 0002-8703;0002-8703 (1982 Jan)

Publication Date: January 1982

Abstract: Twelve patients were entered prospectively into a randomized double-blind study comparing the efficacy of nifedipine and isosorbide dinitrate (ISDN) in the treatment of variant angina pectoris due to coronary artery spasm. Using the diary technique, both anginal episodes and nitroglycerin tablets consumed were recorded during the pretrial, no drug period, and both active drug phases. During the baseline pretrial period, an average of 1.1 anginal episodes/day occurred with reduction to 0.28/day during nifedipine treatment and 0.39/day during ISDN treatment. Headache was the major side effect during ISDN treatment, occurring in 9 of 11 (81%) patients; and nonheart failure related pedal edema during nifedipine treatment, occurring in 4 of 12 (33%) patients. Intolerable side effects necessitating cessation of treatment occurred in two patients during nifedipine treatment and in three patients during ISDN treatment. Patients preferred nifedipine over ISDN because of increased efficacy and fewer uncomfortable side effects. We conclude that both nifedipine and ISDN are effective therapy for coronary spasm, but that nifedipine was more effective and was preferred by the majority of patients.

Source: MEDLINE


Author(s): Rutitzky B, Girotti AL, Rosenbaum MB

Citation: American Heart Journal, January 1982, vol./is. 103/1(38-43), 0002-8703;0002-8703 (1982 Jan)

Publication Date: January 1982

Abstract: In three patients with vasospastic angina pectoris, chronic amiodarone administered orally at doses of 800 and 1,000 mg/day totally suppressed spontaneous episodes of ischemic chest pain for 8 to 14 months. Before treatment, ergonovine maleate 0.2 to 0.4 mg intravenously provoked chest pain and similar ischemic ECG changes as those occurring spontaneously. During amiodarone treatment ergonovine vasoconstriction was totally or partially inhibited. In addition to calcium-blocking agents, amiodarone is another spasmolytic drug which effects smooth muscle relaxation by different mechanisms and appears to be useful for the chronic treatment and prevention of variant angina. The vasodilator property of amiodarone is achieved by both direct action and noncompetitive alpha receptor antagonism of coronary vasculature.

Source: MEDLINE

132. Diagnosis and treatment of Prinzmetal's variant angina.

Author(s): McMahon MT, McPherson MA, Talbert RL, Greenberg B, Sheaffer SL

Citation: Clinical Pharmacy, January 1982, vol./is. 1/1(34-42), 0278-2677;0278-2677
Abstract: The presentation, diagnosis (including provocative testing), and therapy of Prinzmetal's variant angina are reviewed. Prinzmetal's variant angina (PVA) is a form of angina caused by coronary-artery vasospasm (CAS) and is not associated with exertion. It is diagnosed by history, electrocardiogram, or coronary-artery angiography. Provocative tests, such as the coldpressor test or intravenous ergonovine maleate, are sometimes used to aid diagnosis of PVA. Nitrates, adrenergic - blocking agents, and calcium-channel blocking agents can be used in treating PVA. Nitroglycerin and isosorbide dinitrate effectively relieve CAS. However, long-term prospective studies on the use of these drugs for PVA are lacking in the literature. Studies on treating PVA with adrenergic-blocking agents have been equivocal, with some studies reporting improvement and some reporting worsening. Calcium-channel blocking agents are promising drugs for PVA. Nifedipine is generally considered the prototype of this class for antianginal activity. It is administered orally in PVA patients and is effective. Side effects are mild and do not usually require termination of therapy. Verapamil hydrochloride, the prototype calcium-channel blocking agent for arrhythmias, is effective for PVA, but only 10-20% of an orally administered dose reaches systemic circulation because of the first-pass effect. Other calcium-channel blockers, including perhexilene maleate, diltiazem hydrochloride, prenylamine, and lidoflazine, have been tested in a few CAS patients with some success; adverse effects and toxicities limit the use of some of them, especially perhexilene. Therapy, using combinations of nitrates, adrenergic-blocking agents, and calcium-channel blocking agents, is needed in some patients. Dosing guidelines for all drugs are given in the paper. Treatment of PVA should begin with oral nitrates. Calcium-channel blocking agents are indicated in the patient who has failed to respond or is intolerant to maximum doses of nitrates given in various forms.

Source: MEDLINE
135. Prinzmetal's angina: atypical angiographic features of atypical angina pectoris.

Author(s): Slack JD

Citation: Angiology, August 1981, vol./is. 32/8(567-80), 0003-3197;0003-3197 (1981 Aug)

Abstract: Clinicians have puzzled over the coronary physiology associated with atypical angina pectoris for the past century. Recent recognition of coronary artery spasm, which has been so thoroughly documented with coronary angiography, has resolved many of these conceptual difficulties. However, several features of coronary artery spasm, both spontaneous and secondary to provocation with ergonovine maleate, remain poorly understood. This paper addresses the management problems associated with spontaneously occurring spasm in the setting of pre-existent atherosclerotic coronary artery disease, angiographically severe spasm unassociated with symptoms of angina pectoris or signs of myocardial ischemia, and the precipitation of angina pectoris by ergonovine maleate administration unaccompanied by demonstrable epicardial coronary artery spasm. The rationale, indications and therapeutic efficacy of a new class of agents known as slow channel inhibitors of calcium antagonists are discussed.

Source: MEDLINE

Full Text: Available in fulltext at EBSCO Host

136. Prinzmetal's variant angina

Author(s): Sandoe E., Vilhelmsen R., Efsen F.

Citation: Acta medica Scandinavica. Supplementum, 1981, vol./is. 644/(34-37), 0365-463X (1981)

Publication Date: 1981

Abstract: A series of 12 consecutive patients with Prinzmetal's variant angina is presented. There was a preponderance of males (eight/12) and individuals less than 60 years of age (nine/12). Delay in diagnosis was frequent, primarily due to difficulty in achieving a proper 12 lead ECG recording of the attack which often occurred late at night or in the early morning, subsiding within minutes. In some cases, moreover, ST-depression was observed in the ECG monitoring lead as a reciprocal manifestation of subepicardial ischaemia or due to incorrect polarity in the monitoring lead. The incidence of serious arrhythmias, AV-block and ventricular tachycardia was high (eight/12); two patients had to be DC-converted. Coronary arteriography revealed a spectrum from normal or nearly normal coronary arteries to single vessel disease. Nitroglycerin was well suited for treatment of acute attacks. Long-term treatment with calcium antagonists was effective and without serious side-effects. The follow-up time was from 8 months to 5 years (mean 2 years). It is concluded that Prinzmetal's variant angina as such is a rare disease, but that coronary artery spasm is most likely an important contributory factor in the clinical manifestations of coronary artery disease: arrhythmias, sudden death and myocardial infarction.

Source: EMBASE

137. Medical therapy of Prinzmetal's variant angina.

Author(s): Schroeder JS, Rosenthal S, Ginsburg R, Lamb I

Citation: Chest, July 1980, vol./is. 78/1 Suppl(231-3), 0012-3692;0012-3692 (1980 Jul)

Publication Date: July 1980

Abstract: Medical therapy for Prinzmetal's variant angina has been treatment of the acute attack with sublingual nitroglycerin. Prophylactic therapy has been more difficult, utilizing long-acting vasodilators that are limited because of their short half-life and side effects when therapeutic doses are used. Alpha-adrenergic blockade has been effective in some patients but is frequently associated with intolerable side effects or apparent development
of tolerance to the drug. Preliminary experience from a randomized double-blind trial of diltiazem, a new calcium antagonist, has demonstrated a 90% reduction in pain episodes, with many patients becoming pain-free on the 240-mg daily dose. These data and the lack of adverse side effects demonstrate a dramatically effective therapy for patients with coronary artery spasm.

**Source:** MEDLINE


**Author(s):** Phaneuf DC, Waters DD, Dauwe F, Theroux P, Pelletier G, Mizgala HF

**Citation:** Catheterization & Cardiovascular Diagnosis, 1980, vol./is. 6/4(143-21), 0098-6569;0098-6569 (1980)

**Publication Date:** 1980

**Abstract:** A young man with a single left coronary artery and refractory variant angina is described. Spontaneous coronary artery spasm developed during coronary arteriography at the site of a 50% fixed left anterior descending coronary artery stenosis. Frequent episodes of rest angina with transient ST segment elevation persisted in hospital in spite of treatment with three different calcium antagonist drugs. Symptoms disappeared only when the combination of nifedipine, diltiazem, isosorbide dinitrate, and nitroglycerin ointment were given. Ergonovine testing was used to objectively assess the response to treatment.

**Source:** MEDLINE

**Additional results:**

1. An unusual case of pulseless electrical activity arrest associated with Prinzmetal's angina.

**Author(s):** Gaikwad NJ, McNamara M, Batra R, Aroney G, Jayasinghe R

**Citation:** Critical Care & Resuscitation, December 2010, vol./is. 12/4(269-72), 1441-2772;1441-2772 (2010 Dec)

**Publication Date:** December 2010

**Abstract:** Cardiac arrest due to ventricular tachyrhythmia in the setting of Prinzmetal's angina (PA) has been well reported in the literature. However, to our knowledge, there have been no reports of a pulseless electrical activity (PEA) arrest in patients with PA. We report a case of PEA arrest in a patient with PA after surgical drainage of an abscess in the first web-space of the left hand. We propose that the Bezold-Jarisch reflex may be the underlying mechanism responsible for this arrest. The case also highlights the danger of ceasing treatment with nitrates and calcium channel blockers in patients with PA.

**Source:** MEDLINE


**Author(s):** Higuma T, Oikawa K, Kato T, Mori Y, Kudo T, Yamamoto T, Hoshi Y, Kameda K, Suto N, Fujita N, Inokubo Y, Konda A, Osanai T, Okumura K

**Citation:** Journal of Cardiology, November 2010, vol./is. 56/3(354-60), 0914-5087;1876-4738 (2010 Nov)

**Publication Date:** November 2010

**Abstract:** OBJECTIVES: We compared the efficacy of once-daily administration of nifedipine CR 40 mg (N) with that of twice-daily diltiazem R 100mg (D) in patients with vasospastic angina (VSA) registered in 8 cardiovascular institutes in Aomori Prefecture.METHODS AND RESULTS: VSA was diagnosed by the ischemic ST segment changes during chest pain attacks at rest and/or acetylcholine induction test done during coronary angiography. Thirty-seven patients were randomly allocated to either the N (n=20) or D group (n=17). The number of symptomatic attacks and amount of short-acting nitrate use were examined based on data in diaries written by the patients. There were no
significant differences in the baseline characteristics between the two groups. The mean number (median number) of attacks per week was significantly decreased in the N group from 2.56 (2.0) at baseline to 0.41 (0.0) after 4 weeks of treatment, to 0.24 (0.0) after 8 weeks, and to 0.36 (0.0) after 12 weeks (all p<0.05 vs. baseline). It was also decreased in D group from 2.71 (2.0) at baseline to 0.55 (0.0) after 4 weeks, to 0.32 (0.0) after 8 weeks, and to 0.27 (0.0) after 12 weeks (all p<0.05 vs. baseline). The numbers of attacks before and after treatment were comparable between N and D groups. In one patient in each of the N and D groups, the allocated drug was crossed over to the other due to recurrence of the attacks. One patient in each group experienced adverse effects and the drug was changed to the other.

CONCLUSION: Once-daily administration of nifedipine CR was as effective as twice-daily diltiazem R in the prevention of VSA attacks. Copyright 2010 Japanese College of Cardiology. Published by Elsevier Ltd. All rights reserved.

Source: MEDLINE


Author(s): Okawa Y, Matsuno S, Yajima J, Nakamura M, Ono T, Ishiwata S, Fujimoto Y, Aizawa T

Citation: Journal of Cardiology, March 2010, vol./is. 55/2(238-47), 0914-5087;0914-5087 (2010 Mar)

Publication Date: March 2010

Abstract: BACKGROUND: We compared the efficacy of once-daily treatment with nifedipine CR 40 mg (NR) and twice-daily treatment with benidipine 4 mg (BD) in patients with coronary spastic angina (CSA) registered in 3 cardiovascular institutes in Tokyo.METHODS AND RESULTS: CSA was diagnosed by an ischemic ST change during Holter ECG monitoring or drug-induced test. Thirty patients were randomly allocated to either NR or BD group. The number of symptomatic attacks and the total frequency of short-acting nitrates were examined based on the data in diaries written by patients. There were no significant differences in the baseline characteristics between the two groups. The median number (25-75% quartile) of attacks per week was significantly decreased in NR group, i.e., 1.0 (0.8-2.0) at baseline, 0.0 (0.0-1.0) after 4 weeks of treatment, and 0.0 (0.0-0.0) after 8 weeks of treatment (P=0.0093, P=0.0002, Wilcoxon's rank-sum test). No significant decrease was observed in BD, i.e. 1.0 (0.5-2.0) at baseline, 1.3 (0.0-3.0) after 4 weeks, and 0.0 (0.0-1.0) after 8 weeks. The number of attacks was fewer in NR than in BD group (P=0.074, P=0.015, U-test for difference).CONCLUSION: Once-daily treatment with NR 40 mg was more effective than twice-daily treatment with BD in the prevention of CSA attacks. Copyright 2009 Japanese College of Cardiology. Published by Elsevier Ltd. All rights reserved.

Source: MEDLINE

4. Implantable cardioverter defibrillator (ICD) for polymorphic ventricular tachycardia (VT) due to coronary vasospasm.

Author(s): Bhat PK, Quan KJ

Citation: Journal of Hospital Medicine (Online), July 2009, vol./is. 4/6(E23-5), 1553-5592:1553-5606 (2009 Jul)

Publication Date: July 2009

Abstract: We report a case of a young woman who presented with atypical angina. During an episode of chest pain she had a documented run of sustained polymorphic ventricular tachycardia (VT). In addition to medical therapy, she received an ICD to prevent future episodes of sudden cardiac death.

Source: MEDLINE

5. Improved myocardial perfusion preceding clinical response on bosentan treatment for coronary vasospasm.
Abstract: Many patients suffer from persistent angina due to coronary vasospasm despite optimal medical treatment. We treated a 46-year-old patient with severe and treatment-resistant coronary vasospasm with the endothelin-receptor antagonist bosentan. Using oxygen-15 labelled water in conjunction with oxygen 15-labelled carbon monoxide positron emission tomography (PET), we measured an impaired coronary flow reserve (CFR) in 6 out of 13 segments directly before the start of bosentan therapy. A repeated PET measurement after 16 weeks of bosentan revealed a completely normalized CFR in this patient. Furthermore, the patient reported less frequent and less severe chest pain. Our data suggest a potential role of endothelin-receptor antagonists for patients with severe coronary vasospasms.

Source: MEDLINE


Abstract: BACKGROUND: Cardiopulmonary resuscitation guidelines imply the use of epinephrine/adrenaline during cardiopulmonary arrest. However, in cardiac arrest situations resulting from coronary artery spasm (CAS), the use of epinephrine/adrenaline could be deleterious. METHODS AND RESULTS: A 49-year-old patient underwent an emergency coronaryography with an attempt to stent the coronary arteries. Radiologic imaging revealed a positive methylergonovine maleate (Methergine, Novartis Pharmaceuticals, East Hanover, NJ) test, with subocclusive CAS in several coronary vessels leading to electromechanical dissociation. Cardiopulmonary resuscitation was performed, and intracoronary boluses of isosorbide dinitrate were given to treat CAS. Epinephrine/adrenaline was not administered during resuscitation. Spontaneous circulation was obtained after cardioversion for ventricular fibrillation, and the patient progressively regained consciousness. CONCLUSION: Resuscitation guidelines do not specify the use of trinitrate derivatives in cardiac arrest situations caused by CAS. The pros and cons of the use of nitrates and epinephrine/adrenaline during cardiac arrest caused by CAS are analyzed in this case report.

Source: MEDLINE

7. Differential effects of calcium-channel blockers on vascular endothelial function in patients with coronary spastic angina.

Abstract: BACKGROUND: The effects of the 3 classes of L-type calcium-channel blockers (CCBs) on vascular endothelial function have not been clarified in patients with coronary vasospasm. METHODS AND RESULTS: Twenty-five normotensive patients (age 64.0 +/- 1.4 years) with coronary vasospasm were randomly treated for 3 months with benidipine, diltiazem, and verapamil, which belong to the dihydropyridine, benzothiazepine, and phenylalkylamine classes of CCBs, respectively. Endothelium-dependent flow-mediated dilatation (FMD), endothelium-independent nitroglycerin-induced dilatation in the brachial arteries, and plasma cyclic guanosine 3',5'-monophosphate (cGMP), a nitric-oxide-related product, were assessed before and after treatment. At baseline, the patients with vasospasm had significantly lower FMD as compared with normal subjects (n=8). Blood pressure did not differ among the 3 groups before and after treatment. Benidipine
significantly increased FMD (from 4.7+/−0.6 to 7.4+/−1.1%, P<0.05) and plasma cGMP levels. In contrast, neither diltiazem nor verapamil affected FMD and cGMP levels. None of the treatments affected nitroglycerin-induced dilatation.

CONCLUSIONS: Benidipine, but not diltiazem or verapamil, improves endothelial dysfunction beyond blood pressure lowering effects in patients with coronary vasospasm. Upregulation of the nitric oxide-cGMP system by benidipine may partly contribute to the improvement. The dihydropyridine class may be more beneficial for vascular endothelial function than the non-dihydropyridine classes of CCBs.

Source: MEDLINE

8. High incidence of repeat anginal attacks despite treatment with calcium-channel blockers in patients with coronary spastic angina.


Citation: Circulation Journal, March 2009, vol./is. 73/3(512-5), 1346-9843;1346-9843 (2009 Mar)

Publication Date: March 2009

Abstract: BACKGROUND: Calcium-channel blockers (CCBs) are highly effective in suppressing coronary spasm and are widely used as the standard therapy for coronary spastic angina, but it is unclear if CCB treatment completely suppresses the symptoms. METHODS AND RESULTS: The clinical course of the symptoms caused by coronary spasm was investigated in patients taking CCBs: 90 patients were evaluated and 80 patients were followed. The mean follow-up period was 1,796+/−1,169 days. There were no cardiac deaths, but 3 patients were admitted to the hospital, 1 because of the onset of non-Q wave myocardial infarction and 2 because of repeat anginal attacks. In those 2 patients, medical therapy was discontinued at their discretion. In the follow-up analysis, we found that the incidence of symptoms caused by repeat anginal attacks was 37.0% (27/73) in the first year and was increasing every year. CONCLUSIONS: CCBs are strongly recommended for improving the prognosis of coronary spasm, but in many cases they do not suppress completely symptoms.

Source: MEDLINE


Author(s): Singh A, Arya RC, Mohan B

Citation: Annals of Cardiac Anaesthesia, January 2009, vol./is. 12/1(67-70), 0971-9784;0974-5181 (2009 Jan-Jun)

Publication Date: January 2009

Abstract: A 42-year-old male presented to the emergency department with acute chest pain. The electrocardiogram revealed inferior wall myocardial infarction. Emergency coronary angiography revealed total occlusion of the distal right coronary artery with thrombus. Patient was taken up for primary percutaneous coronary angioplasty with stenting of distal right coronary artery. Six hours following the procedure, the patient developed re-elevation of ST-segment in inferior leads of electrocardiogram and subsequent haemodynamic instability. Repeat coronary angiography revealed patent stent and coronary artery spasm in proximal part, which was relieved by intracoronary injection of nitroglycerine. After an hour, the patient re-developed symptoms of chest pain along with bradycardia, hypotension and ST segment elevation. Intravenous infusion of nitroglycerine did not improve the condition but produced persistent hypotension. Infusion of milrinone was then started. Over time, normalisation of electrocardiogram occurred. The patient was discharged in stable condition. This case suggests that milrinone may be effective in alleviating coronary artery spasm when the use of other agents fails.

Source: MEDLINE

10. Eosinophilia and coronary artery vasospasm.

Author(s): Wong CW, Luis S, Zeng I, Stewart RA
OBJECTIVE: To describe the clinical features, natural history and response to treatment of coronary vasospasm associated with eosinophilia. METHODS: Two patients with eosinophilia who had recurrent acute coronary events due to multi-vessel coronary artery spasm are described. The clinical presentation and outcomes of these 2 patients and 17 additional cases of eosinophilia and coronary artery vasospasm identified on a systematic literature review are presented. RESULTS: Patients were usually admitted because of repeated episodes of angina at rest and raised plasma markers of myocyte necrosis. Dynamic ST elevation was observed in 15 (83%) patients. Coronary angiography was performed in all patients. Spontaneous (n=7) or provoked (n=8) coronary artery spasm, which was usually multi-focal, was observed in 15 (83%) patients. Symptoms often continued despite high dose vasodilators but responded well to prednisone. Recurrent coronary events were frequent, and included sudden death (n=4), resuscitated cardiac arrest (n=2), myocardial infarction (n=10) and unstable angina (n=11). Recurrent events were more frequent when not taking compared to when taking prednisone (4.2 versus 0.4 events/year, p=0.002, hazard ratio 11, 95% confidence interval 2.4–50). CONCLUSION: Published case reports suggest that coronary vasospasm associated with eosinophilia responds poorly to conventional vasodilator treatment and the risk of recurrent coronary events is high. Most patients respond to treatment which suppresses the eosinophilia.

Source: MEDLINE

11. Treatment of coronary spastic angina with a statin in addition to a calcium channel blocker: a pilot study.

Author(s): Tani S, Nagao K, Anazawa T, Kawamata H, Furuya S, Takahashi H, Iida K, Fuji T, Matsumoto M, Kumabe T, Sato Y, Hirayama A

Citation: Journal of Cardiovascular Pharmacology, July 2008, vol./is. 52/1(28-34), 0160-2446;1533-4023 (2008 Jul)

Publication Date: July 2008

Abstract: Combined therapy with a statin and a calcium channel blocker, which can improve lipid metabolism and reduce oxidative stress, may attenuate coronary vasoconstriction in patients with coronary spastic angina (CSA). After 6 months of therapy with benidipine and pravastatin, an acetylcholine provocation test was performed a second time in 25 patients with CSA. The patients were divided into 2 groups according to whether the result of this second test was positive (n = 13) or negative (n = 12). The test was designated as positive when the intracoronary injection of acetylcholine induced angiographically demonstrable total or subtotal occlusion (positive-test group). In the negative-test group, significant decrease in the plasma levels of low-density lipoprotein (LDL) cholesterol (−20.7 +/- 11.1%, P < 0.01 versus baseline) were observed along with a dramatic increase in the serum level of high-density lipoprotein (HDL) cholesterol (26.8 +/- 13.2%, P < 0.01 versus baseline). Furthermore, a significant decrease of the malondialdehyde-modified low-density lipoprotein (MDA-LDL) level, a marker of oxidative stress, was also observed (−22.6 +/- 14.1%, P < 0.01 versus baseline) in this group. In the positive-test group, however, no significant changes were found in any of the aforementioned parameters. The results showed that improvement of lipid metabolism, especially an increase of HDL cholesterol level and a reduction of MDA-LDL, may inhibit vascular contractility.

Source: MEDLINE


Author(s): Sidi A, Dahleen L, Gaspardone A

Citation: Journal of Clinical Anesthesia, February 2008, vol./is. 20/1(64-9), 0952-8180;0952-8180 (2008 Feb)
Abstract: We describe a patient who developed severe ST-segment elevation, pulseless ventricular tachycardia, and cardiac arrest during induction of general anesthesia. This transient ST-segment elevation may have been the result of coronary artery spasm. Awareness of this variant of coronary artery vasospasm—Prinzmetal angina—in patients without clear symptoms or established ischemic heart disease, is the key to successful outcome. Recommended preparations and treatments are preoperative calcium channel blockers, nitroglycerin available intraoperatively, reduction of endogenous or exogenous catecholamines, and vigilant monitoring.

Source: MEDLINE

13. Effectiveness of intravenous administration of nicorandil in a patient with variant angina refractory to continuous intravenous nitroglycerin.

Author(s): Lee KH, Kim SH, Lim HE, Kim EJ, Kim MK, Park WJ, Cho GY

Citation: International Journal of Cardiology, August 2007, vol./is. 120/1(e9-12), 0167-5273;1874-1754 (2007 Aug 9)

Publication Date: August 2007

Abstract: Variant angina usually responds to conventional treatment with nitrates and calcium antagonists. However, severe variant angina refractory to intensive anti-anginal treatment can be catastrophic because prolonged occlusion of a major coronary artery can result in myocardial infarction, severe cardiac arrhythmia, and sudden death. We report a patient with active variant angina which was refractory to conventional treatment including sublingual nitroglycerin and intravenous nitroglycerin administration. Only intravenous administration of nicorandil was consistently effective in eliminating chest pain of the patient.

Source: MEDLINE

14. Successful management of unremitting spasm of the nongrafted right coronary artery after off-pump coronary artery bypass grafting.

Author(s): Schena S, Wildes T, Beardslee MA, Lasala JM, Damiano RJ Jr, Lawton JS

Citation: Journal of Thoracic & Cardiovascular Surgery, June 2007, vol./is. 133/6(1649-50), 0022-5223;1097-685X (2007 Jun)

Publication Date: June 2007

Source: MEDLINE

Full Text:
Available in fulltext at Highwire Press


Author(s): Dominguez Franco AJ, Gomez Doblas JJ, Garcia Pinilla JM, Hernandez Garcia JM, Jimenez Navarro M, Alonso Briales JH, de Teresa Galvan E

Citation: International Journal of Cardiology, May 2007, vol./is. 118/2(e51-3), 0167-5273;1874-1754 (2007 May 31)

Publication Date: May 2007

Source: MEDLINE


Author(s): Kaku B, Ikeda M, Kato H, Takabatake S, Hayashi T, Taguchi T, Niita Y, Hiraiwa Y, Aoki S

Citation: International Heart Journal, May 2007, vol./is. 48/3(379-85), 1349-2365;1349-2365 (2007 May)

Publication Date: May 2007
Abstract: A 74-year-old man had undergone on-pump coronary artery bypass grafting (CABG) for effort-induced angina pectoris. Soon after CABG using the left internal thoracic artery for the left anterior descending artery and saphenous vein for the left circumflex artery, ST elevation was found in the inferior leads and complete atrioventricular block, ventricular tachycardia, and circulatory collapse occurred. Emergent coronary angiography revealed diffuse severe spasm of the right coronary artery (RCA). Despite the intravenous and intracoronary administration of massive doses of vasodilators and intra-aortic balloon pumping, the coronary spasm did not resolve. Five stents were deployed from the distal to the proximal portion of the RCA. After multistenting, coronary flow was dramatically improved and the ST elevations in the inferior leads were also improved. Coronary artery spasm after CABG is relatively rare, but when it occurs, it can be fatal. Multistenting is a useful treatment for life-threatening refractory coronary spasm after CABG.

Source: MEDLINE


Author(s): Pragliola C, Altamura L, Niccolì G, Siviglia M, De Paulis S, Possati GF
Citation: Annals of Thoracic Surgery, February 2007, vol./is. 83/2(670-2), 0003-4975;1552-6259 (2007 Feb)
Publication Date: February 2007
Abstract: We report a case of coronary spasm soon after aortic valve replacement associated with hemodynamic and arrhythmic instability. The spasm was demonstrated at coronary angiography and was resolved with the intracoronary infusion of nitrates and antiarrhythmics.

Source: MEDLINE

Available in fulltext at Highwire Press

18. Effects of benidipine and some other calcium channel blockers on the prognosis of patients with vasospastic angina. Cohort study with evaluation of the ergonovine coronary spasm induction test.

Citation: Arzneimittel-Forschung, 2007, vol./is. 57/9(573-81), 0004-4172;0004-4172 (2007)
Publication Date: 2007
Abstract: BACKGROUND: It has been reported that the morbidity rate of vasospastic angina is higher in Japan compared to western countries, and its prognosis has already been reported. However, the prognosis of vasospastic angina in relation to coronary angiographic findings, prognostic risk factors and treatment has not yet been fully investigated.METHODS AND RESULTS: From January 2000 to October 2005, 1047 patients with vasospastic angina diagnosed by coronary angiography at Gifu University Hospital and related hospitals were registered in a cohort study (follow-up rate: 91.4%, median follow-up duration: 3.8 years). The presence of coronary artery stenosis, diabetes mellitus, total spasm, and age of more than 65 years had a negative prognostic impact on cardiovascular events. Patients were treated with calcium channel blockers such as diltiazem (CAS 33286-22-5, CAS 42399-41-7), amlodipine (CAS 111470-99-6), nifedipine (CAS 21829-25-4), and benidipine (CAS 91599-74-5). Among these calcium channel blockers, when patient background was matched by the propensity score in patients treated with calcium channel blockers only, the cardiovascular event rate was significantly lower in the benidipine group than in the diltiazem group.CONCLUSION: The study demonstrated for the first time that total spasm is a risk factor, independent of other factors, for cardiovascular events in patients with vasospastic angina. Treatment with benidipine showed a better prognosis than that with diltiazem.

Source: MEDLINE

Author(s): Sakamoto T, Shintomi Y, Yoshimura M, Ogawa H

Citation: Internal Medicine, 2007, vol./is. 46/17(1425-9), 0918-2918;1349-7235 (2007)

Publication Date: 2007

Abstract: This case report describes a 78-year-old man with recurrent angina attacks due to coronary spasm. He was treated with maximum daily doses of antianginal and antioxidative medications, including isosorbide mononitrate (40 mg), diltiazem (200 mg), and tocopherol nicotinate (300 mg). Despite the use of these medications, rest angina occurred 2 or 3 times during sleep. Although his symptoms disappeared promptly with the use of sublingual glycerine trinitrate (GTN), an angiotensin II receptor blocker, valsartan (80 mg), was added on a daily basis with the intent of improving endothelial function and controlling his angina. After beginning 80 mg/day of valsartan, the number of the anginal attacks decreased by about 66%. The anginal attacks totally disappeared after the dose of valsartan was increased to 160 mg/day. To confirm the effect of valsartan on his angina, valsartan was stopped temporarily with his consent. His anginal attacks increased to the same frequency that was observed before valsartan; therefore, valsartan therapy was resumed. The data indicate that the addition of valsartan to maximum antianginal medications may be effective in helping to control angina attacks at rest due to coronary spasm.

Source: MEDLINE

20. Left main coronary artery spasm: medical versus surgical management.

Author(s): Fitzsimons MG, Walker J, Inglessis I, Boucher C

Citation: Journal of Cardiothoracic & Vascular Anesthesia, December 2006, vol./is. 20/6(834-6), 1053-0770;1053-0770 (2006 Dec)

Publication Date: December 2006

Source: MEDLINE


Author(s): Nakajima D, Negoro N, Nakaboh A, Nakakoji T, Hoshiga M, Nariyama J, Ishihara T, Hanafusa T

Citation: International Journal of Cardiology, April 2006, vol./is. 108/2(281-3), 0167-5273;0167-5273 (2006 Apr 4)

Publication Date: April 2006

Source: MEDLINE

22. [Effects of intra-coronary and intra-graft administration of nicorandil for coronary spasm after coronary artery bypass grafting].

Author(s): Kimura N, Kawahito K, Adachi K, Murata H, Yamaguchi A, Adachi H, Ino T

Citation: Kyobu Geka - Japanese Journal of Thoracic Surgery, January 2006, vol./is. 59/1(71-7), 0021-5252;0021-5252 (2006 Jan)

Publication Date: January 2006

Abstract: Coronary artery spasm after coronary artery bypass grafting (CABG) is relatively rare, but when it occurs, it is fatal. In cases of circulatory collapse just after surgery, coronary spasm should be suspected, and immediate diagnosis by coronary angiography is necessary. We conducted a study to assess the clinical characteristics of coronary spasm after CABG and the usefulness of intra-coronary and intra-graft administration of
nicorandil. Study subjects were 7 patients (6 men and 1 woman, mean age 60.4 years) in whom coronary spasm after CABG was diagnosed angiographically from January 1992 to December 2003. Off-pump CABG (OPCAB) had been performed in 2 patients. Despite continuous administration of nitroglycerin and diltiazem hydrochloride during surgery, sudden circulatory collapse occurred during surgery or within 24 hours after CABG in all 7 patients. All required mechanical circulatory support, and emergency coronary angiography revealed severe graft and native coronary spasms. Intracoronary and/or intra-graft administration of diltiazem hydrochloride or nitroglycerin was not very effective, however, administration of nicorandil was effective for vasodilatation. One patient suffered brain damage and died, but the other 6 patients recovered and were discharged without complication. In conclusion, intra-coronary and/or intra-graft administration of nicorandil appears to be useful for the treatment of coronary spasm after CABG.

Source: MEDLINE


Author(s): Van Spall HG, Overgaard CB, Abramson BL

Citation: Canadian Journal of Cardiology, September 2005, vol./is. 21/11(953-7), 0828-282X;0828-282X (2005 Sep)

Publication Date: September 2005

Abstract: Coronary vasospasm is defined as a transient abnormal contraction of an epicardial coronary artery that results in myocardial ischemia. Vasospasm frequently occurs at the site of coronary atheroma, implicating endothelial dysfunction in the pathogenesis of this phenomenon. Definitive diagnosis is made after angiographic evidence of coronary vasoconstriction that reverses with the administration of intravenous or intra-arterial nitroglycerin. Medical therapy involves the use of high-dose calcium channel blockers and/or nitrates. In selected cases, coronary revascularization with stenting may successfully prevent the recurrence of clinically significant vasospasm but should be offered in conjunction with traditional medical therapy. Long-term prognosis of treated patients is excellent but is dependent on the severity of vasospastic episodes and the degree of underlying coronary artery disease and left ventricular dysfunction. A case of severe vasospasm that localized to the proximal left anterior descending artery and was successfully treated with stenting and vasodilator therapy is reported. The pathophysiology, diagnosis and management of coronary vasospasm are also reviewed.

Source: MEDLINE

24. Inhibition of Rho-kinase by fasudil preventing anginal attacks associated with spastic angina: a case report.

Author(s): Hiroki J, Fukumoto Y, Shimokawa H, Hirooka Y, Takeshita A

Citation: Journal of Cardiology, October 2004, vol./is. 44/4(161-4), 0914-5087;0914-5087 (2004 Oct)

Publication Date: October 2004

Abstract: An 86-year-old woman was admitted with unstable angina pectoris. Plain old balloon angioplasty (POBA) was performed for 90% stenosis at segment 7 of the left coronary artery with concomitant treatment with nitrate, calcium antagonists, and nicorandil. Five days after POBA, she again suffered chest pain at rest with ST depression by electrocardiography, despite increased doses of calcium-antagonist and nicorandil. Coronary arteriography showed no evidence of restenosis (50%) at the POBA site. The involvement of coronary artery spasm was considered and intravenous treatment with a Rho-kinase inhibitor, fasudil, was started, which resulted in disappearance of the anginal attacks. She refused to continue the fasudil treatment on day 5, which resulted in reappearance of anginal attacks. Third coronary angiography showed a 90% restenosis at POBA site and percutaneous coronary intervention was again performed. This case suggests that a Rho-kinase inhibitor is potentially effective to prevent anginal attacks in spastic angina.

Source: MEDLINE

25. Usefulness of fasudil, a Rho-kinase inhibitor, to treat intractable severe
coronary spasm after coronary artery bypass surgery.

**Author(s):** Inokuchi K, Ito A, Fukumoto Y, Matoba T, Shiose A, Nishida T, Masuda M, Morita S, Shimokawa H

**Citation:** Journal of Cardiovascular Pharmacology, September 2004, vol./is. 44/3(75-7), 0160-2446;0160-2446 (2004 Sep)

**Publication Date:** September 2004

**Abstract:** We have recently demonstrated that fasudil, a Rho-kinase inhibitor, is effective in suppressing coronary artery spasm in patients with vasospastic angina. Thus, blockade of Rho-kinase may provide a novel therapeutic strategy to treat ischemic coronary syndrome caused by the spasm. Severe coronary artery spasm still remains a life-threatening serious complication of coronary artery bypass grafting (CABG). In this study, we examined the inhibitory effect of fasudil in patients with intractable severe coronary spasm after CABG. Three patients who underwent CABG showed severe myocardial ischemia resistant to intensive therapy with intravenous conventional vasodilators, including isosorbide dinitrate (ISDN), diltiazem, and nicorandil. Coronary angiography revealed severe coronary spasm in native coronary arteries and/or bypass arterial grafts in all patients. Since intracoronary and/or intragraft administration of ISDN was ineffective to resolve the spasm, we then administered fasudil (1.5 mg/min for 15 minutes) into the spastic arteries. Fasudil successfully resolved the spasm and improved myocardial ischemia in all patients without any systemic adverse effects. In conclusion, the treatment with fasudil may be useful to treat intractable and otherwise fatal coronary spasm resistant to intensive conventional vasodilator therapy after CABG.

**Source:** MEDLINE


**Author(s):** Keller KB, Lemberg L

**Citation:** American Journal of Critical Care, July 2004, vol./is. 13/4(350-4), 1062-3264;1062-3264 (2004 Jul)

**Publication Date:** July 2004

**Abstract:** Prinzmetal's angina, often referred to as "variant" angina, is a temporary increase in coronary vascular tone (vasospasm) causing a marked, but transient reduction in luminal diameter. This coronary vasospastic state is usually focal at a single site and can occur in either a normal or diseased vessel. Patients are predominantly younger women who may not have the classical cardiovascular risk factors (except for cigarette use). PVA has been associated with vasospastic disorders such as Raynaud's phenomenon and migraine headaches. Arrhythmias are common and may be life threatening especially when the effects of vasospasm are seen in those ECG leads that reflect the potential variations of the epicardial surface of the left ventricle. Endothelial dysfunction has been considered as primarily responsible for PVA. The diagnosis is made by observing transient ST-segment elevation during the attack of angina. Since PVA is not a "demand"-induced symptom, but rather a supply (vasospastic) abnormality, exercise treadmill stress testing is of no value in the diagnosis of PVA. The most sensitive and specific test for PVA is the administration of ergonovine intravenously. Fifty micrograms at 5-minute intervals is given until a positive result or a maximum dose of 400 microg has been administered. When positive, the symptoms and associated ST-segment elevation should be present. Nitroglycerin rapidly reverses the effects of ergonovine if refractory spasm occurs. Medical therapy classically employs vasodilator drugs, which include nitrates and calcium channel blockers. The prognosis is good when there is no significant coronary artery stenosis. Treatment of associated coronary atherosclerosis in elderly patients with PVA is advised. When PVA is associated with coronary atherosclerosis, the prognosis is determined by the severity of the underlying disease. beta-Blockers and large doses of aspirin are contraindicated in PVA.

**Source:** MEDLINE

**Full Text:**
Available in fulltext at Highwire Press
Available in fulltext at EBSCO Host
27. Vitamin E improves fibrinolytic activity in patients with coronary spastic angina.

Author(s): Miyamoto S, Kawano H, Takazoe K, Soejima H, Sakamoto T, Hokamaki J, Yoshimura M, Nakamura H, Yodoi J, Ogawa H

Citation: Thrombosis Research, 2004, vol./is. 113/6(345-51), 0049-3848;0049-3848 (2004)

Publication Date: 2004

Abstract: INTRODUCTION: The fibrinolytic system has a major role as a defense mechanism against thrombus formation. Net fibrinolytic activity in plasma reflects the balance between tissue-type plasminogen activator and plasminogen activator inhibitor (PAI). PAI is the main factor determining overall fibrinolytic activity.MATERIALS AND METHODS: We examined the effects of oral administration of vitamin E, an antioxidant, on fibrinolytic activity and oxidative stress in patients with coronary spastic angina. Forty patients with coronary spastic angina were randomly assigned into two treatment groups, either vitamin E group (alpha-tocopherol acetate, 400 mg/day) or placebo group by means of computerized system. PAI activity and thioredoxin, a marker of oxidative stress, levels were measured before and at the end of 1 month treatment.RESULTS: Before treatment, the levels of PAI activity and thioredoxin were increased in patients with coronary spastic angina as compared with control subjects (n=17) (PAI activity levels: 13.6+/-1.4 vs. 7.6+/-2.2 IU/ml, p<0.05, thioredoxin levels: 22.8+/-1.7 vs. 16.0+/-1.4 ng/ml, p<0.05). In patients with coronary spastic angina, administration of vitamin E decreased both PAI activity and thioredoxin levels (PAI activity levels: 14.7+/-1.7 to 7.5+/-1.6 IU/ml, p<0.01, thioredoxin levels: 23.3+/-2.4 to 15.1+/-2.5 ng/ml, p<0.01), whereas placebo had no effect on these variables.CONCLUSIONS: Oral administration of vitamin E improved fibrinolytic activity and the improvement was associated with a decrease in oxidative stress. Administration of vitamin E is possible to be an effective adjunct therapy of coronary spasm in the absence of coronary atherosclerosis.

Source: MEDLINE

28. Successful treatment of refractory vasospastic angina with corticosteroids: coronary arterial hyperactivity caused by local inflammation?.

Author(s): Takagi S, Goto Y, Hirose E, Terashima M, Sakuragi S, Suzuki S, Tsutsumi Y, Miyazaki S, Nonogi H

Citation: Circulation Journal, January 2004, vol./is. 68/1(17-22), 1346-9843;1346-9843 (2004 Jan)

Publication Date: January 2004

Abstract: BACKGROUND: Although vasospastic angina usually responds well to treatment with calcium antagonists and/or nitrates, there have been anecdotal case reports of refractory vasospastic angina resistant to intensive treatment with high doses of calcium antagonists and nitrates.METHODS AND RESULTS: Four patients with vasospastic angina, which was refractory to intensive treatment with high doses of calcium antagonists and nitrates, were completely controlled after administration of corticosteroids. Although none of the 4 patients showed eosinophilia, all had bronchial asthma or chronic thyroiditis, and in 2 cases, the activity of vasospastic angina corresponded with that of bronchial asthma.CONCLUSIONS: These findings suggest that in these patients, coronary spasm may have been induced by arterial hyperreactivity because of local inflammation in the coronary arterial wall and that the corticosteroids suppressed the arterial hyperreactivity by alleviating the inflammation. Corticosteroids may be considered as a treatment choice for patients with refractory vasospastic angina, particularly when the patient has an allergic tendency, such as bronchial asthma.

Source: MEDLINE


Author(s): Adachi N, Miyamoto Y, Hodono S, Yorozuya T, Arai T
We report a case of life-threatening arrhythmia that was not predicted before surgery. Pulse-less ventricular tachycardia and ventricular fibrillation occurred during surgery without any changes in heart rate and blood pressure, and cardiac massage was required to maintain circulation. Although no organic stenosis was found in either the right or left coronary arteries, post-surgical angiographic examination revealed severe vasospastic angina induced by intra-luminal administration of acetylcholine. Anaesthesia with a high dose of fentanyl and vasodilators prevented the recurrence of life-threatening arrhythmia. Vasospastic angina attacks are difficult to predict with the preoperative examination routinely employed.

Source: MEDLINE

Full Text:
Available in fulltext at EBSCO Host
Available in print at Lincoln County Hospital Professional Library

30. Successful brachytherapy of coronary vasospasm.

Author(s): Chatterjee T, Juelke PD, Thum P, Erne P

Citation: Heart, September 2003, vol./is. 89/9(e25), 1355-6037;1468-201X (2003 Sep)

Publication Date: September 2003

Abstract: Brachytherapy is a proposed treatment for in-stent restenosis and is the subject of several clinical trials and debates. The standard treatment of patients with variant angina is to eliminate vasoconstrictive factors and to administer vasodilating drugs. This is the first description of successful brachytherapy for coronary spasm.

Source: MEDLINE

Full Text:
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Available in fulltext at National Library of Medicine
Available in print at Grantham Hospital Staff Library
Available in print at Pilgrim Hospital Staff Library

31. Treatment and prognosis of vasospastic angina.

Author(s): Kijima M

Citation: Nippon Rinsho - Japanese Journal of Clinical Medicine, May 2003, vol./is. 61 Suppl 5/(159-66), 0047-1852;0047-1852 (2003 May)

Publication Date: May 2003

Source: MEDLINE

32. Rho-kinase inhibition with intracoronary fasudil prevents myocardial ischemia in patients with coronary microvascular spasm.

Author(s): Mohri M, Shimokawa H, Hirakawa Y, Masamoto A, Takeshita A

Citation: Journal of the American College of Cardiology, January 2003, vol./is. 41/1(15-9), 0735-1097;0735-1097 (2003 Jan 1)

Publication Date: January 2003

Abstract: OBJECTIVES: We sought to determine whether a potent Rho-kinase inhibitor fasudil prevents the occurrence of myocardial ischemia in patients with microvascular angina attributable to coronary microvascular spasm. BACKGROUND: Effective treatment...
of patients with angina who have normal coronary arteriograms (microvascular angina) has not yet been established. Rho-kinase-mediated calcium sensitization of the myosin light chain in smooth muscle cells has been implicated as substantially contributing to vascular hyperconstriction.

METHODS: We studied consecutive 18 patients with angina and normal epicardial coronaries in whom intracoronary acetylcholine (ACh) induced myocardial ischemia (ischemic electrocardiographic changes, myocardial lactate production, or both) without angiographically demonstrable epicardial coronary vasospasm. All patients underwent a second ACh challenge test after pretreatment with either saline (n = 5) or fasudil (4.5 mg intracoronarily, n = 13).

RESULTS: Myocardial ischemia was reproducibly induced by ACh in the saline group. In contrast, 11 of the 13 patients pretreated with fasudil had no evidence of myocardial ischemia during the second infusion of ACh (p < 0.01). The lactate extraction ratio (median value [interquartile range]) during ACh infusion was improved by fasudil pretreatment, from -0.16 (-0.25 to 0.04) to 0.09 (0.05 to 0.18) (p = 0.0125).

CONCLUSIONS: Fasudil ameliorated myocardial ischemia in patients who were most likely having coronary microvascular spasm. The inhibition of Rho-kinase may be a novel therapeutic strategy for this group of patients with microvascular angina.

Source: MEDLINE

Full Text:
Available in fulltext at Highwire Press

33. Treatment of refractory coronary vasospasm during cardiopulmonary bypass with compulsory coronary perfusion.

Author(s): Ito T, Sakurai K, Nakayama T, Yamazaki T, Yano Y, Abe T

Citation: Annals of Thoracic & Cardiovascular Surgery, December 2002, vol./is. 8/6(386-8), 1341-1098;1341-1098 (2002 Dec)

Publication Date: December 2002

Abstract: Coronary vasospasm is still a devastating complication during cardiac surgery. We report on a case of intractable coronary vasospasm in a 45-year-old male during coronary bypass surgery refractory to drugs and intra-aortic balloon pumping (IABP). Under cardiopulmonary bypass (CPB) support, the aorta was again cross-clamped and the aortic root was compulsorily perfused with pump blood using a small pump for infusion of cardioplegia. Vasodilators were administered through the perfusion line. Coronary vasospasm was dramatically resolved. He was then successfully weaned from CPB and recovered without further incidents.

Source: MEDLINE

34. Treatment of medically uncontrolled coronary artery spasm in the normal coronary artery with coronary stenting.

Author(s): Nedeljkovic MA, Ostojic M, Beleslin B

Citation: Journal of Invasive Cardiology, October 2002, vol./is. 14/10(633-5), 1042-3931;1042-3931 (2002 Oct)

Publication Date: October 2002

Abstract: We present a 53-year-old male with recurrent episodes of vasospastic angina and serious complications of coronary artery spasm including ventricular fibrillation and myocardial infarction, who was treated with coronary stenting at the site of ergonovine-induced coronary vasospasm where the coronary artery appeared angiographically normal, i.e., without evidence of atherosclerotic lesion.

Source: MEDLINE

35. [Serotonin receptor blockade effective for postprandial vasospastic angina associated with dumping syndrome after esophagectomy: a case report].

Author(s): Iwasawa T, Yasu T, Kubo N, Fujii M, Kuroki M, Kawakami M, Saito M

Citation: Journal of Cardiology, July 2002, vol./is. 40/1(19-24), 0914-5087;0914-5087 (2002 Jul)
Publication Date: July 2002

Abstract: A 49-year-old woman was admitted to our hospital because of frequent postprandial esophageal angina. After successful pyloric plasty, chest oppression lasting 5 to 15 min developed postprandially as well as symptoms of dumping syndrome. Electrocardiography showed ST-segment elevation in the II, III, aVf and precordial leads (V2 to V6). Finally, giant positive T waves and U waves were uniquely noted in the V1 to V5 leads. Intracoronary administration of acetylcholine (20 micrograms) provoked severe diffuse spasm in both right and left coronary arteries, chest pain and ST elevation. The conventional treatment for vasospastic angina, such as Ca2+ antagonists, nitrates and K channel opener, achieved no response. However, the combination with serotonergic receptor blockade reduced anginal attack. These findings suggest that the spastic angina in this case was partly caused by serotonin.

Source: MEDLINE

36. Stenting for coronary artery spasm.

Author(s): Khatri S, Webb JG, Carere RG, Dodek A

Citation: Catheterization & Cardiovascular Interventions, May 2002, vol./is. 56/1(16-20), 1522-1946;1522-1946 (2002 May)

Publication Date: May 2002

Abstract: We evaluated coronary stenting in nine patients with clinically severe, angiographically documented spasm refractory to aggressive pharmacologic management. No patient subsequently developed unstable ischemia requiring hospitalization as a consequence of recurrent spasm within the stent. Mechanisms of therapeutic failure included both persistent spasm and spasm in a different artery in one patient. Restenosis occurred in three patients who subsequently underwent repeat revascularization. In the rare, carefully selected patient, stents may represent an adjunct in the management of focal coronary artery spasm, although currently medical therapy remains the standard initial approach. Copyright 2002 Wiley-Liss, Inc.

Source: MEDLINE


Author(s): Masumoto A, Mohri M, Shimokawa H, Urakami L, Usui M, Takeshita A

Citation: Circulation, April 2002, vol./is. 105/13(1545-7), 0009-7322;1524-4539 (2002 Apr 2)

Publication Date: April 2002

Abstract: BACKGROUND: Increased activity of Rho-kinase causes hypercontraction of vascular smooth muscle and has been implicated as playing a pathogenetic role in divergent cardiovascular diseases such as coronary artery spasm. We examined whether an intracoronary infusion of fasudil, a selective Rho-kinase inhibitor, would attenuate coronary vasoconstrictor responses to acetylcholine (ACh) in patients with vasospastic angina.METHODS AND RESULTS: We studied 20 consecutive patients in whom coronary artery spasm was provoked by intracoronary ACh. The patients underwent a second ACh challenge after pretreatment with intracoronary saline (n=5) or fasudil (n=15; 300 microg/min for 15 minutes). Angina and coronary vasospasm were reproducibly induced by the second testing in patients who received saline. In contrast, fasudil markedly attenuated the coronary constriction induced by ACh (P<0.001) and prevented the occurrence of chest pain and ischemic ECG changes in all treated patients (both P<0.01 versus saline). Fasudil, at the dose used in this study, did not significantly change systemic hemodynamics or baseline coronary blood flow.CONCLUSIONS: Fasudil was effective in preventing ACh-induced coronary artery spasm and resultant myocardial ischemia in patients with vasospastic angina. We suggest that this Rho-kinase inhibitor may be a novel therapeutic intervention to treat ischemic coronary syndromes caused by coronary artery spasm.

Source: MEDLINE
38. Successful management of intractable coronary spasm with a coronary stent.


**Citation:** Japanese Circulation Journal, November 2000, vol./is. 64/11(897-900), 0047-1828;0047-1828 (2000 Nov)

**Publication Date:** November 2000

**Abstract:** Although the long-term survival of patients suffering from coronary spasm is usually excellent, serious complications can develop, such as disabling pain, myocardial infarction, ventricular tachyarrhythmias, atrioventricular block and sudden cardiac death. A 40-year-old man who had intractable chest pain from coronary artery spasm suffered ventricular fibrillation and an acute anterior myocardial infarction upon first admission. The patient underwent a coronary angiogram, which revealed a spontaneous focal spasm at the proximal left anterior descending coronary artery (LAD). He was treated by the combination of nitrate and calcium channel blocker, but continued to complain of severe chest pain despite intensive medical therapy and he had to be treated in the emergency room 5 times during an 8-month follow-up period. An ergonovine coronary angiogram was performed and an intracoronary ultrasound examination, which revealed a focal spasm at the same site of the proximal LAD with a small amount of localized eccentric atheromatous plaque. A coronary artery stent was placed in the proximal LAD and his symptoms resolved. A follow-up coronary angiogram was performed 3 years after stenting and the stent remained patent without any in-stent restenosis or spasm.

**Source:** MEDLINE

39. Refractory coronary spasm relieved by intracoronary administration of nicorandil.

**Author(s):** Noguchi T, Nonogi H, Yasuda S, Daikoku S, Morii I, Itoh A, Goto Y, Miyazaki S

**Citation:** Japanese Circulation Journal, May 2000, vol./is. 64/5(396-8), 0047-1828;0047-1828 (2000 May)

**Publication Date:** May 2000

**Abstract:** Two patients in whom coronary spasm was refractory to intracoronary injection of nitroglycerin were relieved by intracoronary administration of nicorandil (a nitrate and potassium channel opener) during catheterization. These findings suggest that nicorandil may prove useful as an additional therapeutic agent.

**Source:** MEDLINE

40. Spontaneous and diffuse coronary artery spasm unresponsive to conventional intracoronary pharmacological therapy: a case report.

**Author(s):** Rashid H, Marshall RJ, Diver DJ, Breall JA

**Citation:** Catheterization & Cardiovascular Interventions, February 2000, vol./is. 49/2(188-91), 1522-1946;1522-1946 (2000 Feb)

**Publication Date:** February 2000

**Source:** MEDLINE

41. Intravenous atropine relieves coronary arterial spasm and hemodynamic decompensation during recovery after exercise.

**Author(s):** Hung MJ, Wang CH, Kuo LT, Cherng WJ
A 66-year-old man developed right coronary arterial spasm and hemodynamic decompensation during the early recovery phase of a treadmill exercise test. The unstable condition was corrected immediately after intravenous administration of atropine. A subsequent coronary angiographic study revealed insignificant right coronary artery stenosis. The pathophysiology of this response may be related to rapid alterations in autonomic balance during recovery after exercise. To our knowledge, this is the 1st reported case in which atropine effected immediate reversal of coronary arterial spasm and hemodynamic decompensation that were induced by exercise, rather than by pharmacologic agents. Atropine might be an effective treatment in patients who experience exercise-induced coronary arterial spasm and hemodynamic decompensation, but further investigation is warranted.

Abstract: A 45-year-old White man presented with the classic history of Prinzmetal's variant angina, culminating in a transmural inferior myocardial infarction despite intensive treatment with continuous nitroglycerin infusion and the oral calcium antagonist nifedipine. During the frequent episodes of 'pre-infarction' Prinzmetal's variant angina intermittent second-degree atrioventricular heart block as well as ventricular tachycardia was witnessed, necessitating the insertion of a temporary transvenous right ventricular pacemaker. Selective coronary angiography performed approximately 1 week after the infarction in an attempt to elucidate the cause of continuing chest pain unresponsive to medication showed subtotal occlusion of the distal part of the dominant right coronary artery proximal to the origin of the artery to the atrioventricular node, while only very minor narrowings of the internal lumen were evident in the left coronary artery. The well-known angiographic features of a resolving intracoronary thrombus were visualized without any superimposed reversible coronary vasospasm. After catheterization the angina settled down and the patient was discharged on oral nifedipine and isosorbide dinitrate treatment.

The place of coronary artery spasm in the pathophysiology of acute myocardial infarction, one facet of the clinical spectrum of ischaemic heart disease, is reviewed.

Abstract: Angina from coronary artery spasm is not rare. Because new and effective medical therapy is now available, it is imperative that the physician recognize this syndrome when it occurs. Coronary artery spasm can present clinically as unstable rest angina with reversible ST-segment elevation and bradyarrhythmias and tachyarrhythmias. In this setting, Prinzmetal's variant angina is generally promptly recognized and appropriately treated. The diagnosis is variant angina, however, often is not so obvious. Chest pain may be exertional or seem noncardiac in origin. The chest pain syndrome may be chronic and stable as well as unstable. The ECG may show ST-segment depression, rather than elevation. Five cases of coronary artery spasm that emphasize the variable...
features of variant angina and offer aid for the prompt diagnosis and treatment of the syndrome are presented here.

Source: MEDLINE

44. Prinzmetal's angina with documented coronary artery spasm. Treatment and follow-up.

Author(s): Huckell VF, McLaughlin PR, Morch JE, Wigle ED, Adelman AG

Citation: British Heart Journal, June 1981, vol./is. 45/6(649-55), 0007-0769;0007-0769 (1981 Jun)

Publication Date: June 1981

Abstract: Eighteen patients with Prinzmetal's angina were studied angiographically and 17 were followed for an average of 27 months. The were 12 men and six women, with a mean age of 46.3 years. The mean duration of symptoms before clinical diagnosis was 4.1 weeks. Four had a previous myocardial infarction. Six patients had spontaneous cardiac arrests within 48 hours of diagnosis and hospital admission. At coronary arteriography, 10 patients had significant coronary artery disease; two of these had coronary artery spasm. The remaining eight patients had normal coronary arteries with significant coronary artery spasm at arteriography. Angiographic mitral valve prolapse was found in eight patients; seven of these had inferior ST segment elevation with pain. Six of the 10 patients with significant coronary artery disease had aortocoronary bypasses performed with good results. Ten of the remaining 11 patients who were treated medically had their symptoms controlled with oral isosorbide dinitrate alone or in combination with propranolol, nifedipine or perhexiline but propranolol may have an adverse effect. Though the initial clinical course in untreated patients was unfavourable, progress after starting treatment was good, with no further cardiac arrests, myocardial infarctions, or deaths.

Source: MEDLINE

Full Text:

Available in fulltext at National Library of Medicine

MEDLINE results for coronary artery spasm OR prinzmetal's angina


Author(s): Carneiro Neto JD, Lima Neto JA, Simoes RM, Stolf NA

Citation: Revista Brasileira de Cirurgia Cardiovascular: Orgao Oficial da Sociedade Brasileira de Cirurgia Cardiovascular, September 2010, vol./is. 25/3(410-4), 0102-7638;1678-9741 (2010 Sep)

Publication Date: September 2010

Abstract: Coronary artery spasm in perioperative of coronary artery bypass graft surgery is a serious complication, with high rate mortality. Patient 51 years-old submitted to coronary artery bypass graft surgery without Extracorporeal Circulation. The patient evolved in 1st post operative (PO) day with enzymatic alteration and ST-elevation, developing soon afterwards in ventricular fibrillation, defibrillation with success. Cardiac catheterization showed important spasm of all coronary arteries and anastomosis between the left internal thoracic artery and the left anterior interventricular artery. Intracoronary Vasodilators and intra-graft, with re-establishment of their usual and immediate calibers to improve clinic and Hemodynamic stability was used. Satisfactory evolution, discharged at 13rd PO day.

Source: MEDLINE

2. PDE5 inhibitors and their applications.

Author(s): Giovannoni MP, Vergelli C, Graziano A, Dal Piaz V

Citation: Current Medicinal Chemistry, August 2010, vol./is. 17/24(2564-87), 0929-8673;1875-533X (2010 Aug)
Publication Date: August 2010

Abstract: PDE5 belongs to a superfamily of enzymes that catalyzes the hydrolysis of cyclic nucleotides cAMP and cGMP to the corresponding 5-nucleoside monophosphate. PDE5 takes part in many physiological and pathological functions, therefore selective PDE5 inhibitors are potentially useful for a variety of pathologies. At the present, PDE5 inhibitors available on the market have been used for the treatment of erectile dysfunction but, at the same time, are in clinical trials investigating other pathologies such as pulmonary arterial hypertension, coronary vasospasm, benign prostatic hyperplasia etc. This review analyzes the PDE5 inhibitors currently in clinical use, the drugs in clinical trials and the most representative chemical classes published in literature in this last decade.

Source: MEDLINE


Author(s): JCS Joint Working Group

Citation: Circulation Journal, August 2010, vol./is. 74/8(1745-62), 1346-9843;1347-4820 (2010 Aug)

Publication Date: August 2010

Source: MEDLINE

4. The role of percutaneous cardiopulmonary support in the treatment of native coronary spasm after coronary artery bypass grafting.

Author(s): Min HK, Lee YT, Kim WS, Kim SW

Citation: Heart Surgery Forum, April 2010, vol./is. 13/2(E126-8), 1098-3511;1522-6662 (2010 Apr)

Publication Date: April 2010

Abstract: Postoperative coronary artery spasm following off-pump coronary artery bypass is a rare and unpredictable complication. The clinical manifestations following spasm vary, depending on the severity or the affected vessels. In serious cases, it can proceed to circulatory collapse and cardiac arrest. Coronary angiography with infusion of coronary vasodilators has been a well-established diagnostic and therapeutic tool. We present a patient who was successfully resuscitated with an intra-aortic balloon pump (IABP) and percutaneous cardiopulmonary support (PCPS) as initial stabilization because of an inability to proceed to angiography. Furthermore, we demonstrated the effectiveness of IABP and PCPS for restoring cardiac function.

Source: MEDLINE


Author(s): Hajlaoui N, Tarragano F, Raisky P, Beaufils P, Henry P

Citation: Annales de Cardiologie et d Angeiologie, April 2010, vol./is. 59/2(103-6), 0003-3928;1768-3181 (2010 Apr)

Publication Date: April 2010

Abstract: Medical treatment of coronary spastic angina is based classically on the association of calcium channel blockers with nitrate derivatives. Some clinical forms of spastic angina remain refractory to these medications and can thus lead to serious complications (sudden cardiac death secondary to ventricular rhythm disturbance, myocardial infarction...). When the coronary spasm is focal, percutaneous coronary angioplasty with deployment of a stent can offer an interesting therapeutic alternative. We report in this article the case of a patient who had a focal spasm of the right coronary artery, which became refractory to optimal medical treatment. This patient was well improved by percutaneous angioplasty with deployment of a stent in the spastic segment of the...
the right coronary artery. We propose also a review of the literature of the treatment of this pathology, which still remains not well codified.

**Source:** MEDLINE

### 6. The first provocative test for coronary artery spasm at the Cleveland Clinic.

**Author(s):** Siegel W  
**Citation:** American Journal of Cardiology, April 2010, vol./is. 105/8(1198-9), 0002-9149;1879-1913 (2010 Apr 15)  
**Publication Date:** April 2010  
**Abstract:** This article provides narration of the events during the development of ergonovine maleate infusions for detecting coronary artery spasm at the Cleveland Clinic in 1973. This was the first safe, reproducible and reliable test for angiographic visualization of the pathophysiology associated with the Prinzmetal Syndrome termed "angina inversa".

**Source:** MEDLINE

### 7. Current advances in the understanding of coronary vasospasm.

**Author(s):** Hung MJ  
**Citation:** World Journal of Cardiology, February 2010, vol./is. 2/2(34-42), 1949-8462 (2010 Feb 26)  
**Publication Date:** February 2010  
**Abstract:** Recent years have witnessed progress in our understanding of coronary vasospasm (CVS). It is evident that this is not only an East Asian but also a global disease associated with significant symptoms and possible lethal sequelae for afflicted individuals. A correct diagnosis depends on the understanding of pathogenesis and symptomatology of CVS. With the correct diagnosis, we can manage CVS patients effectively and promptly, providing optimal patient safety. Advances in our understanding of interactions between inflammation, endothelium, and smooth muscle cells have led to substantial progress in understanding the pathogenesis of symptoms in CVS and have provided some insights into the basic etiology of this disorder in some patient subpopulations. We look forward to a time when therapy will address pathophysiology and perhaps, even the primary etiology.

**Source:** MEDLINE  
**Full Text:**  
Available in fulltext at [National Library of Medicine](https://www.nlm.nih.gov)

### 8. High incidence of repeat anginal attacks despite treatment with calcium-channel blockers in patients with coronary spastic angina.

**Author(s):** Ogawa T, Komukai K, Ogawa K, Kosuga T, Nagoshi T, Minai K, Sakamoto H, Hashimoto K, Yoshida S, Taniguchi I, Mochizuki S, Yoshimura M  
**Citation:** Circulation Journal, March 2009, vol./is. 73/3(512-5), 1346-9843;1346-9843 (2009 Mar)  
**Publication Date:** March 2009  
**Abstract:** BACKGROUND: Calcium-channel blockers (CCBs) are highly effective in suppressing coronary spasm and are widely used as the standard therapy for coronary spastic angina, but it is unclear if CCB treatment completely suppresses the symptoms. METHODS AND RESULTS: The clinical course of the symptoms caused by coronary spasm was investigated in patients taking CCBs: 90 patients were evaluated and 80 patients were followed. The mean follow-up period was 1,796 +/- 1,169 days. There were no cardiac deaths, but 3 patients were admitted to the hospital, 1 because of the onset of non-Q wave myocardial infarction and 2 because of repeat anginal attacks. In those 2 patients, medical therapy was discontinued at their discretion. In the follow-up analysis, we found that the incidence of symptoms caused by repeat anginal attacks was 37.0% (27/73) in the first year and was increasing every year. CONCLUSIONS: CCBs are strongly recommended for improving the prognosis of coronary spasm, but in many cases they do
not suppress completely symptoms.

Source: MEDLINE

9. **Coronary artery spasm: a rare but important cause of postoperative myocardial infarction.**

Author(s): Guo LR, Myers ML, Kuntz EL

Citation: Annals of Thoracic Surgery, September 2008, vol./is. 86/3(994-5), 0003-4975;1552-6259 (2008 Sep)

Publication Date: September 2008

Abstract: Myocardial infarction that is attributed to native coronary artery spasm in the early postoperative phase has rarely been documented. We report three cases of postoperative myocardial infarction secondary to angiographically demonstrated coronary spasm. Native coronary artery spasm is a rare, but important cause of postoperative ischemia and infarction. Suspicious electrocardiographic changes warrant consideration of transesophageal echocardiography to detect unexpected wall motion abnormalities. Established treatments include intravenous or intracoronary infusion of nitroglycerin and calcium channel antagonists, although several new therapeutic agents may also be beneficial. Prompt coronary angiography is the only definitive modality for early diagnosis and targeted treatment.

Source: MEDLINE

Full Text:
Available in fulltext at [Highwire Press](#)

10. **Endoscopic thoracic sympathectomy as a novel strategy for vasospastic angina refractory to medical treatments.**

Author(s): Yoshida K, Inoue T, Hirakawa N, Node K

Citation: Journal of Cardiology, August 2008, vol./is. 52/1(49-52), 0914-5087;1876-4738 (2008 Aug)

Publication Date: August 2008

Abstract: Although vasospastic angina (VSA) is usually controlled by medications, refractory or lethal cases are occasionally encountered. We performed bilateral endoscopic thoracic sympathectomy (ETS) in 5 male patients with refractory VSA. Prior to ETS, stellate ganglion blockade was performed in 4 patients to reduce VSA attacks and to confirm the effect of sympathetic blockade. Under endoscopic guidance, the second to fourth thoracic sympathetic ganglia were ablated with a YAG-laser. No patient had complications after ETS, including major sweating abnormalities. In 4 of 5 patients, ETS relieved all VSA symptoms. ST-segment elevation often detected before ETS was absent on repeated ambulatory 24-h Holter monitoring after ETS. ETS is an effective strategy for the treatment of refractory VSA.

Source: MEDLINE

11. **A case of vasospastic angina showing resolution of coronary vasospasm in acetylcholine provocation test corresponding to regression of coronary atherosclerosis.**

Author(s): Tani S, Watanabe I, Anazawa T, Kawamata H, Tachibana E, Fuji T, Matsumoto M, Onikura M, Sato Y, Nagao K, Kannatsuse K, Kushiyo T, Hirayama A

Citation: International Journal of Cardiology, March 2008, vol./is. 125/1(e1-3), 0167-5273;1874-1754 (2008 Mar 28)

Publication Date: March 2008

Abstract: We experienced a case of vasospastic angina showing resolution of vasospasm in the acetylcholine provocation test corresponding to regression of coronary atherosclerotic plaque following treatment with a combination of benidpine and pravastatin.

Source: MEDLINE
Author(s): Asano T, Kobayashi Y, Ohno M, Nakayama T, Kuroda N, Komuro I
Citation: Angiology, October 2007, vol./is. 58/5(636-9), 0003-3197;0003-3197 (2007 Oct-Nov)
Publication Date: October 2007
Abstract: This case report describes multivessel coronary artery spasm refractory to oral nifedipine, intravenous isosorbide dinitrate, diltiazem and nicorandil, and intracoronary nitroglycerin. Intracoronary administration of nicorandil only transiently relieved coronary artery spasm. Prednisolone was effective in preventing coronary artery spasm.
Source: MEDLINE
Full Text:
Available in fulltext at EBSCO Host

13. Coronary stenting for coronary vasospasm refractory to medical therapy.
Author(s): Burns A, Malaiapan Y, Meredith I
Citation: Catheterization & Cardiovascular Interventions, September 2007, vol./is. 70/3(379-82), 1522-1946;1522-1946 (2007 Sep)
Publication Date: September 2007
Abstract: We describe the case of a 54-year-old male with recurrent chest pain, ST segment elevation, and bradycardia. Coronary vasospasm was confirmed by acetylcholine challenge. After failing medical therapy, stenting of an extensive segment of the right coronary artery has been clinically successful after 24-months follow-up. (c) 2007 Wiley-Liss, Inc.
Source: MEDLINE

Author(s): Ajani AE, Yan BP
Citation: Heart, Lung & Circulation, February 2007, vol./is. 16/1(10-5), 1443-9506;1443-9506 (2007 Feb)
Publication Date: February 2007
Abstract: Coronary artery spasm is an important cause of chest pain and myocardial ischaemia. It can be defined as an exaggerated contractile response of epicardial coronary artery smooth muscle to various stimuli but the underlying mechanism is not well understood. Recent studies have shown that the loss of endothelial vasodilatory function in conjunction with an increase in vascular smooth muscle constrictor sensitivity to calcium are the likely predisposing conditions for coronary spasm. This review highlights current understanding of the pathophysiology, predisposing factors, diagnostic and therapeutic approaches for coronary spasm.
Source: MEDLINE

Author(s): Pragliola C, Altamura L, Niccoli G, Siviglia M, De Paulis S, Possati GF
Citation: Annals of Thoracic Surgery, February 2007, vol./is. 83/2(670-2), 0003-4975;1552-6259 (2007 Feb)
Publication Date: February 2007
Abstract: We report a case of coronary spasm soon after aortic valve replacement associated with hemodynamic and arrhythmic instability. The spasm was demonstrated at coronary angiography and was resolved with the intracoronary infusion of nitrates and antiarrhythmics.
16. **Stent implantation in variant angina refractory to medical treatment.**

**Author(s):** Martí V, Ligero C, Garcia J, Kastanis P, Guindo J, Domínguez de Rozas JM  
**Citation:** Clinical Cardiology, December 2006, vol./is. 29/12(530-3), 0160-9289;0160-9289 (2006 Dec)  
**Publication Date:** December 2006  
**Abstract:** BACKGROUND: Vasospastic angina usually responds well to medical treatment. HYPOTHESIS: The present study describes our experience in patients who received a coronary stent because of recurrent variant angina refractory to medical treatment and evaluates stent implantation as an alternative treatment. MATERIALS AND METHODS: Between March 1998 and February 2005, recurrent variant angina was diagnosed in 22 patients admitted to our coronary care unit. Of these, five patients (22.7%), were refractory to pharmacologic treatment. Coronary angiography and coronary stents were indicated. Clinical follow-up was 29 +/- 6 months. RESULTS: Stenting was performed during diagnostic coronary angiography in two patients. In the other three patients, the stent was implanted 24-48 h later. We observed coronary spasm recurrences proximal or distal to the stent in four patients-two during the stent implantation procedure and the other two in the coronary care unit within 48 h post angioplasty. Three patients where treated with additional stenting and the fourth patient improved with pharmacologic treatment. During follow-up three patients remained asymptomatic. The fourth patient had diffuse in-stent restenosis in the third month, and the fifth patient showed a de novo lesion in the treated segment 2 years later. CONCLUSIONS: Stent implantation in patients with recurrent variant angina refractory to medical treatment may be an alternative treatment in carefully selected, clinically unstable patients. Spasm recurrences may occur in other segments of the treated artery, probably due to the diffuse nature of the disease. Immediate and continued surveillance is recommended because of the risk of adverse clinical events.

17. **Variations in presentation and various options in management of variant angina.**

**Author(s):** Mishra PK  
**Citation:** European Journal of Cardio-Thoracic Surgery, May 2006, vol./is. 29/5(748-59), 1010-7940;1010-7940 (2006 May)  
**Publication Date:** May 2006  
**Abstract:** Patients with variant angina represent a diagnostic and therapeutic dilemma. Variant angina is a disease with various causes, variations in treatment guidelines and variable prognosis. In an era of robotic cardiac surgery and automatic cardioverter defibrillators, it is regrettable that we lack enough information on the optimal management of this entity. Lack of randomised trials and a tendency for spontaneous remissions makes interpretation of results difficult. We review the pathophysiology, presentation and recent developments in medical and surgical management of variant angina. Literature is full of conflicting data and it is difficult to make specific recommendations.

18. **Physiological role of ROCKs in the cardiovascular system.**

**Author(s):** Noma K, Oyama N, Liao JK  
**Citation:** American Journal of Physiology - Cell Physiology, March 2006, vol./is. 290/3(C661-8), 0363-6143;0363-6143 (2006 Mar)
Publication Date: March 2006

Abstract: Rho-associated kinases (ROCKs), the immediate downstream targets of RhoA, are ubiquitously expressed serine-threonine protein kinases that are involved in diverse cellular functions, including smooth muscle contraction, actin cytoskeleton organization, cell adhesion and motility, and gene expression. Recent studies have shown that ROCKs may play a pivotal role in cardiovascular diseases such as vasospastic angina, ischemic stroke, and heart failure. Indeed, inhibition of ROCKs by statins or other selective inhibitors leads to the upregulation and activation of endothelial nitric oxide synthase (eNOS) and reduction of vascular inflammation and atherosclerosis. Thus inhibition of ROCKs may contribute to some of the cholesterol-independent beneficial effects of statin therapy. Currently, two ROCK isoforms have been identified, ROCK1 and ROCK2. Because ROCK inhibitors are nonselective with respect to ROCK1 and ROCK2 and also, in some cases, may be nonspecific with respect to other ROCK-related kinases such as myristolated alanine-rich C kinase substrate (MARCKS), protein kinase A, and protein kinase C, the precise role of ROCKs in cardiovascular disease remains unknown. However, with the recent development of ROCK1- and ROCK2-knockout mice, further dissection of ROCK signaling pathways is now possible. Herein we review what is known about the physiological role of ROCKs in the cardiovascular system and speculate about how inhibition of ROCKs could provide cardiovascular benefits.

Source: MEDLINE

Full Text: Available in fulltext at Highwire Press


Author(s): El-Bialy A, Shenoda M, Caraang C

Citation: Journal of Invasive Cardiology, February 2006, vol./is. 18/2(E95-8), 1042-3931;1557-2501 (2006 Feb)

Publication Date: February 2006

Abstract: Serotonin (5-hydroxytryptamine) has been recently shown to be an important mediator of coronary vasospasm. Its divergent effect on normal and atherosclerosed arteries has been demonstrated in both animal and human studies. We present a case of coronary vasospasm in a 55-year-old man with repeated episodes of chest pain following coronary percutaneous intervention. Repeat angiography demonstrated no reocclusion or complication. The patient's symptoms were resistant to treatment with maximum doses of two calcium channel antagonists and oral and intravenous nitrates, but responded to cyproheptadine, a nonselective serotonin antagonist. Currently, there are only two reported cases of coronary vasospasm following balloon angioplasty responding to treatment with serotonin antagonists. This is the first case reported case following drug-eluting stent deployment.

Source: MEDLINE

20. Control of hypereosinophilic syndrome-associated recalcitrant coronary artery spasm by combined treatment with prednisone, imatinib mesylate and hydroxyurea.

Author(s): Butterfield JH, Sharkey SW

Citation: Experimental & Clinical Cardiology, 2006, vol./is. 11/1(25-8), 1205-6626;1205-6626 (2006)

Publication Date: 2006

Abstract: Uncontrolled hypereosinophilic syndrome is frequently associated with cardiovascular consequences that cause significant morbidity and mortality. The present article reports on a patient with hypereosinophilic syndrome in whom recurrent, recalcitrant coronary artery spasm and associated cardiac arrest were the predominant cardiac manifestations. No valvular abnormalities, evidence of mural thrombi or other cardiac findings commonly associated with hypereosinophilic syndrome were detected, and cardiac function remained normal. The serum tryptase level was normal, cysteine-rich hydrophobic
domain 2 (CHIC2) deletion analysis of bone marrow cells was negative and no evidence of mastocytosis or other hematological disorder was found in the bone marrow. To allow for the reduction of prednisone, interferon-alpha-2b was added to the patient's program, but caused aggravation of chest pain and was discontinued. However, a combination of reduced prednisone dosage, imatinib mesylate and hydroxyurea successfully controlled the eosinophilia, and thereafter, episodes of coronary artery spasm did not recur. The clinical features of the present case suggest that, in some patients, hypereosinophilia may manifest as resistant coronary artery spasm and that aggressive control of eosinophilia is necessary.

Source: MEDLINE

21. Rho-kinase is an important therapeutic target in cardiovascular medicine.

Author(s): Shimokawa H, Takeshita A

Citation: Arteriosclerosis, Thrombosis & Vascular Biology, September 2005, vol./is. 25/9(1767-75), 1079-5642;1524-4636 (2005 Sep)

Publication Date: September 2005

Abstract: Rho-kinase has been identified as one of the effectors of the small GTP-binding protein Rho. Accumulating evidence has demonstrated that Rho/Rho-kinase pathway plays an important role in various cellular functions, not only in vascular smooth muscle cell (VSMC) contraction but also in actin cytoskeleton organization, cell adhesion and motility, cytokinesis, and gene expressions, all of which may be involved in the pathogenesis of cardiovascular disease. At molecular level, Rho-kinase upregulates various molecules that accelerate inflammation/oxidative stress, thrombus formation, and fibrosis, whereas it downregulates endothelial nitric oxide synthase. The expression of Rho-kinase itself is mediated by protein kinase C/NF-kappaB pathway with an inhibitory and stimulatory modulation by estrogen and nicotine, respectively. At cellular level, Rho-kinase mediates VSMC hypercontraction, stimulates VSMC proliferation and migration, and enhances inflammatory cell motility. In animal studies, Rho-kinase has been shown to be substantially involved in the pathogenesis of vasospasm, arteriosclerosis, ischemia/reperfusion injury, hypertension, pulmonary hypertension, stroke and heart failure, and to enhance central sympathetic nerve activity. Finally, in clinical studies, fasudil, a Rho-kinase inhibitor, is effective for the treatment of a wide range of cardiovascular disease, including cerebral and coronary vasospasm, angina, hypertension, pulmonary hypertension, and heart failure, with a reasonable safety. Thus, Rho-kinase is an important therapeutic target in cardiovascular medicine.

Source: MEDLINE

22. Is there a role for provocation testing to diagnose coronary artery spasm?

Author(s): Adlam D, Azeem T, Ali T, Gershlick A

Citation: International Journal of Cardiology, June 2005, vol./is. 102/1(1-7), 0167-5273;0167-5273 (2005 Jun 22)

Publication Date: June 2005

Abstract: Spontaneous coronary artery spasm is an important cause of morbidity both in patients with coronary artery disease and in those with variant angina. A number of pharmacological agents have been identified which can provoke coronary artery spasm in susceptible patients. The role of provocation testing in the clinical diagnosis of coronary spasm is controversial. This is reflected by variations in the clinical use of provocation testing between specialist cardiac centres. Provocation testing appears to be a sensitive method of identifying patients with variant angina and active disease but such patients can often be diagnosed clinically. The specificity is less clear. There is little evidence that altering patient therapy on the basis of a positive test modifies prognosis. There may be a
role for provocation testing in rare patients with refractory disease to identify a target site for coronary stenting. A more widespread use of these tests in patients with undiagnosed chest pain syndromes would not currently be recommended.

Source: MEDLINE

23. **ROCKs as therapeutic targets in cardiovascular diseases.**

Author(s): Rikitake Y, Liao JK

Citation: Expert Review of Cardiovascular Therapy, May 2005, vol./is. 3/3(441-51), 1477-9072;1744-8344 (2005 May)

Publication Date: May 2005

Abstract: There is growing evidence that Rho-kinases (ROCKs), the immediate downstream targets of the small guanosine triphosphate-binding protein Rho, may contribute to cardiovascular disease. ROCKs play a central role in diverse cellular functions such as smooth muscle contraction, stress fiber formation and cell migration and proliferation. Overactivity of ROCKs is observed in cerebral ischemia, coronary vasospasm, hypertension, vascular inflammation, arteriosclerosis and atherosclerosis. ROCKs, therefore, may be an important and still relatively unexplored therapeutic target in cardiovascular disease. Recent experimental and clinical studies using ROCK inhibitors such as Y-27632 and fasudil have revealed a critical role of ROCKs in embryonic development, inflammation and oncogenesis. This review will focus on the potential role of ROCKs in cellular functions and discuss the prospects of ROCK inhibitors as emerging therapy for cardiovascular diseases.

Source: MEDLINE

24. **Coronary vasospasm leading to an acute myocardial infarction after the administration of dolasetron.**

Author(s): Arole A, Kroll HR, Brown M

Citation: Journal of Clinical Anesthesia, February 2005, vol./is. 17/1(72-4), 0952-8180;0952-8180 (2005 Feb)

Publication Date: February 2005

Abstract: The 5-hydroxytryptamine antagonists are commonly used agents for the treatment of postoperative nausea and vomiting. However, these drugs can have significant cardiovascular adverse effects. We report a case of acute myocardial infarction after administration of dolasetron in a 17-year-old adolescent girl during strabismus corrective surgery.

Source: MEDLINE

25. **Multivessel variant angina unresponsive to urapidil.**

Author(s): Vydt T, Wildiers A, Vrints CJ

Citation: Acta Cardiologica, August 2004, vol./is. 59/4(439-43), 0001-5385;0001-5385 (2004 Aug)

Publication Date: August 2004

Abstract: We present a case of variant angina complicated by recurrent sudden cardiac death. During coronary angiography a diffuse 3-vessel vasoconstriction was observed progressing to a more severe vasoconstriction in the mid LAD. Intracoronary administration of urapidil did not reverse the vasoconstriction of the LAD; instead an occlusive vasospasm occurred accompanied by marked ischaemia.

Source: MEDLINE

26. **Did the widespread use of long-acting calcium antagonists decrease the occurrence of variant angina?**

Author(s): Sueda S, Kohno H, Fukuda H, Uraoka T
BACKGROUND: We have not often encountered variant angina (VA) since the use of long-acting calcium antagonists (L-CAs) became widespread. OBJECTIVES: This study examined the frequency of VA retrospectively.

METHODS: and results: We diagnosed angiographically confirmed coronary spastic angina (CSA) in 349 consecutive patients using selective spasm provocation tests from January 1991 to December 2002. During this period, 3,148 diagnostic cardiac catheterizations and 1,515 selective spasm provocation tests were performed. Seventy-four of these 349 patients (21.2%) had VA. Coronary spasms were defined as transient luminal narrowings of > 99%, and VA was defined as an ST elevation during spontaneous attacks or noninvasive stress tests. We classified the 12 years of the study into four periods of 3 years each. No tendency to decrease for the ratio of the number of patients with CSA and the number of selective spasm provocation tests was observed among the four time periods (18%, 24%, 32%, and 23%, respectively). However, the number of patients with VA (28, 33, 9, and 4) and the VA/CSA ratio (32%, 28%, 14%, and 5%, respectively) in the four group significantly decreased. The frequency of administration of calcium antagonists (CAs) before hospital admission (49% vs 33%, respectively; p < 0.05) was significantly higher in the last time period (from 2000 to 2002) than in the first period (from 1991 to 1993). L-CAs were administered in > 90% of CSA patients who had been medicated with CAs before hospital admission in the last period (from 2000 to 2002), while L-CAs were administered in only 20% in the former period (from 1991 to 1993). The administration of statins and angiotensin-converting enzyme inhibitors/angiotensin receptor blockers before hospital admission gradually increased according to the period passed, but not significantly. CONCLUSION: The frequency of VA has decreased in Japan, possibly due to the widespread use of therapy with L-CAs.
channel blockers is frequent. Therapy should therefore be guided by repetitive provocation tests, and seems to avoid recurrence of cardiac arrest.

**Source:** MEDLINE

**Available in print at Lincoln County Hospital Professional Library**

28. **Usefulness of massive oral nicorandil in a patient with variant angina refractory to conventional treatment.**

**Author(s):** Kurisu S, Inoue I, Kawagoe T, Ishihara M, Shimatani Y, Nishioka K, Nakamura S, Umemura T, Yoshida M

**Citation:** Internal Medicine, February 2003, vol./is. 42/2(163-7), 0918-2918;0918-2918 (2003 Feb)

**Publication Date:** February 2003

**Abstract:** A 67-year-old man, who was previously diagnosed with vasospastic angina and treated with standard therapy, was admitted to our hospital because of recurrent chest pain refractory to sublingual nitroglycerin. Admission electrocardiography revealed ST segment elevation in II, III and aV(F), and his symptoms were relieved by intravenous bolus administration of nicorandil. He was diagnosed to have active variant angina, and remained symptomatic even after treatment with calcium antagonists and nitrates at optimal doses. Intravenous bolus administration of nicorandil was consistently effective to relieve his symptoms. Anginal attack was finally prevented by massive oral nicorandil in addition to conventional treatment.

**Source:** MEDLINE

29. **[A case of coronary vasospasm treated with stent placement]. [German]**

**Dianose und Stent-Therapie eines symptomatischen Koronarspasmus.**

**Author(s):** Maeder M, Ammann P, Angehrn W, Rickli H

**Citation:** Zeitschrift fur Kardiologie, February 2003, vol./is. 92/2(182-7), 0300-5860;0300-5860 (2003 Feb)

**Publication Date:** February 2003

**Abstract:** We report about a 49 year old woman with repeated chest pain at rest. During hyperventilation significant ST-segment elevation in leads V1-V5 appeared. Bicycle stress test did not provoke any ECG changes. Coronary angiography showed a significant stenosis of the left anterior descending coronary artery. Successful balloon angioplasty followed by stent implantation was performed. After an uneventful course of twelve months, hyperventilation could provoke neither chest pain nor ECG changes again without any antispastic medical treatment. Impact of fixed atherosclerotic lesions for the occurrence of coronary vasospasm, usefulness of hyperventilation as a non-invasive provocation test and therapy are discussed.

**Source:** MEDLINE

30. **Coronary artery spasm associated with a moderately severe atherosclerotic stenosis in the proximal LAD.**

**Author(s):** Ashby DT, Conditt G, Hirose M, Dangas G

**Citation:** Journal of Invasive Cardiology, December 2002, vol./is. 14/12(770-2), 1042-3931;1042-3931 (2002 Dec)

**Publication Date:** December 2002

**Abstract:** Treatment of coronary artery spasm can be difficult; up to 25% of patients continue to have episodes of chest pain despite maximal therapy with calcium antagonists and nitrates. We describe the case of a 42-year-old female with severe coronary artery spasm associated with a moderately severe atherosclerotic stenosis of the proximal left anterior descending coronary artery. We discuss the diagnostic value of intravascular ultrasound and treatment options for spasm associated with atherosclerotic plaques.
31. **Stenting for coronary artery spasm.**

**Author(s):** Khatri S, Webb JG, Carere RG, Dodek A

**Citation:** Catheterization & Cardiovascular Interventions, May 2002, vol./is. 56/1(16-20), 1522-1946;1522-1946 (2002 May)

**Publication Date:** May 2002

**Abstract:** We evaluated coronary stenting in nine patients with clinically severe, angiographically documented spasm refractory to aggressive pharmacologic management. No patient subsequently developed unstable ischemia requiring hospitalization as a consequence of recurrent spasm within the stent. Mechanisms of therapeutic failure included both persistent spasm and spasm in a different artery in one patient. Restenosis occurred in three patients who subsequently underwent repeat revascularization. In the rare, carefully selected patient, stents may represent an adjunct in the management of focal coronary artery spasm, although currently medical therapy remains the standard initial approach. Copyright 2002 Wiley-Liss, Inc.

**Source:** MEDLINE

32. **Percutaneous coronary intervention for variant angina: balloon vs. stent.**

**Author(s):** Cheng TO

**Citation:** Catheterization & Cardiovascular Interventions, May 2002, vol./is. 56/1(21), 1522-1946;1522-1946 (2002 May)

**Publication Date:** May 2002

**Source:** MEDLINE

33. **Comparative results of coronary intervention in patients with variant angina versus those with non-variant angina.**

**Author(s):** Sueda S, Suzuki J, Watanabe K, Mineoi K, Kondou T, Yano K, Ochi T, Ochi N, Kawada H, Hayashi Y, Uraoka A

**Citation:** Japanese Heart Journal, November 2001, vol./is. 42/6(657-67), 0021-4868;0021-4868 (2001 Nov)

**Publication Date:** November 2001

**Abstract:** Coronary angioplasty is reported to be feasible and safe in patients with coronary spasm and fixed stenosis. However, the long-term results are not positive. We compared the results of coronary angioplasty in 20 patients with variant angina versus 17 patients with non-variant angina among 231 consecutive patients with vasospastic angina. Coronary angioplasty was performed successfully in all 37 patients without any complications. Stenting for coronary dissection or recoil was performed in 8 patients, directional coronary atherectomy was selected for ostial lesion of left anterior descending coronary artery stenosis in 2 patients, and standard balloon angioplasty was performed in 27 patients. There were no clinical differences between the two groups. The restenosis rate in patients with variant angina was similar to that in patients with non-variant angina (30% vs 29%, ns). There was no relationship between the provoked spasm and restenosis. During the follow-up period, no major complications were observed in patients with variant angina or those with non-variant angina. In conclusion, full medication with calcium channel antagonists and isosorbide dinitrate, and treatment by coronary angioplasty including the use of new devices, were useful treatments for patients with coronary vasospasm and significant organic stenosis. There was no difference concerning the results of coronary intervention between the patients with variant angina and those with non-variant angina.

**Source:** MEDLINE

34. **[The relationship between clinical types of postinfarction angina and stenosis of ischemia-related artery].**

**Author(s):** Chen J, Guan T, Chen J, Gao R, Yao K, Yang Y, Qin X, Qiao S
OBJECTIVE: To approach the pathogenesis of postinfarction angina and set up its treatment guidelines.

METHODS: 67 patients with postinfarction angina undergoing coronary angiography during the hospitalization were studied.

RESULTS: (1) According to the clinical classification of angina pectoris, spontaneous angina is the most common type (43.9%); mixed angina is second (25.7%), effort angina and variant angina are relatively low frequency (16.7% & 13.6%). (2) Stenosis >= 90% in the ischemia-related artery accounted for the anginal symptoms constituted 100%, 82.8%, 72.7% and 44.4% of the cases with mixed angina, spontaneous angina, effort angina and variant angina respectively. (3) Postinfarction angina caused by non infarction-related artery was relatively less frequent (8.9%).

CONCLUSIONS: Severe residual stenosis of infarction-related artery is the main pathologic factor on the pathogenesis of postinfarction angina, so early interventional therapy or bypass surgery should be taken.

Source: MEDLINE

35. Heart rate variability in patients with variant angina: effect of the presence of significant coronary stenosis.

Author(s): Meloni C, Stazi F, Ballarotto C, Margonato A, Chierchia SL

Citation: Italian Heart Journal: Official Journal of the Italian Federation of Cardiology, July 2000, vol./is. 1/7(470-4), 1129-471X;1129-471X (2000 Jul)

Publication Date: July 2000

Abstract: BACKGROUND: The syndrome of variant angina occurs in patients with a wide spectrum of coronary disease ranging from angiographically normal coronary arteries to severe three-vessel disease. Survival and choice of therapy for these patients are determined by the extent of underlying fixed coronary obstruction. We examined whether heart rate variability (HRV) due to reduced vagal outflow may correlate with the severity of coronary stenoses in such patients.

METHODS: Fifteen men and 2 women with clinically unstable variant angina underwent 24-hour Holter monitoring from which low and high-frequency power, standard deviation of mean 24-hour RR interval, proportion of adjacent RR intervals that differed by more than 50 ms, and mean root square of differences between successive RR intervals were extracted by power spectral analysis. Coronary angiography was later performed to determine coronary pathology and verify variant angina. As controls we studied an age-matched control group of 8 subjects (5 men, 3 women) with no clinical and/or electrocardiographic evidence of coronary heart disease or spasm as shown by negative treadmill exercise and hyperventilation tests.

RESULTS: All measured components of HRV were significantly lower in the 9 patients with severe coronary artery disease compared to the 8 patients with normal coronary arteries or < 40% stenosis. The two groups were otherwise similar in terms of age and clinical parameters.

CONCLUSIONS: These preliminary findings on a small but carefully selected group of patients with variant angina indicate that the analysis of HRV can select patients with severe disease for a more intensive approach. These findings require confirmation on a larger patient series.

Source: MEDLINE


Author(s): Coma-Canella I, Martinez-Caro D, Cosin-Sales J, Fernandez-Jarne E, Garcia Velloso MJ, Gimenez M

Citation: Coronary Artery Disease, July 2000, vol./is. 11/5(383-90), 0954-6928;0954-6928 (2000 Jul)

Publication Date: July 2000

Abstract: BACKGROUND: Coronary vasospasms generally occur at rest, but can also be triggered by physical exercise. Anginal pain and ST-segment elevation may be seen during exercise-stress tests. ST-segment depression, due to nonocclusive vasospasms, has also been found to occur. When the result of a test is positive, scintigraphy usually reveals
perfusion defects. True silent or clandestine ischemia (normal result of exercise test with perfusion defects) in these patients is very uncommon. OBJECTIVE: To stress the need for suspecting occurrence of coronary vasospasms in order to perform a proper diagnosis. METHODS: Eight patients with angina were selected for this study. They had negative results of exercise tests with perfusion defects detected by thallium-201 tomography, normal coronary arteries and vasospasms. Maximal exercise-stress tests with thallium-201 tomography were performed. Sizes of perfusion defects were quantified by examining polar maps. Coronary angiography and then an intracoronary ergonovine test were performed for each patient. RESULTS: Significant defects were seen in territory of the right coronary artery, the left anterior descending artery, or both. Lung:heart ratio was normal in every case. The coronary arteries were normal and vasospasms were elicited with ergonovine in all the patients. Correspondence between the location of perfusion defects and angiographic spasms was generally observed. After treatment with calcium antagonists and nitrates all of them improved and defects detected by thallium tomography were no longer found when tests were repeated. CONCLUSIONS: Some patients with vasospastic angina may have normal results of exercise-stress tests and reversible perfusion defects detectable by scintigraphy. This finding must lead one to perform coronary angiography without administration of nitroglycerine beforehand and an ergonovine test if the coronary arteries are normal.

Source: MEDLINE

Full Text:
Available in fulltext at Ovid

37. [Effect of tongxinluo capsule in treating variant angina pectoris patients and its influence on endothelial function].

Author(s): Jia Z, Gu F, Xue Y

Citation: Zhongguo Zhong Xi Yi Jie He Za Zhi Zhongguo Zhongxiyi Jiehe Zazhi/Chinese Journal of Integrated Traditional & Western Medicine/Zhongguo Zhong Xi Yi Jie He Xue Hui, Zhongguo Zhong Yi Yan Jiu Yuan Zhu Ban, November 1999, vol./is. 19/11(651-2), 1003-5370;1003-5370 (1999 Nov)

Publication Date: November 1999

Abstract: OBJECTIVE: To assess the efficacy of Tongxinluo capsule (TXLC) in treating variant angina pectoris and its effect on endothelial function. METHODS: Sixty-four patients with variant angina pectoris were enrolled in the study for four weeks by a randomized clinical trial treatment with TXLC or isosorbide mononitrate. RESULTS: (1) The symptoms of both groups were significantly improved, the total effective rate of TXLC and isosorbide were 86.67% and 87.10% respectively; (2) The level of serum nitric oxide was increased, and the serum endothelin was decreased after treatment, there was no significant difference between these two groups. CONCLUSION: TXLC could effectively improve the symptoms of variant angina pectoris, the mechanism of which may likely be mediated by nitric oxide and endothelin.

Source: MEDLINE


Author(s): Sganzera P, Child M, Savasta C, Passaretti B, Tavasci E

Citation: Cardiologia, March 1999, vol./is. 44/3(295-8), 0393-1978;0393-1978 (1999 Mar)

Publication Date: March 1999

Abstract: Prinzmetal variant angina due to epicardial coronary artery spasm is a disease usually treated with drug therapy with successful results. A case of variant angina, refractory to conventional pharmacological treatment, and complicated by coronary artery thrombosis, was treated with percutaneous transluminal coronary angioplasty and stenting with good immediate and late clinical results.

Source: MEDLINE

39. Transcardiac 5-hydroxytryptamine release and impaired coronary endothelial
function in patients with vasospastic angina.


Citation: Clinical & Experimental Pharmacology & Physiology, December 1998, vol./is. 25/12(999-1003), 0305-1870;0305-1870 (1998 Dec)

Publication Date: December 1998

Abstract: 1. The present study was designed to test the hypotheses whether platelet degranulation across the coronary bed is detectable during non-ischaemic periods in patients with vasospastic angina (VSA) and whether the exogenous nitric oxide (NO) donor nitroglycerin (GTN) is able to modify platelet degranulation, reflecting an impaired endothelial production of NO. 2. We studied 13 patients with VSA and 10 controls. The time course of coronary sinus (CS) plasma 5-hydroxytryptamine (5-HT) levels was evaluated every 4 h before and after intravenous infusion of GTN over a period of 40 h. Coronary sinus plasma 5-HT levels were significantly higher at any measured time point in patients with VSA compared with control and were significantly decreased in patients with VSA following treatment with GTN, but not in controls. Femoral artery plasma 5-HT levels remained almost constant throughout the study. The ratio of CS:aorta 6-keto-prostaglandin F1 alpha was significantly and inversely correlated with the transcardiac plasma 5-HT difference only in patients with VSA (r = -0.68; P < 0.02; n = 13). 3. The time course of CS 5-HT levels confirmed significant platelet degranulation across the coronary bed supplied by the spasming artery in patients with VSA and this was modified by GTN. The present data suggest that platelet degranulation occurs during non-ischaemic periods in patients with VSA and that prostacyclin biosynthesis may be a compensatory response to an impaired endothelial release of NO, limiting the degree of the effects of platelet degranulation.

Source: MEDLINE

Full Text: Available in fulltext at EBSCO Host

40. Vitamin E administration improves impairment of endothelium-dependent vasodilation in patients with coronary spastic angina.

Author(s): Motoyama T, Kawano H, Kugiyama K, Hirashima O, Ohgushi M, Tsunoda R, Moriyama Y, Miyao Y, Yoshimura M, Ogawa H, Yasue H

Citation: Journal of the American College of Cardiology, November 1998, vol./is. 32/6(1672-9), 0735-1097;0735-1097 (1998 Nov 15)

Publication Date: November 1998

Abstract: OBJECTIVES: We examined the effects of oral administration of vitamin E, an antioxidant, on endothelium-dependent vasodilation in patients with coronary spastic angina.BACKGROUND: We have recently reported that endothelium-dependent vasodilation is impaired in patients with coronary spastic angina (CSA). Furthermore, it is known that oxidative stress may play an important role in the impairment of endothelium-dependent vasodilation in cardiovascular diseases.METHODS: With the ultrasound technique, flow-dependent vasodilation of the brachial arteries during reactive hyperemia was examined before and after treatment for a month with either oral administration of vitamin E (alpha-tocopherol acetate, 300 mg/day) or placebo, which is randomly assigned, in patients with CSA (n=60).RESULTS: Before treatment, patients with CSA had impaired flow-dependent vasodilation, lower plasma levels of alpha-tocopherol and higher plasma levels of thiobarbituric acid reactive substances (TBARS), as compared with age- and sex-matched control subjects (n=60) (flow-dependent vasodilation: 3.1+/-1.8 vs. 7.1+/-2.5%, p < 0.001; alpha-tocopherol levels: 8.9+/-1.8 vs. 10.8+/-1.8 microg/ml, p < 0.001). In patients with CSA, treatment with vitamin E restored flow-dependent vasodilation (3.1+/-1.7 vs. 8.3+/-2.0%, p < 0.001), and this improvement was associated with the decreases in plasma TBARS levels and anginal attacks.CONCLUSIONS: The results indicate that vitamin E treatment improved endothelium-dependent vasodilation and decreased plasma TBARS levels in patients with CSA. Thus, increased oxidative stress may contribute to endothelial dysfunction and anginal attacks in patients with CSA.
41. [Clinical differences between variant and non-variant angina pectoris].

Author(s): Sueda S, Mineoi K, Kondo T, Yano K, Ochi T, Ochi N, Kukita H, Kawada H, Matsuda S, Uraoka T

Citation: Journal of Cardiology, August 1998, vol./is. 32/2(83-8), 0914-5087;0914-5087 (1998 Aug)

Publication Date: August 1998

Abstract: The differences in clinical characteristics were studied between variant angina pectoris with ST segment elevation during ischemic attacks and non-variant angina pectoris without ST segment elevation. Spasm provocation test was performed with either acetylcholine or ergonovine in 192 consecutive patients with vasospastic angina from January 1991 to June 1997. Thirteen patients were excluded because of insufficient data. Fifty-five patients had variant angina and 124 patients had non-variant angina. Coronary risk factors, serum cholesterol level, triglyceride level, high-density lipoprotein cholesterol level, history of syncope, the rates of second or third atrioventricular block and ventricular tachycardia or fibrillation, the incidence of organic stenosis (> or = 50%), the number of vessels with provoked spasm, the dose of acetylcholine and ergonovine used, and duration from the first appearance of chest pain were compared between the 2 groups. Patients with variant angina had more fixed stenosis (p < 0.01), required more percutaneous transluminal coronary angioplasty procedures, lower doses of intracoronary administration of acetylcholine for the induction of coronary arterial spasm and shorter duration from the first appearance of chest pains (p < 0.01) than patients with non-variant angina. However, there were no differences in other factors between the 2 groups. Variant angina pectoris has the same clinical characteristics as non-variant angina pectoris, although variant angina tends to cause higher spasmophilic activity and more fixed stenosis.

Source: MEDLINE

42. [Usefulness of intracoronary injection of acetylcholine and ergonovine in patients with variant angina].

Author(s): Sueda S, Ochi N, Kawada H, Uraoka T

Citation: Journal of Cardiology, March 1998, vol./is. 31/3(145-50), 0914-5087;0914-5087 (1998 Mar)

Publication Date: March 1998

Abstract: The correlation was examined between the angina-producing arteries predicted to be responsible for the sites of ST segment elevation during spontaneous ischemic attacks and the arteries in which spasm was induced by intracoronary injection of either acetylcholine or ergonovine in patients with variant angina. From 1991 January to 1996 June, 42 patients with variant angina, 40 men and 2 women with a mean age of 61.6 years old, underwent the acetylcholine provocation test within 2 weeks of observation of the last ST segment elevation. After discontinuation of antianginal agents for at least 24 hours, a bolus of acetylcholine was injected in incremental doses of 20, 50 micrograms (occasionally 80 micrograms) into the right coronary artery and of 20, 50 and 100 micrograms incrementally into the left coronary artery to provoke coronary spasm. Intracoronary injection of ergonovine was added in nine patients, in whom intracoronary injection of acetylcholine failed to document coronary spasm on the arteries predicted to be responsible for the sites of ST segment elevation during anginal attacks. Ergonovine was injected in total doses of 40 micrograms into the right coronary artery and of 64 micrograms into the left coronary artery. Positive spasm was defined as induction of more than 99% reversible stenosis. The correlation between the arteries predicted to be responsible for the sites of ST segment elevation during attacks and the vessels in which spasm was induced by acetylcholine test was 78.6% for all patients and 80.0% for all sites of ST segment elevation. By adding the ergonovine test after the acetylcholine test, the correlation increased to 95.2% for all patients and 95.6% for all sites of ST segment elevation. The correlation observed agrees with previous studies in which the ergonovine test was
performed in patients without induced spasm by intracoronary injection of acetylcholine and that the super-imposed ergonovine test is useful for diagnosing patients with variant angina.

Source: MEDLINE

43. **Coronary NIR stent implantation for refractory variant angina.**

**Author(s):** Kuppens C, Put P, Mertens D, Jaspers L, Dendale P, Benit E

**Citation:** Acta Cardiologica, 1998, vol./is. 53/3(169-71), 0001-5385;0001-5385 (1998)

**Publication Date:** 1998

**Abstract:** A 44-year-old woman with severe variant angina refractory to maximal medical therapy and at risk of sudden death was successfully treated by a NIR stent implantation on a moderate lesion of LAD. Six months later she was asymptomatic, without in-stent restenosis. This procedure represents an alternative treatment for patients with refractory vasospastic angina.

Source: MEDLINE

44. **Stent placement for recurrent vasospastic angina resistant to medical treatment.**

**Author(s):** Nakamura T, Furukawa K, Uchiyama H, Seo Y, Okuda S, Ebizawa T

**Citation:** Catheterization & Cardiovascular Diagnosis, December 1997, vol./is. 42/4(440-3), 0098-6569;0098-6569 (1997 Dec)

**Publication Date:** December 1997

**Abstract:** The successful stent placement for treatment of recurrent vasospastic angina in a patient with nonstenotic coronary arteries is described. Use of the Palmaz-Schatz stent resulted in successful vasodilation that completely prevented anginal attacks. This procedure represents an alternative treatment for patients with vasospastic angina refractory to aggressive medical therapy.

Source: MEDLINE

45. **[The placement of a Wiktor stent for the treatment of vasospastic angina: a case report]. [Spanish] Colocacion de stent de Wiktor para el tratamiento de angina vasoespastica: presentacion de un caso.**

**Author(s):** Rodriguez Diez S, Lazaro R, Ruiz Nodar JM, Enero J, Romero C, Gomez Recio M, Martinez Elbal L

**Citation:** Revista Espanola de Cardiologia, November 1997, vol./is. 50/11(808-11), 0300-8932;0300-8932 (1997 Nov)

**Publication Date:** November 1997

**Abstract:** A 46-year-old male with a fixed stenosis in the mid-segment of the left anterior descending artery underwent balloon angioplasty. The procedure included the placement of two Wiktor stents because of severe dissection. Five months later he complained of Prinzmetal angina with ST elevation in the anterior wall. A metilergobasine test during the coronary arteriogram showed a discrete, severe spasm on the proximal segment of the left anterior descending artery. Because of a lack of symptomatic improvement with high-dose nitrates and calcium blockers, a Wiktor coronary stent was successfully implanted in the proximal left anterior descending artery, resulting in complete relief of the angina.

Source: MEDLINE

46. **[Angina pectoris: progress in diagnosis and treatment. III. Progress in treatment. 2. Therapeutic guidelines for coronary spastic angina].**

**Author(s):** Aizawa T

**Citation:** Nippon Naika Gakkai Zasshi - Journal of Japanese Society of Internal Medicine, February 1997, vol./is. 86/2(248-53), 0021-5384;0021-5384 (1997 Feb 10)
47. Successful treatment of vasospastic angina and symptomatic polymorphic ventricular tachycardia with calcium antagonists and nitrates based on a diagnosis made with exercise 201TI imaging.

Author(s): Conte FJ, Tilkemeier P

Citation: Journal of Nuclear Cardiology, November 1996, vol./is. 3/6 Pt 1(550-1), 1071-3581;1071-3581 (1996 Nov-Dec)

48. Calcium channel antagonists should be among the first-line drugs in the management of cardiovascular disease.

Author(s): Opie LH

Citation: Cardiovascular Drugs & Therapy, September 1996, vol./is. 10/4(455-61), 0920-3206;0920-3206 (1996 Sep)

49. Directional coronary atherectomy for coronary artery spasm refractory to medical therapy.

Author(s): Hilton TC, Blackshear JL, Utset B, Kern MJ

Citation: Clinical Cardiology, August 1996, vol./is. 19/8(662-4), 0160-9289;0160-9289 (1996 Aug)

Abstract: A patient with severe medically refractory coronary artery spasm was treated successfully with coronary atherectomy of a mild (40%) left anterior descending artery stenosis. Before the procedure, the patient was dependent on intravenous nitroglycerin because of daily episodes of angina with ST-segment elevation despite receiving multiple combinations of antianginal therapies. Clinical response to coronary atherectomy was prompt and dramatic.

Author(s): Goldschmidt M, Landzberg BR, Frishman WH

Citation: Journal of Clinical Pharmacology, July 1996, vol./is. 36/7(559-72), 0091-2700;0091-2700 (1996 Jul)

Publication Date: July 1996

Abstract: Nicorandil is the first oral potassium channel activating drug to be used for the treatment of symptomatic coronary artery disease. It appears to relax vascular smooth muscle through membrane hyperpolarization via increased transmembrane potassium conductance and, like nitrates, through an increase in intracellular cyclic GMP. In addition, nicorandil, in a nitrate-like manner, dilates normal and stenotic coronary arteries and reduces both ventricular preload and afterload. In contrast to nitrates, however, nicorandil does not appear to cause tolerance with long-term administration. In placebo and comparison clinical trials, nicorandil has demonstrated some efficacy and safety in patients with both stable and vasospastic angina pectoris, and it was found to be a myocardial protective agent in animal studies. The antianginal activity of nicorandil, however, is relatively short lived after dosing, which will necessitate the development of extended-release formulations of the drug.

Source: MEDLINE


Author(s): Bory M, Pierron F, Panagides D, Bonnet JL, Yvorra S, Desfossez L

Citation: European Heart Journal, July 1996, vol./is. 17/7(1015-21), 0195-668X;0195-668X (1996 Jul)

Publication Date: July 1996

Abstract: Most studies on the natural course of coronary artery spasm in patients with normal or nearly normal coronary arteries are based on medium-term follow-up in small populations. The present series includes 277 successive patients with a median follow-up of 89 months (range: 1 to 198 months). There were 206 men and 71 women whose mean age was 53.6 +/- 9.3 years. They were all assessed with coronary arteriography which revealed no stenoses greater than 50%. Spasm was confirmed during the coronary arteriography in 157 patients (56.7%), by a positive provocation test following the arteriography in 113 patients (40.8%), and by an electrocardiogram which showed Prinzmetal's variant angina in seven patients (2.5%). The majority of patients, 264 (95.3%) were treated with calcium channel blockers. At the end of this study: 35 patients (12.6%) were lost to follow-up; 20 patients (7.2%) died including 10 (3.6%) from cardiac causes; 18 patients (6.5%) experienced myocardial infarction in 11 of whom repeat coronary arteriography consistently demonstrated one or more significant stenoses (greater than 70%); 109 patients (39%) had persistent angina, in 52 of whom the severity (more than one episode per month) warranted repeat coronary arteriography which detected significant stenosis in 19 cases; 95 patients (34.3%) were asymptomatic. Multivariate statistical analyses showed that only predictors of major coronary events (death, myocardial infarction or angina requiring repeat coronary arteriography) were systemic hypertension or the finding of minor parietal irregularities on the initial coronary arteriogram. Conclusion. Despite treatment with calcium channel blockers, persistent or recurrent episodes of angina are frequently observed whereas complications such as myocardial infarction or death are rare.

Source: MEDLINE

52. A rare indication for stenting: persistent coronary artery spasm.

Author(s): Kultursay H, Can L, Payzin S, Turkozlu C, Altintig A, Akin M, Akilli A

Citation: Heart & Vessels, 1996, vol./is. 11/3(165-8), 0910-8327;0910-8327 (1996)

Publication Date: 1996
Abstract: A 34-year-old man presenting with angina both at rest and on exertion was investigated. He developed severe ST segment elevation and a brief period of ventricular tachycardia during an exercise tolerance test. On coronary angiography, 60% fixed luminal narrowing was observed in the proximal left anterior descending coronary artery and a severe spasm developed at this site, leading to temporary total occlusion of the vessel. Successful coronary angioplasty (PTCA) was performed on this lesion, with a residual 15% narrowing. However, the patient had a recurrence of angina 3 weeks later, despite being administered high doses of nitrate and calcium antagonist. During control angiography, the lesion severity was unchanged, but spasm developed again following contrast injection. At this time, a Palmaz-Schatz stent was implanted. Calcium antagonist, nitrate, Ticlopidine and low molecular weight heparin therapy was started. There was no recurrence of symptoms during a 3-month follow-up. The exercise tolerance test, and myocardial perfusion scintigraphy findings were normal and the stent was patent without restenosis at the end of the 3-month follow-up. Intracoronary stent implantation for persistent coronary spasm refractory to conventional medical therapy can be considered a feasible and attractive treatment modality for the control of symptoms.

Source: MEDLINE

53. Clinical observation of spontaneous anginal attacks and multivessel spasm in variant angina pectoris with normal coronary arteries: evaluation by 24-hour 12-lead electrocardiography with computer analysis.


Citation: Journal of the American College of Cardiology, January 1996, vol./is. 27/1(38-44), 0735-1097;0735-1097 (1996 Jan)

Publication Date: January 1996

Abstract: OBJECTIVES: Using a new, computerized 24-h 12-lead electrocardiographic (ECG) recording and analysis system (the EAGLE system), we sought to evaluate the clinical manifestations of ischemic episodes in patients with variant angina and normal coronary arteries.BACKGROUND: Although the prognosis of variant angina without significant organic stenosis is generally good, the incidence of multivessel spasm, a major prognostic factor, is surprisingly high in provocation tests.METHODS: A total of 122 patients with suspected variant or unstable angina underwent 24-h examination with the EAGLE system and two-channel Holter monitoring. Thirty patients in this group were diagnosed as having variant angina with normal or nearly normal coronary arteries. Twenty-two (73%) of these 30 patients developed anginal attacks with ST segment elevation during monitoring and were enrolled in the study.RESULTS: The 22 patients had a total of 138 episodes of transient ST segment elevation and 13 episodes of ST segment depression. No arrhythmias were observed during ST segment depression, but 26 episodes of ST segment elevation (19%) were associated with arrhythmias: 7 with premature ventricular contractions, 3 with ventricular bigeminy, 3 with complete atrioventricular (AV) block, 1 with complete AV block and couplets of premature ventricular contractions and 12 with marked sinus bradycardia (< 45 beats/min). Ten (45%) of the 22 patients had multivessel spasm. We observed three different patterns of multivessel spasm: 1) spasm at a different site on different occasions (migratory spasm); 2) spasm that sequentially affected two different sites; 3) simultaneous spasm at more than one site. The duration of ST segment elevation was much longer in patients with sequential and simultaneous spasm than in those with single-vessel spasm, and arrhythmias were more frequent during these two types of multivessel spasm.CONCLUSIONS: Although the prognosis of multivessel spasm is believed to be poor, this may not necessarily be so. Anginal attacks due to sequential and simultaneous multivessel spasm seem to be more dangerous than those involving single-vessel spasm or migratory multivessel spasm.

Source: MEDLINE

54. Soluble P-selectin is released into the coronary circulation after coronary spasm.

Author(s): Kaikita K, Ogawa H, Yasue H, Sakamoto T, Suefuji H, Sumida H, Okumura K

Citation: Circulation, October 1995, vol./is. 92/7(1726-30), 0009-7322;0009-7322 (1995
**Publication Date:** October 1995

**Abstract:** BACKGROUND: The glycoprotein P-selectin is an adhesion molecule involved in the property change of leukocytes at the initiation of the inflammatory process. The purpose of the present study was to determine whether acute myocardial ischemia induced by coronary spasm causes an acute inflammatory response in the coronary circulation.

METHODS AND RESULTS: We examined plasma soluble P-selectin levels in the coronary sinus and the aortic root simultaneously in 16 patients with coronary spastic angina before and after left coronary artery spasm induced by intracoronary injection of acetylcholine and in 15 patients with stable exertional angina before and after acute myocardial ischemia induced by rapid atrial pacing. Ten control patients with chest pain but normal coronary arteries and no coronary spasm also received intracoronary acetylcholine.

Plasma soluble P-selectin levels were increased significantly in the coronary sinus (32.8 +/- 3.6 to 52.8 +/- 5.9 ng/mL, P < .001) and in the aortic root (34.6 +/- 3.7 to 41.9 +/- 4.4 ng/mL, P < .05) after the attacks in the coronary spastic angina group but remained unchanged in the stable exertional angina group after the attacks and in the control group after the administration of acetylcholine. Furthermore, the coronary sinus-arterial difference of soluble P-selectin increased significantly after the attacks in the coronary spastic angina group (-1.8 +/- 2.2 to 10.9 +/- 2.7 ng/mL, P < .001).

CONCLUSIONS: Our data indicate that soluble P-selectin is released into the coronary circulation after coronary artery spasm. We conclude that coronary artery spasm may induce the leukocyte adhesion in the coronary circulation and may lead to myocardial damage.

**Source:** MEDLINE

**Available in fulltext at Highwire Press**

**Available in fulltext at Ovid**

55. **Clinical effects and utility of intracoronary diltiazem.**

**Author(s):** McIvor ME, Undemir C, Lawson J, Reddinger J

**Citation:** Catheterization & Cardiovascular Diagnosis, August 1995, vol./is. 35/4(287-91, discussion 92-3), 0098-6569;0098-6569 (1995 Aug)

**Publication Date:** August 1995

**Abstract:** Coronary artery spasm is a known complication of coronary interventions, for which intracoronary nitroglycerin (ICN) is the treatment of choice. Some forms of intense spasm are resistant to ICN. Calcium channel antagonists are also known to be effective for coronary artery spasm, including nitroglycerin-resistant spasm. Here we describe a protocol for the clinical use of intracoronary diltiazem (ICD). By this protocol, ICD can be safely given without disturbing the clinical status of patients. ICD (2.5 mg) given slowly over 1 minute produced no vasodilitation of normal vessel segments but did produce significant dilatation of stenotic segments above and beyond the effects of nitrates. Mean minimum lumen diameter increased 18%, from 0.89 +/- 0.06 mm to 1.06 +/- 0.07 mm (mean +/- SEM, P < 0.001). ICD produced clinically insignificant changes in systolic blood pressure, diastolic blood pressure, heart rate, and PR, QRS, and QT intervals. This protocol has been employed to safely use ICD to relieve both nitroglycerin-resistant epicardial artery spasm and nitroglycerin-resistant distal microvascular spasm (the no-reflow phenomenon).

**Source:** MEDLINE

56. **Pharmacologic therapy of angina pectoris.**

**Author(s):** Zavec JH, Bueno O

**Citation:** Journal of the Louisiana State Medical Society, May 1995, vol./is. 147/5(208-10, 213-6), 0024-6921;0024-6921 (1995 May)

**Publication Date:** May 1995

**Abstract:** The primary drugs utilized in the treatment of angina pectoris include organic nitrates, beta-adrenoeceptor antagonists, Ca2+ antagonists, and the antithrombotic agents aspirin and heparin. Not all of these drugs are useful in every form of angina, and treatment
is symptomatic rather than curative. In stable effort angina, beta-blockers, Ca2+-antagonists, and organic nitrates provide relief from angina pain and improve exercise tolerance primarily through their ability to decrease oxygen demand. The antiplatelet action of aspirin may decrease the incidence of myocardial infarction in these patients. Ca2+-channel blockers and organic nitrates are the drugs of choice for variant angina. These vasodilators restore blood flow by relieving the coronary vasospasm that triggers the ischemic episode. In unstable angina, aspirin and heparin reduce the risk of myocardial infarction, and aspirin increases survival. Heparin and nitrates alleviate angina pain, and under some circumstances beta-blockers and Ca2+-antagonists have a role in the relief of pain.

Source: MEDLINE

57. The evolving role of calcium channel blockers in the treatment of angina pectoris: focus on felodipine.

Author(s): Gradman AH

Citation: Canadian Journal of Cardiology, April 1995, vol./is. 11 Suppl B/(14B-21B), 0828-282X;0828-282X (1995 Apr)

Publication Date: April 1995

Abstract: Calcium channel blockers are used extensively in the treatment of the three major anginal syndromes. In the treatment of Prinzmetal's angina, their antivasospastic properties account for their therapeutic effectiveness. Calcium channel blockers are drugs of first choice in this syndrome. In chronic stable angina, calcium channel blockers may be used as monotherapy or in combination with beta-blockers and/or nitrates. In patients with unstable angina, reduction in the incidence of ischemic episodes produced by calcium channel blockers is well documented. Recent data suggest that calcium channel blockers should generally be used in combination with beta-blockers, nitrates and antithrombotic agents. Patients with ischemic heart disease often exhibit reduced ventricular function. All of the first generation calcium channel blockers exacerbate symptoms in patients with established heart failure and may precipitate heart failure, particularly when combined with beta-blockers. Second generation vascular-selective dihydropyridines have been introduced recently. Vascular selectivity determines the drug's degree of negative inotropic effect. Felodipine is one of the most vascular selective of the available dihydropyridines and has no negative inotropic effects at clinically administered doses. In a long term study, felodipine, 20 mg/day, abolished symptoms and chronic ischemic episodes in 81% of treated subjects with Prinzmetal's angina. In patients with stable angina, felodipine has been found to be effective either as monotherapy or in combination with beta-blockers. In patients with known or suspected ventricular dysfunction, vascular-selective dihydropyridines such as felodipine offer advantages over the nonselective calcium channel blockers, particularly in patients receiving beta-blockers.

Source: MEDLINE


Author(s): Brogden RN, McTavish D

Citation: Drugs & Aging, February 1995, vol./is. 6/2(150-71), 1170-229X;1170-229X (1995 Feb)

Publication Date: February 1995

Abstract: Nilvadipine, a calcium antagonist of the dihydropyridine class, selectively blocks calcium channels in vascular smooth muscle. Compared with nifedipine, the prototype of the dihydropyridines, nilvadipine has a longer duration of action. The antihypertensive efficacy of nilvadipine appears to be comparable with that of nicardipine and nitrendipine, enalapril and captopril and hydrochlorothiazide/triamterene, although further clinical experience is required to establish the claimed advantages nilvadipine may have over the other dihydropyridine derivatives currently used to treat hypertension. Preliminary studies suggest that nilvadipine may also be useful in the treatment of patients with stable exertional or variant angina. Studies conducted in Japan indicate that nilvadipine improves
symptoms resulting from cerebral infarction in some patients, but further comparative studies are required to confirm these results. The tolerability of nilvadipine appears to be comparable with that of nicardipine and better than that of nifedipine with respect to flushes, oedema and liver function abnormalities. As is typical of calcium antagonists, there is no evidence of tolerance to the antihypertensive effects of nilvadipine. The drug is equally effective in treating hypertension in elderly and younger patients and does not appear to adversely affect glucose or lipid metabolism. Thus, provided its apparently good tolerability is confirmed by wider clinical experience, it should be a suitable alternative to other calcium antagonists when used alone or in conjunction with other drugs for the majority of patients with mild to moderate hypertension.

Source: MEDLINE


Author(s): Nicod P
Citation: Praxis, February 1995, vol./is. 84/6(167-72), 1661-8157;1661-8157 (1995 Feb 7)
Publication Date: February 1995
Abstract: Unstable angina pectoris is a clinical syndrome with multiple underlying pathophysiological mechanisms. This presentation is concerned with primary angina pectoris exclusively. In the majority of cases a rupture of an atherosclerotic plaque and an intracoronary thrombus are responsible for instable angina. The practitioner's role is to identify those patients who will develop complications with the aid of clinical parameters. Prinzmetal's angina is also instable, occurs at rest and leads to ST-segment elevation. It is most likely due to coronary spasm, developing in disease-free and atherosclerotic coronary segments alike. This variant of unstable angina is treated most successfully with calcium antagonists. The recognition of the responsible pathophysiologic mechanism permits adjustment of treatment of every patient taking into consideration the seriousness of his prognosis.

Source: MEDLINE


Author(s): Siembab L, Kitlinski M, Piwowarska W
Citation: Przeglad Lekarski, 1995, vol./is. 52/8(395-9), 0033-2240;0033-2240 (1995)
Publication Date: 1995
Abstract: Current views about etiology, pathogenesis, diagnostics and treatment of coronary artery spasm have been presented. A lot of researches show complexity of factors, which are responsible for coronary artery spasm. The most important are: a local hypersensitivity of vessels wall, neurogenic factors and humoral factors. The lack of magnesium plays also important role. Clinical manifestations of coronary artery spasm are: Printzmetal's angina, arrhythmia, acute myocardial infarction, atypical chest pain and cardiac sudden death. Among diagnostic examination the main importance have provocative tests with ergonovine and acetylcholine, rarely hyperventilation and cold are used. Calcium channel blockers, nitrate, molsidomine are employed in treatment patients with coronary artery spasm. There are taken modern examinations of new drugs like beta-1 adrenergic agonists and derived molsidomine agents. Beta-adrenergic blocking agents are contraindicated. It has been emphasized, that early diagnostics and pharmacologic treatment improve long-term prognosis in this group of patients.

Source: MEDLINE

61. Nitrates for unstable angina.

Author(s): Thadani U, Opie LH
Citation: Cardiovascular Drugs & Therapy, October 1994, vol./is. 8/5(719-26), 0920-3206;0920-3206 (1994 Oct)
Publication Date: October 1994
Abstract: The term unstable angina encompasses heterogeneous clinical syndromes. Fissuring of an atherosclerotic coronary artery plaque with superimposed platelet deposition, with or without additional thrombus formation, is invariably responsible for a prolonged episode of angina at rest, increasing frequency of angina at rest, or with minimal exertion of less than 4 weeks in duration and early postinfarction angina. Plaque progression, rather than plaque fissuring, is the most likely mechanism for progressive reduction in walking distance due to angina in patients who previously have stable angina. Coronary artery spasm is responsible for Prinzmetal's variant angina, but its exact role in other forms of unstable angina is unknown. The mainstay of treatment of unstable angina (prolonged episode of angina at rest and recent onset angina at rest, or with minimal exertion with a crescendo pattern) is aspirin, heparin, or both. Both aspirin and intravenous (i.v.) heparin or their combination reduce early mortality and the incidence of acute myocardial infarction in patients hospitalized with unstable angina. However, these agents do not promptly relieve chest pain. There are no placebo-controlled studies evaluating the usefulness of nitrates in unstable angina. In open-label studies, continuous therapy with i.v. nitroglycerin (NTG) for 24 hours or longer has been shown to relieve chest pain in patients with rest angina refractory to therapy with other antianginal agents, including long-acting nitrates. Recurrence of chest pain in patients receiving i.v. NTG is a common problem and probably represents development of pharmacologic tolerance, but this can be overridden by dose escalation; protracted tolerance during short-term use of i.v. NTG is usually not a problem. (ABSTRACT TRUNCATED AT 250 WORDS)

Source: MEDLINE


Author(s): Lopez JA, Angelini P, Leachman DR, Lufschanowski R

Citation: Catheterization & Cardiovascular Diagnosis, October 1994, vol./is. 33/2(161-5), 0098-6569;0098-6569 (1994 Oct)

Publication Date: October 1994

Abstract: A 43-yr-old man with mild, fixed obstruction of the left anterior descending (LAD) coronary artery and severe, uncontrolled variant angina underwent placement of an endovascular stent to preserve patency of the artery. The decision for stent placement was based on several factors, including refractoriness to medical treatment and standard balloon angioplasty, documented spasm localized to the proximal LAD lesion, and the morbidity, mortality, and costs associated with the surgical approach in this type of patient. At follow-up, there was moderate restenosis of the stented coronary segment; the vasospastic angina syndrome had totally resolved.

Source: MEDLINE

63. [Treatment and prognosis of vasospastic angina].

Author(s): Kijima M, Aikawa K, Sato H, Matsumoto S, Ikeda K

Citation: Nippon Rinsho - Japanese Journal of Clinical Medicine, August 1994, vol./is. 52 Suppl/Pt 2(291-4), 0047-1852;0047-1852 (1994 Aug)

Publication Date: August 1994

Source: MEDLINE

64. Beneficial effects of smoking cessation on the short-term prognosis for variant angina--validation of the smoking status by urinary cotinine measurements.

Author(s): Miwa K, Fujita M, Miyagi Y

Citation: International Journal of Cardiology, April 1994, vol./is. 44/2(151-6), 0167-5273:0167-5273 (1994 Apr)

Publication Date: April 1994

Abstract: To examine whether smoking cessation would improve the short-term prognosis for patients with variant angina, 37 smokers with variant angina who were discharged after the complete disappearance of angina by medical treatment with calcium blockers were
advised to stop smoking and were followed-up for 1 year. Urinary cotinine radioimmunoassay was used to evaluate their current smoking status. Patients with a urinary cotinine concentration above 50 ng/ml were classified as current smokers. The prevalence of smokers was underestimated by self-reports (11% by self-reports vs. 35% by urinary cotinine measurements after 3 months; 17% by self-reports vs. 36% by urinary cotinine measurements after 1 year). The presence of angina during the first 3 months was significantly (P < 0.05) more prevalent in those who continued to smoke (8/13, 62%) than in those who succeeded in smoking cessation (5/24, 21%) when the current smoking status was determined by urinary cotinine measurements. Smoking cessation definitely improved the prognosis for variant angina even during a relatively short follow-up period.

Source: MEDLINE


Author(s): Clavijo GA, de Clavijo IV, Weart CW

Citation: American Journal of Hospital Pharmacy, January 1994, vol./is. 51/1(59-68), 0002-9289:0002-9289 (1994 Jan 1)

Publication Date: January 1994

Abstract: The chemistry, pharmacology, pharmacokinetics, efficacy, and adverse effects of amlodipine are reviewed. Amlodipine belongs to the dihydropyridine subclass of calcium antagonists. Amlodipine is a potent peripheral and coronary vasodilator with high selectivity for vascular smooth muscle and minimal effect on myocardial contractility or cardiac conduction. Absorption after oral administration is slow, and the duration of action is long, with a half-life of 36-45 hours. Amlodipine has FDA-approved labeling for use in the treatment of hypertension, chronic stable angina, and vasospastic angina. The agent is also indicated for use in hypertensive or anginal patients who also have congestive heart failure due to systolic dysfunction (New York Heart Association classes II and III). Clinical trials suggest that effective 24-hour control of hypertension and angina is provided by once-daily administration of amlodipine 5-10 mg alone or in combination with other drugs. No clinically important drug interactions have been observed to date. Amlodipine has not shown any unfavorable effects on serum glucose or lipid levels. The most common adverse effect is peripheral edema. Amlodipine is effective and well tolerated when given alone or in combination with other drugs for the treatment of hypertension and angina. Amlodipine may offer advantages over verapamil, diltiazem, and nifedipine in patients with hypertension or angina with associated congestive heart failure due to systolic dysfunction.

Source: MEDLINE


Author(s): Watanabe K, Izumi T, Miyakita Y, Koyama S, Ohshima M, Inomata T, Suzuki M, Takahashi M, Shibata A

Citation: Cardiovascular Drugs & Therapy, December 1993, vol./is. 7/6(923-8), 0920-3206:0920-3206 (1993 Dec)

Publication Date: December 1993

Abstract: The efficacy of amlodipine, a calcium antagonist, was investigated in 12 patients with variant angina. Amlodipine was administered at a dose of 5 mg once daily, and efficacy was assessed from the frequency of anginal attacks, the frequency of ST elevation or depression, and the extent of ST segment changes [ST segment elevation or depression (mm) x duration (seconds)] on the Holter ECG before and after treatment. The frequency of ST elevation during the observation period was 1.67 +/- 0.33 times/day (symptomatic attacks: 1.17 +/- 0.21/day; asymptomatic attacks: 0.50 +/- 0.19/day), and this significantly decreased to zero per day (both symptomatic and asymptomatic attacks) after treatment (p < 0.05). The extent of ST segment elevation during the observation period was 156.6 mm.sec/day (symptomatic: 382.5 +/- 102.9 mm.sec/day; asymptomatic: 125.0 +/- 62.0 mm.sec/day), and such changes were completely suppressed (both symptomatic and asymptomatic) by treatment (p < 0.05). The frequency of ST depression was 2.08 +/- 0.42 times/day (symptomatic: 0.25 +/- 0.13/day; asymptomatic: 1.83 +/- 0.37/day) during the observation period, while it was 1.50 +/- 0.36 times/day (symptomatic: 0.25 +/- 0.13/day;
asymptomatic: 1.25 +/- 0.30/day) after treatment. Although anginal attacks remained unchanged, asymptomatic attacks tended to decrease (p = 0.07). (ABSTRACT TRUNCATED AT 250 WORDS)

Source: MEDLINE


Author(s): Tanaka H, Yasue H, Yoshimura M, Morita E, Jougasaki M, Kato H, Miyao Y, Nakao K

Citation: American Journal of Cardiology, July 1993, vol./is. 72/2(128-33), 0002-9149:0002-9149 (1993 Jul 15)

Publication Date: July 1993

Abstract: Atrial natriuretic peptide (ANP) is reported to dilate a major coronary artery in both experimental animals and humans. Spasm of a major coronary artery is the cause of variant angina pectoris and can be induced by hyperventilation. The effect of the ANP infusion on anginal attack induced by hyperventilation was studied in patients with variant angina pectoris. The study was performed in the early morning on 3 consecutive days in 11 patients with variant angina pectoris in whom the attacks were reproducibly induced by hyperventilation. On days 1 and 3 (saline solution infusion) and day 2 (ANP infusion), hyperventilation was started 14 minutes after beginning infusion of ANP (0.1 microgram/kg/min) or saline solution for 6 minutes. The attacks were induced in all 11 patients by hyperventilation on days 1 and 3. However, the attacks were not induced in any patient on day 2 of the ANP infusion. The plasma ANP level increased from 33 +/- 7 pg/ml to the peak level of 2,973 +/- 479 pg/ml (p < 0.01) at the end of the ANP infusion and the plasma level of cyclic guanosine monophosphate (cGMP) increased from 5 +/- 1 pmol/ml to the peak level of 58 +/- 6 pmol/ml (p < 0.01) 5 minutes after the ANP infusion. The plasma levels of ANP and cGMP did not change after hyperventilation on days 1 and 3. It is concluded that the ANP infusion suppresses the attacks induced by hyperventilation in patients with variant angina pectoris and cGMP is related to the mechanisms of suppression of the attacks.

Source: MEDLINE

68. Randomized placebo-controlled trial of amlodipine in vasospastic angina. Amlodipine Study 160 Group.

Author(s): Chahine RA, Feldman RL, Giles TD, Nicod P, Raizner AE, Weiss RJ, Vanov SK

Citation: Journal of the American College of Cardiology, May 1993, vol./is. 21/6(1365-70), 0735-1097:0735-1097 (1993 May)

Publication Date: May 1993

Abstract: OBJECTIVES: This study was designed to assess the efficacy and safety of amlodipine, a long-acting calcium channel blocker, in patients with vasospastic angina. BACKGROUND: Previous studies have established the value of short-acting calcium channel blockers in the treatment of coronary spasm. METHODS: Fifty-two patients with well documented vasospastic angina were entered into the present study. After a single-blind placebo run-in period, patients were randomized (in a double-blind protocol) to receive either amlodipine (10 mg) or placebo every morning for 4 weeks. Twenty-four patients received amlodipine and 28 received placebo. All patients were given diaries in which to record both the frequency, severity, duration and circumstances of anginal episodes and their intake of sublingual nitroglycerin tablets. RESULTS: The rate of anginal episodes decreased significantly (p = 0.009) with amlodipine treatment compared with placebo and the intake of nitroglycerin tablets showed a similar trend. Peripheral edema was the only adverse event seen more frequently in amlodipine-treated patients. No patient was withdrawn from the double-blind phase of the study because of an adverse event. Patients who completed the double-blind phase as responders to amlodipine or as nonresponders to placebo were offered the option of receiving amlodipine in a long-term, open label extension phase. During the extension, the daily dose of amlodipine was adjusted to 5 or 15 mg if needed and the rate of both anginal episodes and nitroglycerin tablet consumption showed statistically significant decreases between baseline and final
CONCLUSION: This study suggests that amlodipine given once daily is efficacious and safe in the treatment of vasospastic angina.

Source: MEDLINE

69. Cardiac arrest and sudden unexpected death in variant angina: complications of coronary spasm that can occur in the absence of severe organic coronary stenosis.

Author(s): MacAlpin RN

Citation: American Heart Journal, April 1993, vol./is. 125/4(1011-7), 0002-8703;0002-8703 (1993 Apr)

Publication Date: April 1993

Abstract: Experiences in 81 patients with variant angina were reviewed with the goal of determining which clinical features were associated with the greatest risk of angina-linked cardiac arrest (13 patients) or sudden unexpected death (9 patients). The risk of occurrence of one of these actually or potentially fatal events was approximately tripled by the presence of either a history of angina-linked syncope or documentation of serious arrhythmia complicating attacks. An unexpected finding was that the risk was increased 1.5-fold by the absence of high-grade organic coronary stenosis. Cardiac arrest and sudden death are important risks of variant angina, which can occur without the presence of severe organic coronary stenosis. These risks can be reduced by adequate vasodilator therapy that includes a calcium channel blocker.

Source: MEDLINE


Author(s): Frampton J, Buckley MM, Fitton A

Citation: Drugs, October 1992, vol./is. 44/4(625-55), 0012-6667;0012-6667 (1992 Oct)

Publication Date: October 1992

Abstract: Nicorandil belongs to the class of compounds known as potassium channel activators which are characterised by their arterial vasodilator properties. In addition, nicorandil has venodilating properties which are attributable to a nitrate group in its chemical structure. Therefore, by combining these two vasodilator mechanisms, nicorandil represents a novel type of compound for use in the treatment of angina pectoris. Furthermore, increasing experimental evidence suggests that potassium channel activation may also exert a direct cytoprotective effect by augmenting normal physiological processes which protect the heart against ischaemic events. Comparative studies of up to 3 months' duration suggest that nicorandil is equivalent in efficacy to isosorbide dinitrate, propranolol, atenolol, nifedipine or diltiazem in the treatment of stable angina. Preliminary evidence suggests that an improvement of anginal and ischaemic symptoms is maintained for up to 1 year. Whilst the efficacy of nicorandil in other types of angina has not been extensively studied, preliminary results indicate that intravenous nicorandil is as effective as isosorbide dinitrate in the treatment of unstable angina and is also effective in patients with variant angina. In addition, the limited data available indicate that nicorandil may be effective in patients with unstable and variant angina who are refractory to therapy with conventional antianginal agents, a potentially important area for further study. Headache, mostly of mild to moderate intensity was the most commonly reported adverse event, occurring in one-third of patients receiving the recommended therapeutic regimen of nicorandil 10 to 20mg twice daily. In comparative trials involving a total of 84 patients who received nicorandil, the incidence of headache was similar to that produced by isosorbide mononitrate and isosorbide dinitrate. Headache was most frequent on initiating therapy but declined with continued treatment. To date, approximately 5% of patients participating in European trials have withdrawn due to headache, although this rate may be reduced by using a lower starting dose of nicorandil (5 mg twice daily). In summary, clinical experience thus far indicates that nicorandil, with its novel combination of two distinct vasodilator mechanisms, offers an effective alternative to established vasodilator therapy with conventional nitrates and calcium antagonists in the long term treatment of stable angina pectoris. Further studies are warranted to establish whether the unique pharmacodynamic profile of
nicorandil is advantageous for the treatment of other types of angina and/or the ischaemic myocardium.

Source: MEDLINE


Author(s): Okumura K, Yasue H, Ishizaka H, Ogawa H, Fujii H, Yoshimura M

Citation: Journal of the American College of Cardiology, October 1992, vol./is. 20/4(838-44), 0735-1097,0735-1097 (1992 Oct)

Publication Date: October 1992

Abstract: OBJECTIVE: This study was designed to examine whether patients with coronary spastic angina have an impaired coronary artery dilator response to substance P, an endothelium-dependent vasodilator. BACKGROUND: Impairment of the endothelium-dependent vasodilator response has been suggested to be involved in the pathogenesis of coronary spasm. METHODS: In 11 patients with coronary spastic angina and 11 control patients, substance P was infused into the coronary artery at 20 pmol/min for 5 min. Incremental doses of acetylcholine were then injected into the coronary artery. The effects of these drugs and nitroglycerin on the coronary artery diameter were quantitatively analyzed. RESULTS: Heart rate, systolic blood pressure and rate-pressure product did not change after substance P infusion. In 12 coronary arteries of the patients with coronary spastic angina, spasm was induced with acetylcholine. At the site of coronary spasm documented, the lumen diameter, which was 1.6 +/- 0.5 mm at baseline, increased to 2.1 +/- 0.7 mm after substance P infusion (p less than 0.01). It decreased to 0.2 +/- 0.3 mm during acetylcholine-induced spasm (p less than 0.001) and increased to 2.3 +/- 0.8 mm after nitroglycerin administration (p less than 0.001 vs. baseline and p = NS vs. after substance P infusion). Of the 12 arteries with spasm, 5 were angiographically normal and the other 7 were minimally or moderately atherosclerotic: the diameter change after substance P was +28 +/- 20% and +30 +/- 22%, respectively (p = NS). In control patients, the diameter of the middle portion of the left anterior descending artery, which was 2.0 +/- 0.4 mm at baseline, increased to 2.5 +/- 0.4 mm after substance P infusion (p less than 0.001). The diameter changes after substance P infusion were not different between the patients with coronary spastic angina and control patients. CONCLUSIONS: Substance P dilated the artery with spasm of the patients with coronary spastic angina to a degree similar to that in control patients, indicating the preserved endothelium-dependent dilator response at the site of coronary spasm by way of substance P receptor.

Source: MEDLINE

72. Normal and pathophysiologic considerations of endothelial regulation of vascular tone and their relevance to nitrate therapy.

Author(s): Harrison DG, Kurz MA, Quillen JE, Sellke FW, Mugge A

Citation: American Journal of Cardiology, September 1992, vol./is. 70/8(11B-17B), 0002-9149,0002-9149 (1992 Sep 24)

Publication Date: September 1992

Abstract: During the past decade, it has become clear that the vascular endothelium critically influences vascular permeability, controls vessel growth, modulates hemostasis, and regulates vasomotion. This latter role of the endothelium is mediated by the liberation of a number of potent vasoactive compounds, including endothelium-derived relaxing factors, one of which is either nitric oxide or a compound that releases nitric oxide, vasoactive prostaglandins, hyperpolarizing factors, and a number of constricting factors. This role of the endothelium is dramatically altered by several diseases, including atherosclerosis, hypertension, and diabetes. Abnormalities of endothelial regulation of vascular tone may contribute to a number of clinical syndromes, including variant angina, unstable angina, syndrome X, and perhaps many others. In this review, several aspects of the endothelium-derived relaxing factor will be considered, including recent concepts regarding its synthesis, its chemical identity, and alterations in atherosclerosis. Finally, its action in the coronary microcirculation as contrasted to that of nitroglycerin will be considered.
73. Development of nitrate tolerance and usefulness of pulse therapy in a patient with vasospastic angina.

**Author(s):** Hoshio A, Shirota K, Sawada Y, Doi T, Miyakoda H, Kotake H, Mashiba H

**Citation:** European Heart Journal, June 1992, vol./is. 13/6(853-5), 0195-668X;0195-668X (1992 Jun)

**Publication Date:** June 1992

**Abstract:** In a 58-year-old man with vasospastic angina, we investigated the relationship between the antianginal effects of isosorbide dinitrate (ISDN) and plasma ISDN concentration. Despite adequate plasma ISDN levels, sustained therapy using ISDN tapes and oral ISDN (transcutaneously 160 mg and orally 100 mg ISDN day-1) failed to exhibit antianginal effects. However, pulse therapy using sublingual short-acting ISDN prevented anginal episodes, although the plasma ISDN levels were less than those of sustained therapy. Nitrate tolerance of the antianginal effects was avoided by creating an abrupt plasma ISDN concentration gradient using sublingual ISDN.

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74. Biphasic changes (initial increase and late decrease) in coronary sinus venous oxygen saturation during anginal attacks induced by intracoronary acetylcholine in patients with variant angina.

**Author(s):** Miwa K, Fujita M, Ejiri M, Sasayama S

**Citation:** Cardiology, 1992, vol./is. 81/4-5(221-32), 0008-6312;0008-6312 (1992)

**Publication Date:** 1992

**Abstract:** In order to evaluate the effects of intracoronary acetylcholine on coronary resistance vessels, oxygen saturation in coronary sinus blood was continuously measured to compare its dynamic changes during intracoronary injection of acetylcholine in both patients with variant angina and control subjects. Group 1 consisted of 6 patients without coronary artery disease. Group 2 consisted of 10 patients with variant angina and spasm in the left anterior descending coronary artery. A fiberoptic reflection oximetry system was used for the continuous measurement of coronary sinus venous oxygen saturation. Acetylcholine (20 micrograms) was injected directly into the left coronary artery over 30 s. In the group 1 patients, coronary sinus venous oxygen saturation was increased from 39 +/- 2% (mean +/- SEM) to 54 +/- 3% at 30 s, continuously climbed to 70 +/- 3% at 60 s and then gradually decreased to 53 +/- 5% at 120 s after the initiation of intracoronary injection of acetylcholine. In contrast, in the group 2 patients, coronary sinus venous oxygen saturation was transiently increased from 39 +/- 2% to 56 +/- 4% at 30 s, reversed, decreased to 52 +/- 4% at 60 s and then rapidly decreased to 36 +/- 3% at 120 s with the onset of chest pain associated with electrocardiographic ischemic changes. Coronary arteriography during attacks demonstrated a total or subtotal occlusion of the left anterior descending coronary artery due to severe spasm in all of the 10 patients. The extent of increases in coronary sinus venous oxygen saturation at 30 s after acetylcholine injection was not significantly different between the two groups (group 1: 15 +/- 4%, group 2: 17 +/- 3%). Heart rate, blood pressure and rate-pressure product were essentially unchanged at 30 s after intracoronary injection of acetylcholine in both groups. These data suggest that in control adult humans, coronary blood flow was increased through dilatation of resistance vessels by acetylcholine, while in patients with variant angina, coronary blood flow was transiently increased by dilatation of resistance vessels, after which it was suddenly decreased by spasm of an epicardial artery induced by this agent. Relaxant responses to acetylcholine of coronary resistance vessels appear to be preserved well in patients with variant angina.

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75. Intracoronary verapamil for the treatment of distal microvascular coronary artery spasm following PTCA.

**Author(s):** Pomerantz RM, Kuntz RE, Diver DJ, Safian RD, Baim DS
**Citation:** Catheterization & Cardiovascular Diagnosis, December 1991, vol./is. 24/4(283-5), 0098-6569;0098-6569 (1991 Dec)

**Abstract:** Distal microvascular spasm is a somewhat uncommon occurrence following PTCA and often does not respond well to nitroglycerin. We report several patients who developed distal microvascular spasm that was refractory to intracoronary nitroglycerin but responded promptly to intracoronary verapamil.

**Source:** MEDLINE

76. Advances in the treatment of unstable angina pectoris.

**Author(s):** Spinler SA, Davis LE

**Citation:** Clinical Pharmacy, November 1991, vol./is. 10/11(825-38), 0278-2677;0278-2677 (1991 Nov)

**Publication Date:** November 1991

**Abstract:** The pathogenesis, clinical manifestations and diagnosis, and drug and nondrug therapies of unstable angina pectoris are reviewed. Coronary-artery plaque fissure and rupture, with subsequent platelet aggregation and thrombosis, are the primary underlying stimuli for unstable angina. Unstable angina has been defined as consisting of new-onset angina; angina that is increasing in frequency, intensity, or duration (crescendo angina); or angina at rest. The diagnosis of unstable angina is based on the clinical presentation, electrocardiographic findings, the lack of evidence of myocardial infarction (MI), exercise testing, and coronary angiography. I.V. nitroglycerin is the cornerstone of medical therapy for unstable angina, it relieves chest pain and has a short onset of action. I.V. nitroglycerin, however, has not been shown to reduce the occurrence of MI or death, and its beneficial effects may decrease over time. Aspirin reduces the occurrence of MI and death in patients with unstable angina, but the ideal dosage has not been established. Heparin may reduce the frequency of angina and MI, but its effect on mortality is unknown. Nifedipine has produced beneficial effects in small trials, whereas larger trials have suggested that the drug has deleterious effects when used in the treatment of unstable angina. Verapamil and diltiazem may be effective in relieving chest pain. Calcium-channel blockers have generally not been proved to reduce the risk of MI and death. Data evaluating the efficacy of beta-adrenergic blockers as monotherapy for unstable angina are lacking; these drugs should not be used in patients with vasospastic or Prinzmetal's angina. Thrombolytic therapy has produced mixed results when used in the treatment of unstable angina. Nondrug therapies for unstable angina include intra-aortic balloon counterpulsation, percutaneous transluminal coronary angioplasty, and coronary-artery bypass surgery. Numerous drug and nondrug therapies may be employed in the treatment of unstable angina pectoris.

**Source:** MEDLINE

77. Efficacy of slow-release nifedipine on myocardial ischemic episodes in variant angina pectoris.

**Author(s):** Morikami Y, Yasue H

**Citation:** American Journal of Cardiology, September 1991, vol./is. 68/6(580-4), 0002-9149;0002-9149 (1991 Sep 1)

**Publication Date:** September 1991

**Abstract:** To evaluate the efficacy of slow-release nifedipine (a single dose of 20 mg given at 10 P.M. or 2 doses of 20 mg at 10 P.M. and 6 A.M.) on ischemic episodes in patients with variant angina, a single-blind crossover study with ambulatory electrocardiographic monitoring was performed in 15 patients (13 men and 2 women, mean age 63 years). In all, there were 646 ischemic episodes detected with ambulatory electrocardiographic monitoring during the study period, and 618 episodes of them occurred during placebo periods with a circadian variation. Sixty-nine percent of the episodes in placebo periods were asymptomatic. The number of anginal attacks, nitroglycerin tablets taken, ST-segment elevation and the total ischemic duration significantly decreased during nifedipine therapy compared with results after the placebo therapy period, respectively (p less than 0.01 or 0.05). Twenty-eight ischemic episodes occurred during nifedipine therapy when the
plasma level of nifedipine was low. Thus, asymptomatic ischemic episodes more frequently occur than symptomatic episodes and the administration of slow-release nifedipine is highly effective in suppressing not only symptomatic but also asymptomatic myocardial ischemia in patients with variant angina. The timing of the administration of slow-release nifedipine is an important factor in suppressing ischemic episodes.

Source: MEDLINE

78. Refractory variant angina relieved by denopamine--a case report.

Author(s): Shimizu H, Lee JD, Ogawa KB, Sugiyama T, Yamamoto M, Hara A, Nakamura T

Citation: Japanese Circulation Journal, July 1991, vol./is. 55/7(692-4), 0047-1828:0047-1828 (1991 Jul)

Publication Date: July 1991

Abstract: A 48-year-old man with severe variant angina refractory to conventional treatment with calcium antagonists and nitrates, or prazosin, or trihexyphenidyl hydrochloride, became symptom free rapidly when treated with denopamine, a adrenergic beta-1 agonist. Denopamine may prove to be an additional therapeutic agent in the management of severe variant angina. Therefore the response to denopamine and the lack of response to prazosin in this patient suggests that not only the adrenergic alpha receptor but also the adrenergic beta-1 receptor plays an important role in the production of coronary spasm, at least in some patients.

Source: MEDLINE

79. Effect of direct intracoronary administration of methylergonovine in patients with and without variant angina.

Author(s): Igarashi Y, Yamazoe M, Shibata A

Citation: American Heart Journal, April 1991, vol./is. 121/4 Pt 1(1094-100), 0002-8703:0002-8703 (1991 Apr)

Publication Date: April 1991

Abstract: The effects of intracoronary administration of methylergonovine were studied in 21 patients with variant angina and 22 patients with atypical chest pain and in others without angina pectoris (control group). Methylergonovine was administered continuously at a rate of 10 micrograms/min up to 50 micrograms. In all patients with variant angina, coronary spasm was provoked at a mean dose of 28 +/- 13 micrograms (mean +/- SD). In the control group neither ischemic ST change nor localized spasm occurred. The basal tone of the right coronary artery was significantly lower than that of the left coronary artery. The percentage of vasoconstriction of the right coronary artery was significantly higher than that of the left coronary artery. These results suggest that spasm provocation tests, which use an intracoronary injection of a relatively low dose of methylergonovine, have a high sensitivity in variant angina and the vasoreactivity of the right coronary artery may be greater than that of the other coronary arteries.

Source: MEDLINE

80. Usefulness of intracoronary injection of acetylcholine as a provocative test for coronary artery spasm in patients with vasospastic angina.

Author(s): Miwa K, Fujita M, Ejiri M, Sasayama S

Citation: Heart & Vessels, 1991, vol./is. 6/2(96-101), 0910-8327:0910-8327 (1991)

Publication Date: 1991

Abstract: In order to examine both the sensitivity and specificity of coronary artery spasm induced by intracoronary injection of acetylcholine in patients with vasospastic angina, incremental doses of acetylcholine (20, 30, and 50 micrograms) were injected directly into each coronary artery in 21 patients with variant angina (group A), in 28 patients with other types of vasospastic angina (group B), and in 20 patients without any significant coronary artery disease (group C). Coronary artery spasm was defined as severe vasoconstriction (greater than or equal to 90% of reduction in luminal diameter) with chest pain and/or
ischemic changes in the electrocardiogram. Intracoronary injection of acetylcholine induced spasm of at least one coronary artery in 20 patients (95%) of group A, in 27 patients (96%) of group B, and in only 2 patients (10%) of group C. The low dose of acetylcholine (20 micrograms) induced coronary spasm more frequently in group A patients (81%) than in group B patients (43%) (P less than 0.05). ST-segment elevation associated with anginal attacks was significantly (P less than 0.05) more frequent in group A (71%) than in group B (39%). When acetylcholine was injected separately into the left and right coronary arteries, spasm of both coronary arteries was observed in 7 out of 14 of group A (50%), in 8 out of 22 of group B (36%), and in none of the 20 of group C. We concluded that intracoronary injection of acetylcholine is a sensitive and reliable method for the induction of coronary spasm in patients with vasospastic angina as well as in those with variant angina.

Source: MEDLINE

81. [Pathophysiology and therapy of coronary vasospasm].

Author(s): Yasue H, Okumura K

Citation: Nippon Naika Gakkai Zasshi - Journal of Japanese Society of Internal Medicine, November 1990, vol./is. 79/11(1518-22), 0021-5384;0021-5384 (1990 Nov 10)

Publication Date: November 1990

Source: MEDLINE

82. Unstable angina pectoris.

Author(s): Wallace WA, Richeson JF, Yu PN

Citation: Clinical Cardiology, October 1990, vol./is. 13/10(679-86), 0160-9289;0160-9289 (1990 Oct)

Publication Date: October 1990

Abstract: The pathophysiology of unstable angina has been better elucidated in the past five years and has led to more rational therapy. Coronary arteries in patients with unstable angina have atherosclerotic plaques which are often complex and are the site of platelet activation and fibrin deposition. Nitrates, one of the oldest therapies, are efficacious and act not only by dilating coronary vessels but by reducing preload and afterload. Beta blockers have a salutary effect by decreasing myocardial oxygen demand. Calcium channel blockers attenuate smooth muscle contraction and thereby act to decrease coronary artery spasm. Beta blockers and calcium channel blockers are equally efficacious in unstable angina. The antiplatelet agent, aspirin, has been shown to reduce fatal or non-fatal myocardial infarction and probably overall mortality. The use of heparin acutely for unstable angina has been demonstrated to decrease refractory angina and myocardial infarction, and acutely is probably better than aspirin. For patients with reduced ejection fractions (0.30-0.49), a prospective randomized trial has shown that coronary artery bypass graft surgery offers an improved three-year survival compared with medical therapy; however, surgery does not prevent myocardial infarction. Percutaneous transluminal coronary angioplasty may be a reasonable therapeutic alternative for some patients with single-vessel disease who are refractory to medical therapy but there are as yet no controlled trials of this question. To date a clinical benefit from thrombolytic therapy has not been demonstrated.

Source: MEDLINE

83. [Variant (Prinzmetal's) angina with diffuse coronary spasm without coronary sclerosis]. [German] Variant(Prinzmetal)-Angina mit diffusem Koronarspasmus ohne Koronarsklerose.

Author(s): Willberg A, Lieb G, Nunberger D, Hochrein H

Citation: Deutsche Medizinische Wochenschrift, October 1990, vol./is. 115/41(1549-52), 0012-0472;0012-0472 (1990 Oct 12)

Publication Date: October 1990

Abstract: A 49-year-old man developed, over a period of three years, progressively more frequent nocturnal attacks of angina and palpitations. Exercise electrocardiogram was negative. 24-hour Holter monitoring revealed ventricular extrasystoles and tachycardia with
ST segment elevations. The dominant left coronary artery, which was free of atherotic changes, went into diffuse spasm after ergonovine administration, accompanied by angina and ventricular extrasystoles. Registration of spontaneous ischaemia confirmed the diagnosis of variant (Prinzmetal) angina. Administration of twice daily 90 mg diltiazem retard and once daily 120 mg isosorbide dinitrate retard at night ended the spasms and with it the attacks of angina and the arrhythmias. This case illustrates that typical angina and ventricular tachyarrhythmias can be caused by spontaneous coronary spasms, even in the presence of normal exercise ECGs and coronary angiograms. If coronary artery spasms are not detectable by ECG, the ergonovine test may further the diagnosis.

Source: MEDLINE

84. Pharmacologic management of ischemic heart disease with beta-blockers and calcium channel blockers.

Author(s): Pearle DL

Citation: American Heart Journal, September 1990, vol./is. 120/3(739-42; discussion 743-5), 0002-8703;0002-8703 (1990 Sep)

Publication Date: September 1990

Abstract: In myocardial ischemia beta-blockers reduce myocardial oxygen demand, improve flow toward ischemic regions, and have mild antiplatelet and antiarrhythmic effects. These agents are effective in chronic stable angina and unstable angina. In chronic myocardial ischemia, the beta-blockers timolol, metoprolol, atenolol, and propranolol have cardioprotective effects, reducing overall mortality and the incidence of recurrent myocardial infarction. Calcium channel blockers, which reduce myocardial oxygen demand and improve oxygen supply, are effective in the treatment of chronic stable angina, vasospastic angina, and unstable angina. Although calcium channel blockers generally have no effect or adverse effects when used as primary therapy for acute myocardial infarction, diltiazem (when used concomitantly with nitrates or beta-blockers) has been shown to reduce the incidence of reinfarction in patients after non-Q wave myocardial infarction.

Source: MEDLINE

85. Randomized double-blind comparison of isosorbide dinitrate and nifedipine in variant angina pectoris.

Author(s): Aschermann M, Bultas J, Karetova D, Kolbel F, Kozakova M, Simper D

Citation: American Journal of Cardiology, June 1990, vol./is. 65/21(46J-49J), 0002-9149;0002-9149 (1990 Jun 4)

Publication Date: June 1990

Abstract: The antianginal and anti-ischemic effect of isosorbide dinitrate (ISDN), 120 mg once daily, and nifedipine, 20 mg twice daily, both in slow-release formulations, were compared in 17 patients with variant angina pectoris in a randomized, double-blind trial. The design included a placebo run-in period and two 6-week crossover periods of active treatment. Mean frequency of angina decreased significantly from 43 attacks per week during the placebo period to 4 per week with ISDN and 8 with nifedipine (p less than 0.001). Sublingual nitroglycerin consumption decreased significantly from 37 tablets per week with placebo to 3 tablets per week with ISDN and 7 with nifedipine (p less than 0.001). Both drugs reduced the silent and symptomatic ST-segment deviations on ambulatory electrocardiographic recording and increased maximal exercise tolerance. Episodes of coronary spasm could be provoked, by hyperventilation, in all patients during the placebo phase but in no patient during therapy with either active drug. Thus, both ISDN and nifedipine, in their slow-release formulations, are effective in the treatment of variant angina pectoris.

Source: MEDLINE

86. [Gallopamil infusion for treatment of Prinzmetal angina]. [Italian] Il gallopamil in infusione nel trattamento dell’angina di Prinzmetal.

Author(s): Carlon R, Cappelletti F, Ometto R, Maiolino P, Vincenzi M
The efficacy of a new calcium channel blocker, gallopamil, has been tested via a single blind, self-controlled versus placebo protocol in 9 consecutive patients admitted to our Coronary Care Unit because of repeated daily attacks of Prinzmetal variant angina. Exclusion criteria were age (greater than 65 years) bradycardia (less than 50 beats/min), recent myocardial infarction, heart failure, sinoatrial or atrioventricular block. After a 24 hours run-in period on saline drip, gallopamil was administered as 0.03 mg/kg bolus followed by continuous infusion at 0.02 mg/kg/h for the first 24 hours and 0.03 mg/kg/h for the last 48 hours. Treatment was then stopped and the patients were again kept on saline infusion for the next 30 hours. Holter monitoring was recorded during run-in, on third day of treatment and 6 hours after gallopamil withdrawal. Anginal attacks were significantly reduced in number by therapy (-63%, -91%, -84% in the 3 days of treatment). Holter monitoring during gallopamil infusion showed a statistically significant reduction in silent (-98%) and symptomatic (-93%) ischemic episodes (IE). During the last 24 hours of the washout period we observed a statistically significant increase in silent ischemic episodes. While no transient ST segment elevation was recorded in 3 patients, in 1 patient symptomatic IE were increased of 150% with respect to the run-in period. On the whole we observed complete suppression of IE in 7 patients (78%) at the third day of treatment with gallopamil. In 2 patients (22%) a greater than 75% reduction was observed. (ABSTRACT TRUNCATED AT 250 WORDS)

Source: MEDLINE


Author(s): Zaiac M, Renzulli A, Hilton CJ

Citation: European Journal of Cardio-Thoracic Surgery, 1990, vol./is. 4/2(109-11), 1010-7940;1010-7940 (1990)

Publication Date: 1990

Abstract: Coronary artery spasm following coronary artery bypass grafting (CABG) has been described previously. The cause and underlying risk factors are mainly speculative and treatment therefore symptomatic. We present the successful management of this condition by administration of an intravenous Nifedipine infusion after intracoronary Isosorbide dinitrate (ISDN) had failed to relieve the spasm.

Source: MEDLINE

Full Text: Available in fulltext at Highwire Press

88. Calcium antagonists in the treatment of Prinzmetal's angina and unstable angina pectoris.

Author(s): Beller GA

Citation: Circulation, December 1989, vol./is. 80/6 Suppl(IV78-87), 0009-7322;0009-7322 (1989 Dec)

Publication Date: December 1989

Abstract: Calcium antagonists block the entry of calcium into vascular smooth muscle cells, producing pharmacological vasodilation. Thus, it is not surprising that these drugs are effective in treating unstable angina that is often characterized by increased vasmotion and dynamic obstruction at the site of atheromatous plaques. Nifedipine, diltiazem, and verapamil are all highly and equally effective in reducing painful and painless ischemic episodes in Prinzmetal's variant angina. In patients with unstable angina who have known or suspected significant underlying coronary artery disease, a multipharmacological approach to therapy is warranted. Nifedipine used with beta-blocker drugs is more effective than nifedipine as monotherapy. Diltiazem and verapamil have been shown to be effective when given without beta-blockers in unstable angina patients. In many patients, thrombus formation rather than vasospasm is the major pathophysiological event resulting in
progression of the syndrome to infarction or sudden death. In these patients, antiplatelet, antithrombotic, or antiplatelet and antithrombotic therapy is of utmost importance to maintain adequate coronary flow. Nonresponders to medical therapy with unstable angina have a high prevalence of eccentric and multiple coronary stenoses with a high incidence of thrombi. The best responders to calcium antagonist therapy are patients with concentric coronary stenoses. In summary, calcium antagonists are highly effective in reducing ischemic episodes in patients with Prinzmetal's angina and effective for therapy for unstable angina when used in conjunction with other forms of medical treatment aimed at the processes of platelet activation and thrombus formation.

Source: MEDLINE

Full Text:
Available in fulltext at Highwire Press
Available in fulltext at Ovid

89. [Various clinical and vasomotor coronary responses to calcium block in mixed angina and Prinzmetal's angina, expression of various physiopathologic mechanisms]. [Italian] Differente risposta clinica e vasomotoria coronarica al calcio-blocco nell'angina mista e nell'angina tipo Prinzmetal, espressione di un diverso meccanismo fisiopatologico.

Author(s): De Cesare N, Bartorelli A, Fabbiocchi F, Loaldi A, Montorsi P, Apostolo A, Polese A

Citation: Cardiologia, November 1989, vol./is. 34/11(925-33), 0393-1978;0393-1978 (1989 Nov)

Publication Date: November 1989

Abstract: Impedance to flow due to coronary spasm is currently interpreted as the mechanism of Prinzmetal angina. Flow impedance, probably of vasomotor origin, superimposed on severe coronary stenosis is also viewed as the trigger for the spontaneous component of mixed angina. The major question that we attempted to answer in this study was whether mixed angina may be considered a variant of the Prinzmetal form, or a particular manifestation of the classic effort form. For these purposes we investigated the acute vasomotor response to calcium channel blockade (nifedipine 10 mg sl) of both significant (greater than 50%) stenotic lesions and of normal coronary vessels in 22 patients with mixed angina and in 14 patients with Prinzmetal angina, and correlated it with the clinical response to treatment (nifedipine 20 mg qid). Calcium channel blockade, in fact, is considered as a specific remedy in the presence of an altered coronary vasomotility. The clinical response was evaluated through ambulatory Holter monitorings of 48 hour duration, while on placebo, nifedipine and placebo again. In mixed angina an angiographic evaluation showed that the residual lumen diameter of significant lesions was unchanged in 2, enhanced in 11 and reduced in 9 patients after sl nifedipine; lumen variations from base line ranged from +1.5 to -1.3 mm. Acute stenosis widening or narrowing correlated closely with the efficacy or not of the treatment. In the Prinzmetal group the vast majority of the lesions had compliant portions which invariably responded with dilatation (the residual coronary lumen increased by an average of 69% of base line); 100% of patients in this group responded favourably to treatment.(ABSTRACT TRUNCATED AT 250 WORDS)

Source: MEDLINE


Author(s): Prazeres de Sa ME, Bordalo e Sa AL, Correia da Cunha JA, de Lima R, Cantinho G, Delgado C, Soares-Costa JT, Ribeiro C

Citation: Revista Portuguesa de Cardiologia, November 1989, vol./is. 8/11(785-90), 0870-2551;0870-2551 (1989 Nov)

Publication Date: November 1989

Abstract: A case of a male 66 years-old patient who presented with a clinical picture of Prinzmetal's variant angina early in the evolution of an acute myocardial infarction is
Transient elevation of ST-segment was documented on Holter monitoring in association with angina at rest as well as asymptomatic episodes of ST-segment changes. Significant two-vessels obstructive lesions (left anterior descending and circumflex arteries) was present. As variant angina had several recurrences in spite of medical therapy with nitrates and calcium antagonists, the patient was submitted to coronary by-pass surgery associated to plexectomy. A Thallium myocardial scintigraphy suggests that a peroperative infarction had occurred. The patient was asymptomatic at six months follow-up.

Source: MEDLINE

91. Spontaneous coronary artery spasm in variant angina is caused by a local hyperreactivity to a generalized constrictor stimulus.

Author(s): Kaski JC, Maseri A, Vejar M, Crea F, Hackett D

Citation: Journal of the American College of Cardiology, November 1989, vol./is. 14/6(1456-63), 0735-1097;0735-1097 (1989 Nov 15)

Publication Date: November 1989

Abstract: To assess whether spontaneous coronary artery spasm in patients with variant angina results from local coronary hyperreactivity to a generalized constrictor stimulus or from a stimulus generated only at the site of the hyperreactive segment, the behavior of spastic and nonspastic coronary segments was studied in six patients with variant angina in whom focal coronary spasm developed spontaneously during cardiac catheterization. None of the patients had critical (greater than 50% luminal diameter reduction) organic coronary stenoses. Coronary diameters were measured by computerized quantitative arteriography during control, spontaneous spasm and ergonovine-induced spasm and after intracoronary nitrates were given. During spontaneous spasm, the luminal diameter of spastic and both proximal and distal nonspastic coronary segments was significantly reduced from control values, 64.2%, 13.2% and 14.8%, respectively. Average diameter reduction of unrelated arteries was 12.3%. Ergonovine, which was also administered to four patients, provoked focal spasm at the same site as spontaneous spasm. During intravenous ergonovine, luminal diameter of spastic segments was reduced by 91.5%, that of nonspastic proximal segments by 17.8% and that of nonspastic distal segments by 11.5%. Luminal diameter of unrelated arteries during ergonovine-induced spasm was reduced by 17.7%. Constriction of spastic segments was greater during ergonovine-induced spasm (p less than 0.05), whereas the extent of diameter reduction of nonspastic segments was not significantly different during spontaneous spasm and ergonovine-induced spasm. Intracoronary isosorbide dinitrate diluted spastic and nonspastic coronary segments to a similar extent from control (20.7%, 18% and 16.5%, respectively; p = NS).(ABSTRACT TRUNCATED AT 250 WORDS)

Source: MEDLINE


Author(s): Aschermann M, Bultas J, Karetova D, Kolbel F, Simper D, Kozakova M

Citation: Casopis Lekaru Ceskych, September 1989, vol./is. 128/37(1178-81), 0008-7335;0008-7335 (1989 Sep 8)

Publication Date: September 1989

Abstract: The effects of isosorbide dinitrate single dose 120 mg daily and nifedipine 20 mg twice daily were studied in 17 patients with variant angina pectoris due to coronary artery spasm. After a placebo phase the patients were randomized to treatment with either isosorbide dinitrate or nifedipine. After six weeks the patients were crossed over for another six weeks period of treatment. There was significant decrease of number of angina attacks during both treatment regimens. Using 24 hours Holter monitoring we also proved significant decrease of number of ST segment elevation or depression, either symptomatic or asymptomatic. There was increase of performed work during exercise tests after both treatment periods. The efficacy of Isoket 120 mg and Adalat Retard 2 x 20 mg daily in the treatment of patients with active variant angina pectoris was comparable in our study. 3 patients suffered untolerable headache during isosorbide dinitrate phase and had to
terminate treatment after first day only.

Source: MEDLINE

93. [Induction of coronary arterial spasm by intracoronary administration of acetylcholine in patients with vasospastic angina].

Author(s): Miwa K, Fujita M, Ejiri M, Sakai O, Asanoi H, Nozawa T, Araie E, Miyagi Y, Sasayama S

Citation: Journal of Cardiology, September 1989, vol./is. 19/3(749-55), 0914-5087;0914-5087 (1989 Sep)

Publication Date: September 1989

Abstract: To examine whether intracoronary injections of acetylcholine induce coronary artery spasm in patients with vasospastic angina, incremental doses (20, 30 and 50 micrograms) were injected directly into the coronary arteries in 12 patients with variant angina (Group A: rest angina with electrocardiographic ST-segment elevation during attacks), 19 with vasospastic angina (Group B: rest angina and/or effort angina with variable threshold in the treadmill exercise stress test), 11 with organic coronary artery stenosis but without angina (Group C), and 14 without coronary artery disease (Group D). A temporary cardiac pacemaker was positioned in the right ventricle. Coronary artery spasm was defined as severe vasoconstriction (greater than or equal to 90% of reduction in the luminal diameter) with chest pain and/or ischemic changes in the electrocardiogram. Intracoronary injection of acetylcholine induced spasm of at least one coronary artery in all 12 patients (100%) of Group A, in 18 (95%) of Group B, in two (18%) of Group C, and in two (14%) of Group D. Thus, the sensitivity of this method for inducing coronary spasm was 100% in group A, 95% in Group B, and 97% in Group A plus Group B. The specificity for inducing spasm was 86% in Group D, and 84% in Group C and Group D. When acetylcholine was injected separately into the left and right coronary arteries, spasm of both the coronary arteries was observed in two (40%) of Group A, in five (33%) of Group B, and none (0%) of Group C and Group D. Acetylcholine (20 micrograms) induced coronary spasm in 10 (83%) of Group A and only in nine (47%) of Group B.(ABSTRACT TRUNCATED AT 250 WORDS)

Source: MEDLINE

94. Clinical syndromes of angina pectoris.

Author(s): Maseri A

Citation: Hospital Practice (Office Edition), March 1989, vol./is. 24/3(65-80), 8750-2836;8750-2836 (1989 Mar 15)

Publication Date: March 1989

Source: MEDLINE


Author(s): Friedel HA, Sorkin EM

Citation: Drugs, December 1988, vol./is. 36/6(682-731), 0012-6667;0012-6667 (1988 Dec)

Publication Date: December 1988

Abstract: Nisoldipine is an orally administered calcium entry blocking drug structurally related to nifedipine. In limited clinical trials it has been shown to be effective and relatively well tolerated in the treatment of patients with chronic stable angina pectoris and mild to moderate essential hypertension. As for all dihydropyridine-calcium antagonists, its major properties include potent peripheral and coronary vasodilation and improvement in myocardial oxygen supply relative to demand. These actions occur without depression of cardiac conduction or left ventricular function. Short term clinical trials have shown nisoldipine to produce both symptomatic and objective improvements in patients with chronic angina of effort and have suggested a benefit in vasospastic angina. A small number of comparative trials indicate that nisoldipine is equally as effective as nifedipine. In
addition, in combination with beta-adrenoceptor blockade nisoldipine appears to offer additional benefit compared with beta-blockade alone and is well tolerated. In patients with mild to moderate essential hypertension nisoldipine monotherapy, in 1 or 2 daily doses, has maintained blood pressure control and has also been a useful addition to diuretics and beta-adrenoceptor blocking drugs in patients with poorly controlled disease. Side effects appear to be dose related, generally mild and transient, and are primarily those resulting from potent peripheral vasodilation - headache, flushing and pretibial or ankle oedema. Although studies to date are promising, there are no published long term studies (greater than 1 year) of nisoldipine in comparison with other calcium entry blockers and other drugs currently in clinical use for the treatment of angina pectoris or hypertension. Until such studies are completed the exact place of nisoldipine in the treatment of these diseases remains to be established.

Source: MEDLINE

96. **Coronary artery spasm during coronary artery bypass surgery: its diagnosis, treatment and prevention.**

**Author(s):** Fuse K, Makuuchi H, Konishi T, Nakanishi S, Nishiyama S, Nishimura S, Hosoda Y, Yamaguchi H

**Citation:** Japanese Journal of Surgery, November 1988, vol./is. 18/6(626-35), 0047-1909;0047-1909 (1988 Nov)

**Publication Date:** November 1988

**Abstract:** Between 1982 and 1983, we experienced four cases of hemodynamic collapse accompanied by an ST-segment depression in the ECG lead II, shortly after the cessation of cardiopulmonary bypass. The bypass graft flows monitored in these patients during the hemodynamic collapse episodes were remarkably low. In three cases, nitroglycerin (0.5-1 mg) was injected directly into the vein graft, which increased the graft flow suddenly, returned the ST-segment to the baseline, and improved the circulatory condition. Since 1984, however, diltiazem has been used in the cardioplegic solution and postoperative drip infusion. Due to the introduction of this drug, coronary artery spasm has not been seen in any of our patients since. These findings show that the monitoring of ST-segment changes and bypass graft flows are useful in the early diagnosis of coronary artery spasm after myocardial revascularization. Direct infusion of nitroglycerin into the vein graft is effective for the treatment of spasm, while diltiazem is useful in the prevention of coronary artery spasm incidental to myocardial revascularization.

Source: MEDLINE

97. **Acetylcholine and coronary artery spasm: important insight or squeeze play?.**

**Author(s):** Cannon RO 3rd

**Citation:** Journal of the American College of Cardiology, October 1988, vol./is. 12/4(889-91), 0735-1097;0735-1097 (1988 Oct)

**Publication Date:** October 1988

Source: MEDLINE

98. **The contribution of ventricular tachyarrhythmias to the genesis of cardiac pain during transient myocardial ischaemia in patients with variant angina.**

**Author(s):** Biagini A, Emdin M, Michelassi C, Mazzei MG, Carpeggiani C, Testa R, Andreotti F, L'Abbate A

**Citation:** European Heart Journal, May 1988, vol./is. 9/5(484-8), 0195-668X;0195-668X (1988 May)

**Publication Date:** May 1988

**Abstract:** The 24-h ambulatory electrocardiograms of 15 patients with both variant angina and ischaemia-related arrhythmias were analyzed to correlate cardiac pain with the following variables: site, type, duration and magnitude of ECG changes, presence and type of arrhythmias and time of occurrence of ischaemic attacks during the 24-h. Apart from
sublingual nitrate therapy, Holter monitoring was performed in the Coronary Care Unit (CCU), in the drug-free state in all patients. During a total of 79 days of monitoring, patients had 1385 ischaemic episodes, of which only 30% were painful. The site of ischaemia did not predict the occurrence of pain. Pain was more frequently associated with ST-segment elevation, longer ischaemic duration, increased time to peak ECG change, and greater ST-segment shift and arrhythmias. When the 259 attacks in association with ventricular arrhythmias were compared to the arrhythmia-free episodes, they were more frequently painful for the same duration and magnitude of ECG ischaemic changes. Furthermore, the complexity of arrhythmias increased the probability of cardiac pain. Most ischaemic episodes occurred at night and a decrease in the frequency of painful episodes (apart from those associated with arrhythmias) was apparent. Thus, in addition to electrocardiographic severity and duration of ischaemia, the presence of ventricular arrhythmias and the time of occurrence seem to influence pain perception during ischaemia.

Source: MEDLINE


Author(s): Davis WR

Citation: Catheterization & Cardiovascular Diagnosis, 1988, vol./is. 15/3(215), 0098-6569;0098-6569 (1988)

Publication Date: 1988

Source: MEDLINE

100. Physiopathological considerations on the arterial coronary spasm. Some diagnostic and therapeutical conclusions.

Author(s): Oprian O, Trifu A, Carp D, Pogaceanu P

Citation: Physiologie, January 1988, vol./is. 25/1-2(23-8), 1011-6206;1011-6206 (1988 Jan-Jun)

Publication Date: January 1988

Abstract: Starting from the cyclicity of the anginal attack in variant angina, the authors point out the role of alkalosis, besides the richness in alfa-adrenoceptors of the great coronary trunks. At the level of the muscular cell there is a competition between H+ -ions and Ca++ -ions. The diminution of H+ -ions as a result of alkalosis brings about the penetration of Ca++ into the cell and the appearance of the coronary spasm. So, we worked out an original method for the provocation of the spasm (the cold and hiperpnea test) and an original therapeutical procedure (by acetozolamid). We present, herein the first results scored in 16 patients.

Source: MEDLINE

101. Supersensitivity of coronary arteries in variant angina to spasm induced by intracoronary acetylcholine.

Author(s): Miwa K, Goto M, Lee JD, Matsuyama F, Shimizu H, Kato T, Hara A, Nakamura T

Citation: American Journal of Cardiology, January 1988, vol./is. 61/1(77-82), 0002-9149;0002-9149 (1988 Jan 1)

Publication Date: January 1988

Abstract: Acetylcholine (20 to 100 micrograms) was infused directly into coronary arteries in 10 patients with variant angina (group A), 13 subjects without coronary artery disease (group B) and 8 patients with significant organic coronary artery stenosis (greater than or equal to 50%) but without variant angina (group C) during coronary arteriography, to clarify the action of this agent on coronary arteries. Temporary pacing was performed at a demand heart rate of 40 beats/min while bradyarrhythmia developed. Coronary arteriography after administration of acetylcholine showed coronary vasoconstriction in all 10 patients (100%) of group A. Angina accompanied by electrocardiographic ischemic changes in 9 of 10 (90%, 7 ST-segment elevation and 2 depression) was provoked during this test. In the patients of group B, acetylcholine also induced vasoconstriction in 8 of 22
(36%) coronary arterial systems examined, chest pain in 3 (14%) and ST-segment deviation in none (0%). In the patients of group C, acetylcholine induced vasoconstriction in 3 of 9 (33%), chest pain in 2 (22%) and ST-segment depression in 1 (11%). No definite coronary artery dilation induced by acetylcholine was noted. Coronary vasoconstriction (p less than 0.05), electrocardiographic ischemic findings (p less than 0.01) and chest pain (p less than 0.01) were induced significantly more frequently in group A than in both groups B and group C. No significant difference was found between group B and group C. The coronary arteries in the patients with variant angina seem to be more susceptible to acetylcholine than those of patients without variant angina irrespective of the presence of significant atherosclerosis.

Source: MEDLINE

102. Vasospastic angina.

Author(s): Cote G, Waters DD

Citation: Cardiovascular Clinics, 1988, vol./is. 19/2(143-53), 0069-0384;0069-0384 (1988)

Publication Date: 1988

Source: MEDLINE

103. 'Second generation' dihydropyridine calcium antagonists. Greater vascular selectivity and some unique applications.

Author(s): Freedman DD, Waters DD

Citation: Drugs, November 1987, vol./is. 34/5(578-98), 0012-6667;0012-6667 (1987 Nov)

Publication Date: November 1987

Abstract: The newer dihydropyridine calcium antagonists are structurally related to nifedipine, but may provide greater vascular selectivity and wider clinical utility. Five new dihydropyridines-nisoldipine, nicardipine, nimodipine, felodipine and nitrendipine-are reviewed with regard to their preclinical pharmacology, haemodynamic effects and clinical indications. Nisoldipine is a potent arterial vasodilator with minimal electrophysiological and negative inotropic effects. Although data are still preliminary, the drug has shown some efficacy in both exertional angina and essential hypertension. The dosing interval is not yet clearly established, but may be twice daily. Utility in congestive heart failure awaits confirmation, but preliminary studies are promising. Nicardipine is an especially potent peripheral, cerebral and coronary arterial vasodilator that causes 10-fold less myocardial depression in animals than nifedipine, and may provide important cardioprotective effects during ischaemia. Human haemodynamic studies have confirmed nicardipine's lack of negative inotropism, its ability to reduce coronary and peripheral vascular resistance, and its lack of effect on cardiac conduction. Several controlled trials have documented its efficacy in exertional angina, vasospastic angina, and essential hypertension. Nimodipine's potential as an antiatherosclerotic agent is currently under investigation. Nimodipine is undergoing a unique clinical development programme aimed at cerebrovascular disorders. In almost all species, nimodipine selectively increases cerebral blood flow and reverses cerebral artery spasm without altering cerebral oxidative metabolism or systemic blood pressure. In humans, a large, double-blind, placebo-controlled trial in subarachnoid haemorrhage showed that nimodipine significantly reduced the severity of neurological deficits associated with delayed cerebral vasospasm. Several uncontrolled trials with larger numbers of patients support these results. Nimodipine has also proved useful in reducing cerebral artery spasm during intracranial surgery, and in the prophylactic treatment of migraine headaches. A preliminary study of nimodipine in acute stroke showed promising results in limiting neurological disability. Felodipine is a very potent systemic arterial vasodilator with negligible myocardial depressant activity. It is also a renal artery vasodilator. Unlike the other new dihydropyridines, felodipine prolongs the A-H interval on electrophysiological testing, but only to about 50% of that observed with verapamil. Felodipine is undergoing clinical trials in essential hypertension. (ABSTRACT TRUNCATED AT 400 WORDS)

Source: MEDLINE

104. Effect of oral levodopa and carbidopa on coronary spasm in variant angina
pectoris.


Citation: American Journal of Cardiology, September 1987, vol./is. 60/7(489-93), 0002-9149;0002-9149 (1987 Sep 1)

Publication Date: September 1987

Abstract: The effect of oral administration of 500 mg of levodopa with 50 mg of carbidopa, a peripheral dopadecarboxylase inhibitor, on coronary vasomotion during vasoconstrictor stimuli was examined in 15 patients with variant angina presenting with hyperventilation-induced myocardial ischemia. Patients were studied during 3 noninvasive sessions and 1 angiographic session. In all sessions the basic protocol consisted of provocation of coronary spasm by hyperventilation before and 2 hours after levodopa and carbidopa administration. During angiography, great cardiac vein blood flow, right atrial and aortic pressures were measured, and coronary angiograms were recorded at baseline and 1 to 4 minutes after each hyperventilation. Samples for dopamine plasma levels were drawn before and throughout the studies. In 3 selected patients, levodopa and carbidopa were associated with 30 mg of domperidone, an antagonist of dopamine peripheral receptors. Levodopa and carbidopa consistently prevented the occurrence of ischemia after hyperventilation in 6 of the 15 patients. This was due to inhibition of local coronary spasm in 2 patients and reduced coronary constriction in 4. Ischemia due to hyperventilation was still prevented despite addition of domperidone with levodopa and carbidopa. Plasma dopamine levels were 23 +/- 15 before and 739 +/- 284 pg/ml 2 hours after administration of levodopa and carbidopa. These findings are consistent with either a decreased central dopaminergic activity and associated disregulation of vasomotor tone, or a peripheral vasodilatory effect of increasing dopamine.(ABSTRACT TRUNCATED AT 250 WORDS)

Source: MEDLINE

105. Effect of a new coronary vasodilator, nicorandil, on variant angina pectoris.

Author(s): Kishida H, Murao S

Citation: Clinical Pharmacology & Therapeutics, August 1987, vol./is. 42/2(166-74), 0009-9236;0009-9236 (1987 Aug)

Publication Date: August 1987

Abstract: The effect of nicorandil, a new coronary vasodilator, was evaluated in 32 patients with variant angina pectoris in a single-blind trial. The study was comprised of a pretreatment period of 2 days with a placebo, a 3-day nicorandil medication period (20 mg/day), and a 2-day posttreatment period with the placebo. Anginal attacks disappeared completely in 24 of the 32 patients. The number of attacks during the pretreatment period, 3.6 +/- 0.4 per day, became significantly reduced to 0.7 +/- 0.2 per day during nicorandil therapy (P less than 0.001) and significantly increased to 1.3 +/- 0.3 per day after withdrawal of the drug (P less than 0.05). In 17 patients with continuous ECG monitoring, the frequency of occurrence of ST-segment elevation was 8.6 +/- 2.7 per day during the perobservation period, significantly decreased to 0.4 +/- 0.2 per day during nicorandil therapy (P less than 0.01), and significantly increased to 1.9 +/- 0.7 per day after withdrawal of the drug (P less than 0.05). The results demonstrate the effectiveness of nicorandil in the treatment of variant angina pectoris.

Source: MEDLINE

106. An overview of the safety and efficacy of nicardipine in clinical trials.

Author(s): Agre K

Citation: American Journal of Cardiology, June 1987, vol./is. 59/17(31J-35J), 0002-9149;0002-9149 (1987 Jun 30)

Publication Date: June 1987

Abstract: Nicardipine is currently being evaluated in clinical trials as a treatment for angina and hypertension. Over 2,000 patients have received nicardipine, most at dosages of 20 to 40 mg 3 times daily. In 12 double-blind, parallel-group studies (4 of them placebo-controlled) the efficacy of nicardipine was evaluated in mild to moderate hypertension;
supine systolic blood pressure was lowered by 10 to 15 mm Hg and supine diastolic blood pressure by 10 mm Hg. A clear dose response is present at dosages from 10 to 40 mg 3 times daily. Patients with angina were treated in 9 double-blind, crossover design studies: 4 of these were placebo-controlled; 3 were comparison studies with beta blockers; 2 were comparisons with nifedipine. Treadmill exercise tests were the major measure of efficacy. Results of these studies showed consistent, statistically significant improvement in exercise tolerance and time to onset of angina, and clinical improvement in patients with chronic stable angina. The effective dosages of nicardipine were 30 or 40 mg 3 times daily. A placebo-controlled study demonstrated remarkable efficacy in patients with vasospastic angina. No deaths or serious adverse reactions were attributed to nicardipine during clinical trials. The most common side effects reported were flushing, palpitations, headache and pedal edema. These appeared to be due to the drug's pharmacologic property of vasodilatation.

Source: MEDLINE

Author(s): Feldman RL
Citation: Circulation, June 1987, vol./is. 75/6 Pt 2(V96-102), 0009-7322;0009-7322 (1987 Jun)
Publication Date: June 1987
Abstract: This article reviews controlled trials of medical therapy for coronary artery spasm. The calcium antagonists, either alone or in combination with long-acting nitrates, are effective therapy for patients with coronary artery spasm. These drugs definitely decrease angina and the frequency of ischemic ST shifts recorded during continuous electrocardiographic monitoring. Therapy is still relatively nonspecific, however, since the mechanism(s) that lead to spasm remain unknown. Interestingly, the initial response to therapy is similar regardless of the presence or absence of severe coronary artery disease accompanying spasm. Drugs that block adrenergic or serotonin receptors or that alter platelet aggregability or prostaglandin production have been ineffective in relieving angina or decreasing the frequency of ischemic ST shifts. Patients with resting angina syndromes are a heterogeneous group; many do not have coronary spasm since other mechanisms also precipitate ischemic episodes at rest. Prevention of angina or ischemic ST shifts may not necessarily prevent acute myocardial infarction and sudden cardiac death. Both initial and long-term therapies should be individualized according to a detailed clinical and angiographic assessments of each patient.

Source: MEDLINE

Full Text:
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Available in fulltext at Ovid

108. Factors influencing the clinical course and the long-term prognosis of patients with variant angina.
Author(s): Kishida H, Hata N, Kusama Y, Suzuki T, Saito T, Nejima J, Otsu F, Yasutake M, Koumi S, Nakagomi A
Citation: Japanese Heart Journal, May 1987, vol./is. 28/3(293-306), 0021-4868;0021-4868 (1987 May)
Publication Date: May 1987
Abstract: The purpose of this study was to clarify the factors influencing the clinical course and prognosis in variant angina. Also, the mechanism of acute myocardial infarction in variant angina is reviewed. The subjects were 110 patients with variant angina who, after the initial visit or admission, were observed for a period of at least 2 months, the average observation period being 68 +/- 49 months (range: 2 months-16 years). The incidence of acute myocardial infarction was 21.8% of these patients and 87.5% of the infarctions occurred within 1 month of the initial visit or admission. In variant angina, the average rate over 1 year was 2.2%; however, in classical angina the rate was 3.7% and in postinfarction angina 5.0%. The mortality rate was 5.5%, with death in the majority of cases occurring...
within 1 month, as in myocardial infarction. When treatment was stopped, spontaneous remission occurred in at least 26 of the 110 cases (23.6%). Beyond 3 months, the remission continued in 19 of these 26 cases. Seven cases had acute myocardial infarction in spite of the suppression of anginal attacks with administration of calcium antagonists. Apparently coronary spasm is the cause of anginal attacks, and the cause of acute myocardial infarction in patients with variant angina appears to be coronary thrombus formation.

Source: MEDLINE


Author(s): Pesola A, Lauro A, Gallo R, Madeo A, Cosentino G

Citation: Giornale Italiano di Cardiologia, April 1987, vol./is. 17/4(329-39), 0046-5968;0046-5968 (1987 Apr)

Publication Date: April 1987

Abstract: The short and long term efficacy of diltiazem, a calcium-entry blocker, has been evaluated in a group of ten patients with Prinzmetal's variant angina admitted to a CCU. In the short term part of the study, after a run-in period, diltiazem 60 mg tid and placebo were administered alternatively during 4 randomized 72 hour periods. Response was assessed using continuous Holter monitoring, measuring the frequency of transient ischemic attacks. During the run-in period the number of episodes/day/patient was 16.1. No episodes of transient ST segment elevation were recorded during both periods of diltiazem treatment in 3 patients and during one of the two periods in 4. For the group as a whole the number of episodes during the first placebo period was not statistically different from that during the run-in period (208 versus 161). No statistically significant difference was also found in 8 patients comparing the number of episodes during the second placebo period and the run-in period (166 versus 101). During each period of diltiazem treatment an highly significant reduction in the number of episodes was observed (43 and 5, p = .006 and p = .02). Two patients did not complete the study protocol. Both patients had a worsening of angina during the first placebo period following diltiazem treatment. One of them developed an acute myocardial infarction. The possible occurrence of a rebound phenomenon after withdrawal of diltiazem seems to be indicated, in 6 patients, by a significant increase in the number of ischemic episodes recorded during the placebo period following active treatment in respect to the number during the first placebo period (159 versus 73, p = .04). (ABSTRACT TRUNCATED AT 250 WORDS)

Source: MEDLINE

110. Prompt relief of vasospastic angina by calcium antagonists.

Author(s): Egashira K, Araki H, Tomoike H, Takeshita A, Nakamura M

Citation: International Journal of Clinical Pharmacology, Therapy, & Toxicology, April 1987, vol./is. 25/4(175-7), 0174-4879;0174-4879 (1987 Apr)

Publication Date: April 1987

Abstract: A 57-year-old man had recurrent episodes of angina pectoris at rest. An electrocardiogram (ECG) during attack revealed transient ST elevations in leads V1 to V5. His symptoms were not relieved by sublingual nitroglycerin (TNG), but subsided promptly following sublingual or intravenous calcium antagonists. However, there was no difference between the degree of ST elevation on ECG recorded during the treatment of angina with either TNG or with calcium antagonist. Recurrent angina and painless ST elevation on Holter ECG recordings were prevented by a large dose of diltiazem. Coronary arteriography revealed only mild stenosis at the proximal portion of the left anterior descending coronary artery. It is suggested that coronary artery spasm was the cause of angina in this case and that sublingual or intravenous calcium antagonist was more effective in the treatment of acute attack of vasospastic angina than sublingual TNG.

Source: MEDLINE

111. Spontaneous remission of variant angina documented by Holter monitoring
and ergonovine testing in patients treated with calcium antagonists.

Author(s): Previtali M, Panciroli C, Ardissino D, Chimienti M, Angoli L, Salerno JA

Citation: American Journal of Cardiology, February 1987, vol./is. 59/4(235-40), 0002-9149:0002-9149 (1987 Feb 1)

Publication Date: February 1987

Abstract: Twenty-four patients with Prinzmetal's variant angina showing a favorable initial response to calcium antagonist treatment were studied to assess the evolution of the disease and the frequency and time course of spontaneous remission. At 3, 6 and 12 months from the acute phase, patients underwent in-hospital control studies, with 48-hour Holter monitoring and ergonovine testing carried out during treatment and after its interruption. During calcium antagonist therapy complete protection from spontaneous attacks was documented in 22 of 24 patients at 3 months, in 19 of 21 at 6 months and in all 21 at 12 months; ergonovine test results were negative in 16 of 23 patients at 3 months, in 16 of 20 at 6 months and in 16 of 20 studied at 12 months. After stopping treatment spontaneous attacks did not reappear in 7 of 24 patients (29%), 14 of 21 (66%) and 16 of 21 (76%) at 3, 6 and 12 months respectively, while the ergonovine test response remained negative in 6 of 21 (28%), 7 of 18 (39%) and 13 of 20 (65%) of the patients controlled at 3, 6 and 12 months. Thus, complete remission of angina documented by both Holter recording and ergonovine testing occurred in 5 of 24 patients (21%) at 3 months, in 7 of 21 (33%) at 6 months and in 12 of 21 (57%) at 12 months. Patients with remission of angina had a shorter duration of symptoms and more often showed normal or not critically diseased coronary arteries. (ABSTRACT TRUNCATED AT 250 WORDS)

Source: MEDLINE

112. Comparison of diltiazem and nifedipine alone and in combination in patients with coronary artery spasm.

Author(s): Prida XE, Gelman JS, Feldman RL, Hill JA, Pepine CJ, Scott E

Citation: Journal of the American College of Cardiology, February 1987, vol./is. 9/2(412-9), 0735-1097:0735-1097 (1987 Feb)

Publication Date: February 1987

Abstract: Fifteen patients with coronary artery spasm completed a double-blind placebo-controlled trial comparing diltiazem and nifedipine. Increasingly, higher daily doses (diltiazem, 90 to 360 mg; nifedipine, 30 to 120 mg) were administered to achieve optimal clinical effects. Daily diaries and ambulatory electrocardiographic recordings were used to assess efficacy and side effects. Both drugs significantly decreased angina frequency compared with that in the preceding placebo period (diltiazem 1.4 +/- 0.4 [mean +/- SEM] to 0.4 +/- 0.2 episodes per day; nifedipine 1.4 +/- 0.3 to 0.4 +/- 0.1 episodes per day; both p less than 0.05). Ambulatory electrocardiographic recordings showed fewer ST shifts than were expected during all treatment periods (0.02/h recorded during placebo, none during diltiazem and 0.02/h during nifedipine therapy). Although some patients responded better to one drug than the other, neither drug resulted in a clearly superior clinical response. Diltiazem was discontinued in one patient because of urticaria, but the total number of side effects was higher with nifedipine (12 of 15 patients) than with diltiazem (5 of 15, p less than 0.01). Nine patients remained symptomatic on single drug treatment and entered open label treatment with the combination of diltiazem and nifedipine. Three patients did not tolerate the combination because of important side effects; the other six also had side effects, but these were relatively minor. Four patients received no more benefit from the combination than from a single agent; the condition of two patients improved. Both diltiazem and nifedipine provide effective antianginal therapy for coronary spasm, but diltiazem has fewer side effects. (ABSTRACT TRUNCATED AT 250 WORDS)

Source: MEDLINE

113. Use of nitrates in the treatment of unstable and variant angina.

Author(s): Nordlander R

Citation: Drugs, 1987, vol./is. 33 Suppl 4/(131-9), 0012-6667;0012-6667 (1987)

Publication Date: 1987
Abstract: Unstable angina is a clinical syndrome that includes patients with new onset of angina, a change in a previous stable pattern, or the development of chest pain at rest. Generally, more than 90% of patients with this syndrome have significant fixed atherosclerotic coronary artery disease. Other complex, interacting pathophysiological mechanisms may include coronary vasoconstriction, plaque rupture and thrombosis. Therapeutic strategies aim at either reduction of myocardial oxygen demand or restoration of coronary blood flow. Both alternatives have been suggested as treatment of choice. However, as long as the pathophysiological mechanism(s) is unknown in the individual case, the treatment will mainly be empirical or based on results from clinical trials of heterogeneous groups of patients with unstable angina with probably varying aetiology. The results from such studies indicate that some strategies may be of value, but others may even be harmful in treatment of patients with this unstable syndrome. In this situation nitrates seem to be a safe drug which may be used in most forms of irrespective of the underlying pathophysiological mechanism(s).

Source: MEDLINE


Author(s): Nielsen H, Mortensen SA, Sandoe E

Citation: Acta Medica Scandinavica, 1987, vol./is. 221/3(261-5), 0001-6101;0001-6101 (1987)

Publication Date: 1987

Abstract: Sixteen consecutive patients with vasospastic angina underwent a control provocation test in the coronary care unit or the cardiac catheterization laboratory in order to evaluate the disease activity and the efficacy of long-term calcium antagonist treatment. In patients without angina at rest, the prolonged hyperventilation test was negative in 10/10 patients on calcium antagonist treatment (group A + B) and in 4/5 patients without medication (group C). The test was positive in 1/1 patient with angina at rest without medication (group D). However, the test provoked vasospastic angina in 1/5 patients who were asymptomatic without medication. In both the latter patients the prolonged hyperventilation test became negative after the restart of calcium antagonist treatment. During a mean follow-up period of 18 months (range 16-19) after the control hyperventilation test, no relapse of angina at rest, arrhythmias, syncopes, deaths or myocardial infarctions were registered. Thus, a negative test is compatible with low disease activity and/or efficacy of calcium antagonist treatment. Further, the test may reveal a subclinical tendency to coronary artery spasm.

Source: MEDLINE

115. [Usefulness and limitations of the ergonovine maleate test in the evaluation of calcium-antagonist therapy in Prinzmetal variant angina]. [Italian] Utilità e limiti del test con ergonovina maleato nella valutazione della terapia calcio-antagonista nell'angina variante di Prinzmetal.

Author(s): Previtali M, Salerno JA, Pancirolli C, Moizi M, Chimienti M, Montemartini C, Bobba P

Citation: Giornale Italiano di Cardiologia, October 1986, vol./is. 16/10(863-71), 0046-5968;0046-5968 (1986 Oct)

Publication Date: October 1986

Abstract: Ergonovine testing was carried out in a selected group of 25 patients with Prinzmetal's variant angina treated with calcium-antagonists in order to: define its usefulness in the evaluation of the short-term effectiveness of calcium-antagonist treatment; compare the results of the test with those of Holter monitoring; verify if the results of the test during the acute phase are correlated with the long-term response to treatment. In all patients a control period lasting 2-6 days was carried out, after which a treatment period with calcium-antagonists (nifedipine, diltiazem, verapamil), lasting 2-8 days, was instituted. In 20 patients only 1 calcium-antagonist was evaluated, in 1 patient 2 calcium-antagonists and in 4 all of them. Scalar ergonovine test was carried out in control conditions and repeated during each calcium-antagonist treatment period. During both
control and treatment periods all patients underwent Holter monitoring for evaluation of frequency of the spontaneous attacks. After the acute phase 21 of the 25 patients were discharged on calcium-antagonist treatment and followed-up for a mean period of 11 +/- 7 months. In control conditions ergonovine test was positive in 24 patients at a mean dose of 0.11 +/- 0.09 mg. (ABSTRACT TRUNCATED AT 250 WORDS)

Source: MEDLINE

116. The place of transluminal coronary angioplasty in the management of variant angina: a warning.

Author(s): Frank MJ

Citation: Journal of the American College of Cardiology, September 1986, vol./is. 8/3(509-10), 0735-1097;0735-1097 (1986 Sep)

Publication Date: September 1986

Source: MEDLINE

117. Sympathectomy in the treatment of angina and arrhythmias.

Author(s): Kadowaki MH, Levett JM

Citation: Annals of Thoracic Surgery, May 1986, vol./is. 41/5(572-8), 0003-4975;0003-4975 (1986 May)

Publication Date: May 1986

Abstract: Sympathectomy has been used as treatment for several different cardiac conditions. These include classic angina pectoris, Prinzmetal's angina, paroxysmal atrial tachycardia, ventricular tachycardia, and long QT syndrome. To understand the rationale of such treatment, the innervation of the human heart is reviewed with discussion of the cardiac plexus and coronary innervation. Results in published studies are summarized and discussed.

Source: MEDLINE

118. [Comparison of the effects of bepridil and diltiazem in Prinzmetal's angina. Crossed, randomized, double-blind study. Apropos of 14 cases]. [French]


Author(s): Ducloux G, Manouvrier J, Bajolet A, Guermonprez JL

Citation: Annales de Cardiologie et d'Angiologie, March 1986, vol./is. 35/3(167-72), 0003-3928;0003-3928 (1986 Mar)

Publication Date: March 1986

Abstract: The efficacy of bepridil was compared with that of diltiazem in treatment of Prinzmetal's angina, in a crossed, randomized double-blind study of 14 observations using repeated Holter recordings (a total of 9 for each patient). Clinical and electrical monitoring showed that the efficacy of bepridil is comparable to that of diltiazem in treatment of spastic angina.

Source: MEDLINE


Author(s): Capouet V, Massaut J, Deuvaert F

Citation: Acta Anaesthesiologica Belgica, 1986, vol./is. 37/1(53-7), 0001-5164;0001-5164 (1986)

Publication Date: 1986

Abstract: Coronary vasospasm occurring after myocardial revascularisation must be quickly and efficiently treated to avoid the haemodynamic complications that it may cause. Treatment by nitroglycerin intravenously (i.v.) is not always efficient and an alternate
possibility of treatment is essential. During the period from March 1982 to August 1983, we observed in our institution three patients with coronary vasospasms occurring after myocardial revascularisation which did not respond to nitroglycerin i.v. and were successfully treated by verapamil. Recurrence of vasospasm was prevented in those cases by verapamil perfused i.v. (dosage: 0.37 to 0.75 microgram/kg/min). The clinical evolution of these 3 cases are described here. Dosages of verapamil used to treat and to prevent the incident are discussed. The limitations of this therapy are briefly reviewed.

Source: MEDLINE


Author(s): Bolgiano E, Barish R, Tso E, Browne BJ

Citation: Journal of Emergency Medicine, 1986, vol./is. 4/4(307-10), 0736-4679;0736-4679 (1986)

Publication Date: 1986

Abstract: The syndrome of coronary artery spasm is described. This phenomenon may occur in conjunction with, or in the absence of, fixed atherosclerotic coronary artery disease. ECG manifestations during an attack mimic those seen with acute myocardial injury, but normalization of the ECG following the resolution of the pain is usual. Intravenous ergonovine is a sensitive and specific test for confirmation of the diagnosis. Nitrates and calcium channel blockers are the mainstay of therapy, although other agents are of theoretical benefit. The role of surgery is unclear.

Source: MEDLINE

121. [The effects of medical treatment on the long-term prognosis of variant angina pectoris].

Author(s): Aizawa T, Fujii J, Ogasawara K, Nishimura K, Kato K

Citation: Journal of Cardiography - Supplement, 1986, vol./is. /10(3-12), 0386-2887;0386-2887 (1986)

Publication Date: 1986

Abstract: To investigate the changing aspect of the long-term prognosis of patients with medically-treated variant angina, we studied 253 consecutive patients treated from January 1963 to August 1984. The patients were categorized into two groups according to the year of first admission to our hospital; 88 patients hospitalized before January 1975 and mainly treated with nitrates (group I), and 165 patients admitted thereafter and treated with calcium antagonists (group II). The average follow-up period was 63.1 months (ranged from one to 136) in the group I, and 32.4 months (ranged from one to 116) in the group II. Coronary arteriography was performed in 146 patients of the group II. In 82 patients (56%), no fixed coronary artery stenosis of greater than or equal to 75% of the luminal diameter was present; 47 patients (32%) had one-vessel disease, and 17 (12%) had multi-vessel involvement. Seventy-eight patients having both rest and effort angina showed a higher prevalence of fixed coronary artery stenoses (50 of 78 patients) compared with the patients without effort angina (14 of 68 patients) (p less than 0.001). The group II showed a significantly good long-term efficacy of medical treatment for anginal attacks (124 of 165 patients compared with 54 of 88 group I patients: p less than 0.05). Complete remission over three months or more occurred in 56% of the group II compared with 45% of the group I. Fourteen patients (16%) of the group I suffered from myocardial infarction (10 were within six months of onset of angina); whereas, only five (3%) of the group II developed myocardial infarction (two were within six months of initial anginal attack) (p less than 0.001). Cardiac death occurred in five patients (6%) of the group I in contrast to four patients (2%) of the group II. The patients having significantly effective medical treatment for anginal attack were 80%, 62% and 64% in those without significant stenosis, with one-vessel disease, and with multi-vessel disease, respectively. Myocardial infarction occurred in two of 17 patients with multi-vessel disease. Spontaneous remission of angina over at least three years without medical treatment occurred in seven of 32 patients who were followed for more than 10 years. It was concluded that the long-term prognosis of patients with variant angina who received calcium antagonists was reasonably improved compared with patients treated with nitrates. (ABSTRACT TRUNCATED AT 400 WORDS)
122. Coronary artery spasm. Part II.

Author(s): Bolgiano E, Barish R, Tso E, Browne BJ, Whye D

Citation: Journal of Emergency Medicine, 1986, vol./is. 4/6(477-81), 0736-4679;0736-4679 (1986)

Publication Date: 1986

Abstract: Coronary artery spasm can occur in several settings, often combined with coronary artery disease and thrombosis. Calcium channel blockers and beta-blockers are primary treatment modalities. The role of alpha-blocking agents remains unconfirmed.

Source: MEDLINE

123. Management of a case of refractory variant angina with benzhexol hydrochloride (tri hexy phenidyl hydrochloride).

Author(s): Joy M, Haywood GA, Webb-Peploe MM

Citation: British Heart Journal, October 1985, vol./is. 54/4(448-51), 0007-0769;0007-0769 (1985 Oct)

Publication Date: October 1985

Abstract: A patient with severe variant angina that was refractory to conventional treatment became symptom free when she was treated with benzhexol (tri hexy phenidyl hydrochloride), a cholinergic blocking agent used in the management of Parkinson's disease. There was a brief psychotic reaction when a large dose was taken and some memory impairment on the maintenance dose. Benzhexol should be used with caution but may prove to be an additional therapeutic agent in the management of severe variant angina.

Source: MEDLINE

Full Text: Available in fulltext at National Library of Medicine

124. Absence of rebound from diltiazem therapy in Prinzmetal's variant angina.

Author(s): Schroeder JS, Walker SD, Skalland ML, Hemberger JA

Citation: Journal of the American College of Cardiology, July 1985, vol./is. 6/1(174-8), 0735-1097;0735-1097 (1985 Jul)

Publication Date: July 1985

Abstract: To determine the frequency of rebound anginal symptoms on abrupt withdrawal of calcium channel blocking agents, anginal symptoms were retrospectively examined in patients with Prinzmetal's variant angina abruptly withdrawn from diltiazem therapy as part of the design of a placebo-controlled multiple crossover trial. Rebound was defined as a return of anginal symptoms to levels exceeding those of the pretreatment baseline state. Values for daily frequency of angina were compared (after subtracting corresponding baseline values) between placebo periods following diltiazem periods and placebo periods following placebo periods. No intergroup differences existed between mean changes in daily frequency of angina from baseline value (-0.61 for placebo following diltiazem versus -1.10 for placebo following placebo) (p greater than 0.4). Furthermore, in 13 (28%) of 46 occurrences when placebo followed placebo, daily frequency of angina exceeded baseline value in the immediate 3 day period following placebo compared with 17 (21%) of 80 occurrences when placebo followed diltiazem. There was no increased rebound occurrence comparing high dose (240 mg/day) with low dose (120 mg/day) diltiazem therapy. No significant symptoms such as myocardial infarction or unstable angina occurred after withdrawal of diltiazem or placebo. The lack of difference in rebound after diltiazem or placebo withdrawal was consistent using paired and unpaired analyses. In conclusion, there appears to be no evidence that abrupt withdrawal of therapy with diltiazem results in rebound anginal symptoms.
125. Diltiazem. A review of its pharmacological properties and therapeutic efficacy.

Author(s): Chaffman M, Brogden RN
Citation: Drugs, May 1985, vol./is. 29/5(387-454), 0012-6667;0012-6667 (1985 May)
Publication Date: May 1985

Abstract: Diltiazem is an orally and intravenously active calcium channel blocking agent shown to be an effective and well-tolerated treatment for stable angina and angina due to coronary artery spasm. Its efficacy in these diseases has generally been similar to that of nifedipine or verapamil - alternative calcium channel blockers with which diltiazem has many electrophysiological, haemodynamic, and antiarrhythmic similarities. The antianginal mechanism of diltiazem cannot be precisely described; however, it appears to increase myocardial oxygen supply and decrease myocardial oxygen demand, mainly by coronary artery dilatation and/or via both direct and indirect haemodynamic alterations. Diltiazem has also shown substantial efficacy in the treatment of unstable angina, hypertension, and supraventricular tachyarrhythmias, but further study is necessary before its place in the treatment of these diseases may be clearly established. Although headache due to peripheral vasodilatation and depression of atrioventricular nodal conduction may be troublesome, side effects occur in only 2 to 10% of patients receiving diltiazem and are generally minor in nature. Thus, diltiazem offers a worthwhile alternative to other agents currently available for the treatment of angina pectoris. Although the infrequency of serious side effects may offer an advantage, its relative place in therapy compared with that of other calcium channel blockers remains to be clarified.

Source: MEDLINE

126. Catheter-induced spasm during spontaneous attack of variant angina.

Author(s): Matsuda Y, Takashiba K, Hamada Y, Hyakuna E, Ebihara H
Citation: Clinical Cardiology, May 1985, vol./is. 8/5(314-7), 0160-9289;0160-9289 (1985 May)
Publication Date: May 1985

Abstract: The simultaneous occurrences of spontaneous spasm and catheter-induced spasm during coronary angiography were obtained in 3 patients. Catheter-induced spasm was seen in the right coronary artery in 3 patients: 1 patient had spontaneous spasm in the distal right coronary artery and 2 patients had spontaneous spasm in the proximal left anterior descending coronary artery. These findings suggest that patients with variant angina may be susceptible to mechanical induction of spasm.

Source: MEDLINE


Author(s): Nussmeier NA, Slogoff S
Citation: Anesthesiology, April 1985, vol./is. 62/4(539-41), 0003-3022;0003-3022 (1985 Apr)
Publication Date: April 1985

Source: MEDLINE


Author(s): Danchin N, Clozel JP, Khalife K, Elkik F, Boulay F, Neimann JL, Cherrier F
Citation: American Heart Journal, April 1985, vol./is. 109/4(764-8), 0002-8703;0002-8703 (1985 Apr)
Publication Date: April 1985
Abstract: Tiapamil is a new calcium entry blocker. The ability of its intravenous form to prevent methylergometrine-induced coronary artery spasm was studied in 11 consecutive patients with angiographically documented vasospastic angina. The study was designed as a double-blind crossover trial of tiapamil vs placebo. Each patient received, in a randomized order, either tiapamil, as a 1.5 mg/kg intravenous bolus followed by a 50 micrograms/kg/min infusion lasting 3 hours, or a matched placebo. Immediately after the infusion, methylergometrine tests were performed with up to 0.4 mg of methylergometrine or until a positive ECG was recorded. Compared to the values obtained after placebo infusion, tiapamil significantly lowered systolic and diastolic blood pressure (respective pre- and posttiapamil values: 119.9 +/- 17.7 vs 142.1 +/- 25.5 mm Hg, p less than 0.01; and 72.0 +/- 9.1 vs 82.4 +/- 9.3 mm Hg, p less than 0.02); the drug exerted no significant effect on heart rate (63.9 +/- 13.3 vs 67.6 +/- 16.5 bpm, NS), PR interval (0.180 +/- 0.020 vs 0.177 +/- 0.017 sec NS), or QTc interval (404.4 +/- 16.5 vs 396.0 +/- 26.6 msec, NS). After placebo, 10 patients had positive methylergometrine tests following single doses ranging from 0.1 to 0.4 mg. The remaining patient developed ventricular bigeminy, which resolved immediately after administration of isosorbide dinitrate; his test was therefore considered negative in the evaluation of the results. In contrast, after tiapamil, eight patients had negative tests for doses of up to 0.4 mg methylergometrine, and three had positive tests for the same methylergometrine doses as after the placebo.(ABSTRACT TRUNCATED AT 250 WORDS)

Source: MEDLINE


Author(s): Theroux P, Taeymans Y, Morissette D, Bosch X, Pelletier GB, Waters DD

Citation: Journal of the American College of Cardiology, March 1985, vol./is. 5/3(717-22), 0735-1097;0735-1097 (1985 Mar)

Publication Date: March 1985

Abstract: One hundred consecutive patients hospitalized in the coronary care unit for unstable angina, excluding patients with Prinzmetal's variant angina, were randomized within 24 hours of admission to treatment with diltiazem (50 patients) or propranolol (50 patients). Also excluded were patients with previous coronary artery bypass surgery and those receiving a beta-receptor blocking agent at the time of hospital admission. Left ventricular function and the extent of coronary artery disease were similar in the two groups. During the hospital stay, the number of chest pain episodes decreased from a mean (+/- SD) of 0.75 +/- 0.1 per patient per day to 0.26 +/- 0.07 (p less than 0.05) with diltiazem and 0.29 +/- 0.1 (p less than 0.05) with propranolol therapy. The circadian distribution of chest pain episodes was affected similarly. After 1 month, 14 of the patients treated with diltiazem were symptom-free compared with 13 treated with propranolol. At a mean follow-up time of 5.1 months (range 1 to 15), death had occurred in two patients in each group and myocardial infarction in five diltiazem- and four propranolol-treated patients (difference not significant). Coronary artery bypass surgery had been performed in 21 diltiazem- and 19 propranolol-treated patients (difference not significant). Only 15 patients were symptom-free, 9 treated with diltiazem and 6 with propranolol. This similar result observed with the two forms of treatment suggests that coronary artery spasm may not be the main factor involved in unstable angina when Prinzmetal's variant angina is excluded. It also suggests that diltiazem can be used as an alternative to the usual treatment with beta-receptor blocking drugs.

Source: MEDLINE

130. [Effects of medical and surgical therapy on the long-term survival of patients with variant angina]. [Italian] Effetti della terapia medica e chirurgica sulla sopravvivenza a distanza nell'angina variante.


Citation: Giornale Italiano di Cardiologia, February 1985, vol./is. 15/2(123-7), 0046-5968;0046-5968 (1985 Feb)
Publication Date: February 1985

Abstract: To determine the effects on survival of the medical and surgical treatment of variant angina, we compared the prognosis of 75 surgically treated subjects with that of 75 medically treated patients, selected from a series of 340 consecutive patients observed between January 1969 and December 1982. The patients were selected on the basis of a developed computer program to match each medically treated patient with one surgically treated patient so that each pair was similar according to the following clinical and angiographic variables: sex, age, previous myocardial infarction, severe ventricular arrhythmias during pain, site of ST elevation (anterior or inferior), coronary artery disease (single or multivessel), left ventricular function (normal or abnormal). Patients who were considered unoperable because of poor ventricular function or distal vessel disease were not included in this study. Mantel-Haenszel log-rank analysis demonstrated a significantly better prognosis in surgically treated patients, particularly in those with multivessel disease as well as in those with ST elevation in anterior leads. However survival in 63 medical patients who were treated with calcium-antagonists was not significantly different from that of their surgical matched patients. During the follow-up period, anginal symptoms were more frequently found in medically treated patients (p less than 0.05). We conclude that in patients with variant angina surgical treatment does not improve survival as compared to medical treatment with calcium blocking drugs. Coronary artery bypass surgery can be carried out at low risk and is particularly indicated in those patients with angina refractory to medical treatment.

Source: MEDLINE


Author(s): Conti CR

Citation: American Journal of Cardiology, January 1985, vol./is. 55/3(41B-49B), 0002-9149;0002-9149 (1985 Jan 25)

Publication Date: January 1985

Abstract: The diagnosis of coronary artery spasm is confirmed by angiography, for example, change in caliber of the coronary arteries plus evidence of ischemia. The prevalence and contribution of coronary artery spasm in the individual patient with symptoms of ischemic heart disease is not known and depends on how the condition is defined. The prognosis of patients with coronary artery spasm appears to depend on the presence or absence of severe coronary atherosclerosis, that is, those with severe disease have a worse prognosis. Nitrates should be used to initiate therapy in all patients with this problem. Intravenous nitrates have proven useful in patients whose symptoms are difficult to control and who require hospitalization. beta blockers used alone may be detrimental in patients with coronary artery spasm, but studies supporting the detrimental effects are few. The combination of nitrates, beta blockers and nifedipine has proved effective therapy for many patients with recurrent angina at rest, possibly related to coronary artery spasm. Several open-label and double-blind placebo control trials have shown that all of the calcium antagonists are effective short-term agents for patients with proven coronary artery spasm. When nifedipine was compared with isosorbide dinitrate in a randomized crossover, double-blind trial in patients with coronary artery spasm, both drugs were shown to be efficacious and neither was superior. The traditional alpha-blocking agents have not been shown to be an effective therapy, but a recent study of prazosin, a selective alpha blocker, revealed excellent results in patients whose conditions were resistant to therapy with traditional calcium blockers, beta blockers and, in 1 case, phenoxybenzamine.(ABSTRACT TRUNCATED AT 250 WORDS)

Source: MEDLINE

132. A review of nitrate therapy in stable angina, variant angina, unstable angina and myocardial infarction.

Author(s): Maseri A

Citation: Zeitschrift fur Kardiologie, 1985, vol./is. 74 Suppl 4/(1-3), 0300-5860;0300-5860 (1985)
133. Efficacy of diltiazem for coronary artery spasm.

Author(s): Schroeder JS

Citation: Acta Pharmacologica et Toxicologica, 1985, vol./is. 57 Suppl 2/(49-54), 0001-6683:0001-6683 (1985)

Abstract: The introduction of calcium entry blockers which caused marked vascular smooth muscle relaxation with minimal effects on myocardial contractility have provided a new approach to the patient with angina due to coronary artery spasm. Multiple, double-blinded, randomized studies of diltiazem versus placebo have demonstrated that this agent results in reduction in angina frequency and nitroglycerin consumption by 30% to 70% with a demonstrated dose response. A long-term, open label follow-up study of 18 patients who participated in a 44-week prospective, double-blind crossover trial of 240 mg of diltiazem versus placebo for prophylaxis of angina in patients with coronary artery spasm demonstrated a 75% decrease in angina attacks during the first five months of the study and an 80% decrease compared to the placebo period during the second six months. Both the short- and long-term studies have demonstrated very few adverse side effects, less than 7%. A recent long-term study of 43 patients who took diltiazem regularly and were followed in the Coronary Artery Spasm Clinic at Stanford University Medical Center for a mean of 19.6 months (range 6 to 28.5 months) was analyzed for cardiovascular events in the 19.6 months prior to therapy and the 19.6 months after the initiation of therapy. Cardiovascular events on diltiazem, including sudden cardiac death, myocardial infarction, and hospitalization to rule out myocardial infarction utilizing a binomial distribution showed over a 90% reduction compared to the pre-diltiazem period. Adverse effects were reported in six patients who reported minimal to mild pedal oedema.(ABSTRACT TRUNCATED AT 250 WORDS)

Source: MEDLINE

134. Role of percutaneous transluminal coronary angioplasty in patients with variant angina and coexistent coronary stenosis refractory to maximal medical therapy.

Author(s): Leisch F, Herbinger W, Brucke P

Citation: Clinical Cardiology, December 1984, vol./is. 7/12(654-9), 0160-9289;0160-9289 (1984 Dec)

Abstract: Percutaneous transluminal coronary angioplasty (PTCA) was performed with initial success in 7 patients with variant angina and significant (greater than 60%) coronary stenosis. The mean degree of stenosis was reduced from 77 +/- 12% to 29 +/- 15% and the mean systolic pressure gradient from 78 +/- 18 to 25 +/- 9 mmHg. Apart from a reversible spasm in one patient, PTCA was free of acute complications. Despite long-term treatment with nifedipine, nitrates, and warfarin (patients 1 to 5) or aspirin (patients 6 and 7) restenoses occurred in 4 of 7 patients. An aortocoronary bypass was necessary in 2 patients, 3 respectively 6 weeks after PTCA because of tighter restenoses than before PTCA. Another patient underwent successful repeat angioplasty after 6 weeks and remained improved. During a mean follow-up observation of 21 months (6 to 30 months), 4 patients were asymptomatic, even without medication. In one of these patients, the follow-up angiography (6 months after PTCA) demonstrated a restenosis. These results suggest that PTCA demonstrated a restenosis. These results suggest that PTCA can be performed without a higher risk of acute complications in patients with variant angina. Although the recurrence rate is high in these patients, sustained clinical improvement was achieved in a substantial percentage of patients in our study.

Source: MEDLINE

Author(s): Cheng TO
Citation: Chest, December 1984, vol./is. 86/6(918-26), 0012-3692:0012-3692 (1984 Dec)
Publication Date: December 1984
Abstract: Coronary artery spasm was virtually unknown not long ago, but the intense, ongoing interest it has generated in the past decade has produced a number of specific diagnostic techniques and therapeutic approaches, as well as considerable insight into mechanisms of coronary vascular tone and various coronary syndromes. There is growing evidence that coronary artery spasm is involved in unstable angina, stable angina, myocardial infarction, and sudden death. It is by no means a benign process and is associated with significant morbidity or mortality if misdiagnosed or untreated. It seems clear that what started as a mere clinical curiosity involving a minority of patients with the so-called Prinzmetal's variant angina is snowballing into a major arena for research, diagnosis, and treatment in the field of ischemic coronary artery disease.
Source: MEDLINE

136. Concomitant calcium antagonist plus isosorbide dinitrate therapy for markedly active variant angina.
Author(s): Winniford MD, Gabliani G, Johnson SM, Mauritson DR, Fulton KL, Hillis LD
Citation: American Heart Journal, November 1984, vol./is. 108/5(1269-73), 0002-8703:0002-8703 (1984 Nov)
Publication Date: November 1984
Abstract: The present study was performed to assess the efficacy of concomitant calcium antagonist/isosorbide dinitrate therapy in patients with frequent episodes of variant angina and to compare such combination therapy with isosorbide dinitrate alone. We enrolled nine such patients (six men and three women, aged 47 +/- 9 [mean +/- standard deviation] years) in a long-term comparison of (1) oral isosorbide dinitrate (117 +/- 63 mg per day) alone, (2) verapamil (453 +/- 75 mg per day) + isosorbide dinitrate (given in the same dose as stated above), and (3) nifedipine (71 +/- 14 mg per day) + isosorbide dinitrate (also given in the same dose as stated), each administered for 2 months. During isosorbide dinitrate therapy, these nine patients averaged 23.7 +/- 37.3 chest pains per week, consumed 24.4 +/- 47.4 sublingual nitroglycerin tablets per week, and demonstrated 46.5 +/- 43.2 episodes per week of transient ST segment deviations on calibrated two-channel Holter monitoring. During therapy with verapamil/isosorbide dinitrate and nifedipine/isosorbide dinitrate, the frequency of angina and ST segment deviations was dramatically reduced (verapamil/isosorbide dinitrate, 3.9 +/- 3.6 chest pains per week and 3.5 +/- 2.6 ST segment deviations per week, p less than 0.05; nifedipine/isosorbide dinitrate, 3.1 +/- 4.0 chest pains per week and 5.5 +/- 6.6 ST segment deviations per week, p less than 0.05). In all respects, verapamil/isosorbide dinitrate and nifedipine/isosorbide dinitrate were similar to one another. (ABSTRACT TRUNCATED AT 250 WORDS)
Source: MEDLINE

137. Treatment of unstable angina with emphasis on calcium antagonists.
Author(s): Hugenholtz PG, Michels R, Serruys PW, Simoons ML
Citation: Giornale Italiano di Cardiologia, November 1984, vol./is. 14/11(917-26), 0046-5968:0046-5968 (1984 Nov)
Publication Date: November 1984
Abstract: From the literature which has appeared over the last decade a selection was made of the three major calcium antagonists: nifedipine, verapamil and diltiazem. In the clinical situation, the net hemodynamic and electrophysiological effect of these drugs is the result of complex interactions between their peripheral and their central effects. The degree of baroceptor stimulation and reflex mediated beta-adrenergic activity, which counteracts and influences the intrinsic negative dromotropic, chronotropic and inotropic effects of calcium antagonists, are related to the degree of peripheral dilation. Nifedipine is the most potent arterial vasodilator and is consequently associated with the most intense reflex adrenergic activity. Although their effects on vascular and cardiac muscle are similar but not identical, there exist major differences in their antiarrhythmic properties. All act as an
antiarrhythmic agent when ischemia or reperfusion cause the arrhythmias, while verapamil selectively blocks the A-V node conduction. All three discussed calcium antagonists are effective in treating patients with coronary spasm, variant angina and unstable angina. In our personal experience with 73 patients with unstable angina with prolonged severe pain at rest with transient ST-segments and T-wave changes without elevated enzyme levels, 21 became asymptomatic within 8 hours of treatment with conventional therapy, which included nitrates and betablockers. Of 52 who remained refractory to such therapy, the addition of 10 mg of nifedipine orally every two hours to a maximum of 60 mg rendered 42 of the 52 asymptomatic within 8 hours. Arguments why we believe that the timely administration of nifedipine to these and similar patients will reduce or delay the incidence of arrhythmias and myocardial infarction are given on the basis of experimental data. Nifedipine greatly dilates coronary arteries, an effect which persists even after the drug's general hemodynamic effects disappear. It is shown that antagonists have anti-ischemic properties which are primarily related to the persistent reduction of the basic coronary vascular tone which increases oxygen supply whilst reduced myocardial contractility leads to decreased oxygen consumption. Furthermore, preservation of cellular integrity is achieved via protection against intracellular Ca2+ excess, as demonstrated by preserved intracellular high energy phosphate. A randomized multicenter trial in the Netherlands is now in progress to clarify the definitive role of beta blockade versus calcium antagonists therapy of their combination in this syndrome.

Source: MEDLINE


Author(s): Conti CR

Citation: Giornale Italiano di Cardiologia, November 1984, vol./is. 14/11(901-10), 0046-5968;0046-5968 (1984 Nov)

Publication Date: November 1984

Abstract: The term coronary artery spasm should not be used interchangeably with the specific clinical syndrome “variant angina” since it does occur in other acute and chronic ischemic heart disease syndromes. The term coronary artery spasm should not be applied to patients with ischemic heart disease unless there is clinical, angiographic, and physiologic evidence of its presence. The diagnosis of coronary artery spasm is confirmed by angiography, i.e. change in caliber of the coronary arteries plus evidence of ischemia. Probable diagnosis is in patients who have the syndrome of variant angina, i.e. rest angina associated with ST segment elevation on the electrocardiogram. One can be highly suspicious that the spasm is at work in patients who have rest angina, especially those with unstable angina. One can be suspicious of patients who have variable effort angina or walk-through angina. Coronary artery spasm is a possibility in patients with an acute myocardial infarction or acute re-infarction and is also possible that sudden death in patients with normal coronary arteries can be related to coronary artery spasm. Coronary artery spasm is the usual cause of myocardial ischemia in patients with rest angina without effort angina. This has also commonly been documented in patients with rest and effort angina. There are isolated reports suggesting that patients with effort angina pectoris also develop coronary artery spasm. Coronary artery spasm has been documented to occur in association with acute myocardial infarction. Whether coronary artery spasm is the cause or the result of myocardial infarction has not been determined at this time. However, the recent combined use of intracoronary nitroglycerin and intracoronary streptokinase in patients with acute myocardial infarction has shown reversal of totally obstructed arteries and suggests the relationship between coronary artery disease, coronary artery spasm, and in situ coronary thrombosis. The incidence of sudden death in patients with documented coronary artery spasm is unknown. But, since complete heart block and/or ventricular tachycardia occur during episodes of coronary artery spasm, it is not unreasonable to assume that some patients have died as a result of these rhythm disturbances. The prognosis of patients with coronary artery spasm seems to depend on the presence or absence of severe coronary atherosclerosis, i.e. those with severe disease have a worse prognosis. Current therapy of patients with coronary artery spasm involves the use of nitrates and calcium antagonists.(ABSTRACT TRUNCATED AT 400 WORDS)

Source: MEDLINE
139. Nursing management of the patient with coronary artery spasm.

Author(s): Foley J, Brown BG

Citation: Cardiovascular Nursing, September 1984, vol./is. 20/5(25-9), 0008-6355;0008-6355 (1984 Sep-Oct)

Publication Date: September 1984

Source: MEDLINE

140. [Surgical treatment of variant angina].

Author(s): Takemasa A

Citation: Kokyu to Junkan - Respiration & Circulation, June 1984, vol./is. 32/6(595-9), 0452-3458;0452-3458 (1984 Jun)

Publication Date: June 1984

Source: MEDLINE

141. Rebound vasospasm after coronary revascularization in association with calcium antagonist withdrawal.

Author(s): Engelman RM, Hadji-Rousou I, Breyer RH, Whittredge P, Harbison W, Chircop RV

Citation: Annals of Thoracic Surgery, June 1984, vol./is. 37/6(469-72), 0003-4975;0003-4975 (1984 Jun)

Publication Date: June 1984

Abstract: Four patients experienced life-threatening coronary vasospasm following discontinuation of calcium channel blocking medication at the time of coronary revascularization. The last dose of the calcium blocker in each instance was administered between 8 and 18 hours before operation. Two of the patients were receiving diltiazem (60 mg four times a day) and 2, nifedipine (20 mg four times a day). During this same period, 16 patients had received diltiazem (12.5% incidence of vasospasm) and more than 100 patients, nifedipine (less than 2% incidence). In 3 of the 4 patients, coronary spasm was identified by electrocardiogram and documented as the cause of ischemia in the distribution of a nondiseased right coronary artery. In the fourth patient, spasm had occurred in the distribution of a bypassed left anterior descending coronary artery. In 2 patients in whom the problem was recognized retrospectively, an infarct developed; 1 patient died. In the 2 patients in whom the problem was apparent prior to infarction, nitroglycerin (1 to 3 micrograms/kg/min, intravenously) and nifedipine (10 mg, sublingually every 4 to 6 hours) successfully reversed the ischemic process. The routine administration of calcium at the completion of coronary revascularization may be ill-advised in patients in whom calcium channel blockers have been utilized. Postoperative therapy of this condition with intravenous administration of nitroglycerin and sublingual administration of nifedipine seems to be effective when instituted early.

Source: MEDLINE

142. Rebound of vasospastic angina after cessation of long-term treatment with nifedipine.

Author(s): Lette J, Gagnon RM, Lemire JG, Morissette M

Citation: Canadian Medical Association Journal, May 1984, vol./is. 130/9(1169-71, 1174), 0008-4409;0008-4409 (1984 May 1)

Publication Date: May 1984

Abstract: The beneficial effect of calcium antagonists in the treatment of vasospastic angina is now well recognized. Although withdrawal symptoms have been reported following abrupt cessation of therapy with some cardiovascular drugs, there is no detailed report on similar complications of the cessation of therapy with calcium antagonists. In a 4-month period eight patients with well documented and well controlled vasospastic angina experienced a marked increase in the frequency and duration of anginal episodes at rest...
following the involuntary cessation of treatment with nifedipine, 10 to 20 mg four times a day. The increase began within 2 to 5 days after the cessation of treatment. Substitute therapy with isosorbide dinitrate, 30 mg, and verapamil, 80 to 120 mg, each four times a day, was effective in all cases. Although the mechanism responsible for this rebound phenomenon is not known, awareness of its existence is essential considering the widespread use of calcium antagonists.

Source: MEDLINE

Full Text:
Available in fulltext at EBSCO Host
Available in fulltext at National Library of Medicine

143. Diagnosis and management of variant angina.

Author(s): Elbaum DM, Wolfson PM, Braunstein DB, Haspel LU, Smith CR Jr, Litchfield RL, Siegel MS, Sallen MK

Citation: Journal of the American Osteopathic Association, February 1984, vol./is. 83/6(419-28), 0098-6151;0098-6151 (1984 Feb)

Publication Date: February 1984

Source: MEDLINE

144. Comprehensive drug management of angina pectoris.

Author(s): Pepine CJ, Feldman RL, Conti CR

Citation: Cardiovascular Clinics, 1984, vol./is. 14/3(139-51), 0069-0384;0069-0384 (1984)

Publication Date: 1984

Abstract: Our current understanding of the pathophysiology of angina and myocardial ischemia includes both anatomic and dynamic mechanisms. The relative contribution made by hemodynamically important atherosclerotic obstruction and dynamic coronary artery obstruction, either by arterial spasm or arteriolar constriction, to the pathophysiology of ischemia in any given patient should be delineated. This information appears to be useful in identifying patients likely to achieve major benefit from vasodilators on the one hand or beta-adrenergic blocking agents on the other. A number of agents are now available within these two pharmacologic classes. There are some differences in action of these various agents that require thorough familiarity of effects of these drugs so that their action can be optimized. Practically speaking, the large majority of patients with an angina syndrome will respond to nitrates. Nitrates are extremely safe and cheap; thus, their use for relief or prevention of the acute ischemic episode remains the initial treatment of choice. When symptoms are more than mild to moderate in severity, or unacceptably controlled in frequency using nitrates alone, other pharmacologic measures are needed (Fig. 2). In patients with a predominant symptom of effort angina, suggesting that a hemodynamically important atherosclerotic-type obstruction is responsible for the syndrome, beta-adrenergic blocking drugs can be very helpful. If effort angina remains unacceptably controlled or adverse effects occur, a calcium-channel antagonist may be added or substituted. These latter agents do not exacerbate bronchospasm or peripheral vascular disease, and they offer a distinct advantage over beta-adrenergic blocking agents in patients with angina who have such disorders. Where the predominant symptom is rest angina, or the patient has other evidence suggesting coronary spasm or arteriolar vasoconstriction, a calcium-channel antagonist may result in a very favorable response. This therapy should be extended not only to patients in whom coronary spasm occurs spontaneously but to those in whom it can be provoked by stimuli such as effort or cold. When spasm is superimposed upon hemodynamically important atherosclerotic obstruction, the favorable response does not seem to be as great as that seen when spasm exists alone. In these cases, coronary bypass surgery, plexectomy , and other nonpharmacologic approaches may have to be added to the pharmacologic regimen.(ABSTRACT TRUNCATED AT 400 WORDS)

Source: MEDLINE

145. Continuous intracoronary nitroglycerin infusion for spasm after
A patient with reversible coronary artery spasm superimposed on fixed atherosclerotic coronary disease was treated with percutaneous transluminal angioplasty. The procedure successfully dilated the atherosclerotic lesion. However, 20 minutes later, the patient developed coronary artery spasm at the angioplasty site. Sublingual nitroglycerin, sublingual nifedipine, intravenous nitroglycerin, and repeated boluses of intracoronary nitroglycerin alleviated episodes of spasm, but failed to prevent recurrence. The patient was successfully treated with a continuous intracoronary infusion of nitroglycerin. Patients with coronary artery spasm in addition to fixed obstructive coronary disease may be at higher risk for spasm after percutaneous transluminal angioplasty. Continuous intracoronary infusion of nitroglycerin may be an effective therapy for recurrent coronary artery spasm occurring in the catheterization laboratory.

Source: MEDLINE

146. Efficacy of nifedipine therapy in patients with refractory angina pectoris: significance of the presence of coronary vasospasm.

Author(s): Stone PH, Muller JE, Turi ZG, Geltman E, Jaffe AS, Braunwald E

Citation: American Heart Journal, October 1983, vol./is. 106/4 Pt 1(644-52), 0002-8703:0002-8703 (1983 Oct)

Publication Date: October 1983

Source: MEDLINE

147. Update on calcium-channel blocking agents.

Author(s): Talbert RL, Bussey HI

Citation: Clinical Pharmacy, September 1983, vol./is. 2/5(403-16), 0278-2677;0278-2677 (1983 Sep-Oct)

Publication Date: September 1983

Abstract: The pharmacokinetics, clinical efficacy, and adverse effects of three calcium-channel blocking agents—verapamil, nifedipine, and diltiazem—are reviewed. Verapamil, nifedipine, and diltiazem are absorbed well after oral dosing, but absolute bioavailability of each is reduced substantially by a first-pass effect. Each drug is metabolized extensively (verapamil and diltiazem to moderately active metabolites) by the liver. A substantial percentage of each drug is bound to plasma proteins, but the binding is of clinical importance only for nifedipine (92–98% protein bound). Intravenous verapamil has become the agent of first choice for treatment of acute paroxysmal supraventricular tachycardia (PSVT); use of chronic oral verapamil therapy for prophylaxis remains controversial. Verapamil and diltiazem have been evaluated with mixed results for atrial flutter and fibrillation. For treatment of myocardial ischemia, calcium-channel blockers may be of some value (possibly in combination with nitrates of B blockers). All three agents have been studied in patients with exertional angina with good results. Calcium-channel blockers appear to be equal with nitrates for treatment of variant angina. Patients with hypertropic cardiomyopathy have been treated with verapamil and nifedipine with promising results. Nifedipine has been effective for treatment of essential hypertension. Adverse effects of calcium-channel blockers have been relatively minor or infrequent. Diltiazem overall has the best side-effect profile, with adverse effects causing discontinuation of therapy in about 2–10% of patients; verapamil in intermediate (8–10%) and nifedipine the worst (17%) in this respect. The most common side effects generally are fatigue, headache, dizziness, skin rash, and peripheral edema. While they generally should be reserved for patients in whom more conventional therapy has failed (except those with PSVT), calcium-channel blockers appear to have a valid role as reserve agents for exertional and variant angina, cardiomyopathy, and hypertension.


Citation: American Heart Journal, September 1983, vol./is. 106/3(509-15), 0002-8703;0002-8703 (1983 Sep)

Publication Date: September 1983

Abstract: The present study is an angiographic demonstration of coronary artery spasm during both spontaneous and exercise-induced angina in three patients with variant angina. In each case, clinical, ECG, coronary angiographic, and left ventriculographic observations were made at rest, during spontaneous angina, and during exercise-induced angina. The character of chest pain was similar during spontaneous and exercise-induced episodes. ST segment elevation was present in the anterior ECG leads during both episodes. The left anterior descending coronary artery became partially or totally obstructed during both types of attacks. When coronary spasm was demonstrated during both types of attacks, left ventriculography disclosed akinetic or dyskinetic wall motion in the area supplied by the involved artery. In those patients with reproducible exercise-induced ST segment elevation and chest pain, thallium-201 scintigraphy showed areas of reversible anteroseptal hypoperfusion. Thus in selected patients exercise-induced attacks of angina were similar to spontaneous episodes.

Source: MEDLINE

149. Detrimental effect of propranolol in patients with coronary arterial spasm countered by combination with diltiazem.

Author(s): Tilmant PY, Lablanche JM, Thieuleux FA, Dupuis BA, Bertrand ME

Citation: American Journal of Cardiology, August 1983, vol./is. 52/3(230-3), 0002-9149;0002-9149 (1983 Aug)

Publication Date: August 1983

Abstract: This study determines, with quantitative variables, if propranolol is detrimental in patients with documented coronary arterial spasm and if this drug can be used in combination with calcium antagonists. Eleven patients with documented coronary spasm were entered prospectively in a study with 4 phases of 2 days each: (1) control, (2) diltiazem or propranolol (mean 225 +/- 75 mg/day), (3) propranolol or diltiazem (360 mg/day), (4) propranolol and diltiazem. The effects of the drugs were assessed by the detection of ischemic electrocardiographic episodes (24-hour electrocardiographic monitoring) and provocative tests with ergonovine. During the period of treatment with propranolol, the number and the duration of attacks increased and provocative tests had positive results in all patients. Diltiazem completely abolished spontaneous episodes, but 6 of 11 patients remained sensitive to the administration of ergonovine. The association of the 2 drugs led to a disappearance of ischemic episodes. In conclusion, propranolol is ineffective in patients with coronary artery spasm. It can be used in combination with diltiazem, but without any advantage over diltiazem alone.

Source: MEDLINE

150. Spontaneous remission is a frequent outcome of variant angina.

Author(s): Waters DD, Bouchard A, Theroux P

Citation: Journal of the American College of Cardiology, August 1983, vol./is. 2/2(195-9), 0735-1097;0735-1097 (1983 Aug)

Publication Date: August 1983

Abstract: To assess the prevalence of spontaneous remission in variant angina, 100 patients with this diagnosis who had undergone coronary arteriography in the hospital and a follow-up of at least 1 year were studied. Patients with coronary bypass surgery or myocardial infarction were excluded. Remission was diagnosed in 45 of the 100 patients
who had been angina-free and had had no treatment for more than 3 months (mean 18.3). The other 55 patients were receiving medical treatment; 37 had been angina-free for at least 6 months (mean 22.5) and angina persisted in 18. The persistent angina group had a lower prevalence of organic coronary stenoses 70% or greater: 4 of 18 versus 22 of 45 and 22 of 37 for the other two groups (p less than 0.05), and a longer history of rest angina before admission. The remission group contained more patients (17 of 45 versus 4 of 55 [p less than 0.001]) whose attacks had been documented only by provocative testing. Rest angina recurred when calcium antagonist drugs were discontinued in 15 of 51 instances, within 1 month in 11 patients and later in 4 patients. Remission was eventually attained in 35 of the 38 patients in whom these drugs were stopped. These results indicate that remission is a frequent outcome of variant angina. This fact should be considered in the evaluation of the long-term results of treatment and in the planning of care for an individual patient.

Source: MEDLINE

151. Factors influencing the long-term prognosis of treated patients with variant angina.

Author(s): Waters DD, Miller DD, Szlachcic J, Bouchard A, Methe M, Kreeft J, Theroux P

Citation: Circulation, August 1983, vol./is. 68/2(258-65), 0009-7322;0009-7322 (1983 Aug)

Publication Date: August 1983

Abstract: To determine the prognosis of variant angina and the factors influencing it, 169 consecutive patients hospitalized in our coronary unit were followed for a mean of 15.3 months (range 1 to 68). Survival at 1, 2, and 3 years was 95%, 90%, and 87%, respectively; survival without myocardial infarction was 80%, 78%, and 75%. Twenty of the 22 myocardial infarctions and eight of the 14 deaths occurred within the first 3 months. Mantel-Haenszel log-rank analysis demonstrated that coronary disease, ventricular function, and the degree of disease activity were significant interdependent variables that influenced both survival and survival without infarction. At 1, 2, and 3 years, survival for patients with multivessel disease was 81%, 76%, and 66%; for patients with one-vessel disease, 97%, 92%, and 92%; and for patients without stenoses greater than or equal to 70%, 98% at each year (p = .0003). Survival without infarction at 1 year was 88% in patients with no stenoses greater than or equal to 70% and 82% in patients with single-vessel disease; it did not change thereafter in either group, but was 62%, 58%, and 50% at 1, 2, and 3 years in patients with multivessel disease (p = .001). Treatment did not influence survival in any subgroup (only 14 patients died overall) or survival without infarction in patients with multivessel disease. However, in patients without multivessel disease, treatment with nifedipine, diltiazem, and verapamil improved survival without infarction compared to treatment with perhexiline maleate or long-acting nitrates alone (92% vs 67% at 1, 2, and 3 years; p less than .005). Thus in addition to preventing angina, nifedipine, diltiazem, and verapamil appear to reduce complications in patients with variant angina without multivessel disease.

Source: MEDLINE

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152. Prinzmetal's variant angina unresponsive to calcium channel-blocking drugs but responsive to combined calcium channel- and beta-blocking drugs.

Author(s): Bourmayan C, Artigou JY, Barrillon AG, Juillard A, Fournier C, Gay J, Gerbaux A

Citation: American Journal of Cardiology, June 1983, vol./is. 51/10(1792-3), 0002-9149;0002-9149 (1983 Jun)

Publication Date: June 1983

Source: MEDLINE

Author(s): Conti RC, Hill JA, Feldman RL, Mehta JL, Pepine CJ

Citation: American Journal of Medicine, June 1983, vol./is. 74/6B(40-4), 0002-9343;0002-9343 (1983 Jun 27)

Publication Date: June 1983

Abstract: The treatment of a patient with unstable angina at the time of the initial presentation of the physician can begin with nitrates. The beneficial action of nitrates are several. Nitrates dilate epicardial coronary arteries as well as many coronary artery stenoses. They may be effective because of this action plus a marked effect on decreasing ventricular volume and ventricular end diastolic pressure. Perhaps the best way to manage patients with severe angina that may be in part related to coronary artery vasoconstriction is to combine a long-acting nitrate with a calcium antagonist. The combined use of nitrates and calcium antagonists will (1) dilate the coronary arteries to maintain coronary blood flow, (2) decrease systemic arterial pressure and thus decrease peripheral vascular resistance, and (3) dilate peripheral veins and thus decrease ventricular volume and pressure. When proper doses are used, the combination may be more effective than either drug alone. Of course, proper dosing must be determined for the individual patient by the physician. Initial treatment with the nitrates should begin with small doses and gradually build up. Similar dosing schedules should be used for the calcium antagonists. Both doses can be increased to high levels is the clinical situation warrants it.

Source: MEDLINE

154. [Surgical treatment for variant angina].

Author(s): Shimamoto M

Citation: Nippon Kyobu Geka Gakkai Zasshi - Journal of the Japanese Association for Thoracic Surgery, June 1983, vol./is. 31/6(828-38), 0369-4739;0369-4739 (1983 Jun)

Publication Date: June 1983

Source: MEDLINE

155. [Surgical treatment for variant angina--diltiazem drip infusion to prevent perioperative spasm].

Author(s): Shimamoto M, Shinozaki T, Chihara K, Takahashi K, Imura M, Yamazaki F, Kawarazaki S, Akiyama F

Citation: Kyobu Geka - Japanese Journal of Thoracic Surgery, May 1983, vol./is. 36/5(399-404), 0021-5252;0021-5252 (1983 May)

Publication Date: May 1983

Source: MEDLINE

156. Coronary artery spasm: current perspectives and nursing management.

Author(s): Padula CA

Citation: Critical Care Nurse, May 1983, vol./is. 3/3(74-85), 0279-5442;0279-5442 (1983 May-Jun)

Publication Date: May 1983

Source: MEDLINE


Author(s): Braun LT

Citation: Heart & Lung, May 1983, vol./is. 12/3(226-32), 0147-9563;0147-9563 (1983 May)

Publication Date: May 1983
Abstract: Coronary artery spasm is recognized as a cause of ischemic heart disease, producing a syndrome of the variant form of angina that occurs at rest. Spasm also may play a role in other types of rest angina (unstable angina) and exertional angina. Calcium is essential for the basic tonus of vascular smooth muscle. The accentuated contraction that occurs in coronary artery spasm is the result of an increase in intracellular calcium ions. Current therapy is aimed at blocking the slow calcium currents that are responsible for electrical activation and contraction of smooth muscle cells. A marked coronary vasodilatation is produced with calcium channel blockers, thus demonstrating effective therapy for coronary artery spasm. A similar effect is achieved by nitrates, and these agents will continue to have a role in the therapy of spasm. Calcium channel blockers produce beneficial effects on myocardial oxygen supply and demand and, therefore, are also useful in the prevention of classic exertional angina caused by fixed obstruction. Verapamil and diltiazem possess electrophysiologic effects and have, in addition, proved useful in the treatment of supraventricular dysrhythmias.

Source: MEDLINE


Author(s): Ginsburg R

Citation: Hospital Practice (Office Edition), April 1983, vol./is. 18/4(165-9, 173-6), 8750-2836:8750-2836 (1983 Apr)

Publication Date: April 1983

Abstract: Although coronary vasospasm may occur in vessels that arteriographically appear fully patent, histologically there is virtually always some evidence of atherosclerotic lesions. Whether or not atherosclerosis can be angiographically documented, all patients with coronary vasospasm require therapy. Calcium channel blockers may actually alter the course of the disease process as well as relieve symptoms.

Source: MEDLINE

159. Intravenous nitroglycerin for the treatment of angina at rest unresponsive to standard nitrate therapy.

Author(s): Kaplan K, Davison R, Parker M, Przybylek J, Teagarden JR, Lesch M

Citation: American Journal of Cardiology, March 1983, vol./is. 51/5(694-8), 0002-9149:0002-9149 (1983 Mar 1)

Publication Date: March 1983

Abstract: Thirty-five patients who had angina at rest that was unresponsive to standard therapy comprised of oral or topical nitrates and beta-blocking drugs were treated with a continuous infusion of intravenous nitroglycerin (IVNTG). The infusion was started at 10 micrograms/min and increased by 10 micrograms/min increments every 5 minutes until an infusion rate of 50 micrograms/min was reached. After each episode of rest angina, the infusion was increased by 50 micrograms/min in the same stepwise manner. Data from a 24-hour baseline control period were compared with those from a 24-hour IVNTG endpoint period at which time the highest IVNTG infusion rate was administered. The average IVNTG infusion rate was 140 +/- 15 micrograms/min. With IVNTG therapy, the number of episodes of angina at rest decreased from 3.5 +/- 0.4 to 0.3 +/- 0.1, sublingual nitroglycerin use decreased from 1.9 +/- 0.3 to 0.4 +/- 0.1 mg/day, and morphine sulfate administration decreased from 5.5 +/- 1.3 to 0.4 +/- 0.2 mg/day (all p less than 0.001). When each patient's response on the endpoint day was analyzed, 25 were defined as complete (no rest angina), 8 as partial (greater than 50% decrease in the number of episodes/day from control values), and 2 as nonresponders. No significant drug-induced adverse effects occurred. IVNTG appears to be effective therapy for angina at rest refractory to standard oral and topical medications.

Source: MEDLINE

160. Influence of partial sympathetic denervation on the results of myocardial revascularization in variant angina.

Author(s): Betriu A, Pomar JL, Bourassa MG, Grondin CM
Poor results of the aortocoronary bypass graft operation in the treatment of variant angina have been ascribed to recurrent vasospastic activity due to autonomic imbalance. Cardiac sympathetic denervation (plexectomy) may represent a rational approach in the prevention of vasospasm. To test the value of plexectomy in the treatment of variant angina, 31 patients were studied, 17 of whom (Group 1) underwent conventional coronary artery grafting whereas the remaining 14 (Group 2) underwent cardiac sympathetic denervation also. The 2 groups were similar with respect to age (54 +/- 8 versus 50 +/- 7 years), sex distribution (male/female ratio 12/5 versus 9/5), prevalence of coexisting effort angina (10 versus 12 patients), previous myocardial infarction (7 versus 4 patients), and duration of variant angina (3.3 +/- 5.4 versus 2.4 +/- 2.7 months). The left ventricular ejection fraction was comparable in both groups (60 +/- 11 versus 60 +/- 4%) as were left ventricular end-diastolic pressure (15 +/- 4 versus 13 +/- 5 mm Hg) and extent of coronary artery disease (65 versus 71% prevalence of multivessel disease). The average duration of follow-up was 23 +/- 15 months in Group 1 and 22 +/- 18 months in Group 2 (p = not significant [NS]). There were no operative deaths. Four patients, 2 in each group, had a perioperative myocardial infarction. Seven patients in Group 1 and 1 patient in Group 2 had recurrent variant angina. There was sudden death and 2 infarcts in Group 1. Actuarial curves showed the cumulative probability of recurrent variant angina to be significantly lower (p less than 0.05 and p less than 0.001 at 6 and 10 months, respectively) in Group 2. This study suggests that cardiac sympathetic denervation may prevent recurrent vasospastic activity in variant angina.

Source: MEDLINE

161. Relaxation of large coronary artery by verapamil, D600, and nifedipine is constrictor selective: comparison with glyceryl trinitrate.

Author(s): Angus JA, Brazenor RM

We compared the vasodilator potencies of a number of Ca2+-entry blockers with glyceryl trinitrate (GTN) in isolated ring segments of dog coronary arteries contracted by a variety of substances. Rings were contracted to 80% of maximum by serotonin, phenylephrine (PE), noradrenaline (NA), K+ (KCl), or U46619 (stable thromboxane A2 analogue). Cumulative additions of a vasodilator then relaxed the ring towards basal tone. GTN had a similar IC50 value (0.1 - 0.3 microM) regardless of the substance used to contract the ring. In contrast, nifedipine and verapamil were weak relaxant drugs against arteries contracted by U46619. Nifedipine was most potent in rings contracted by K+, whereas verapamil was similarly effective towards K+ and serotonin, but threefold less potent against PE or NA. The (-)-enantiomers of verapamil and D600 were more potent (seven-to 26-fold) than the (+)-enantiomers in arteries contracted by K+ or serotonin, but not for PE or NA. A combination of (-)-verapamil and GTN showed additive effects without a change in the IC50 for GTN. We conclude that, in contrast with GTN, the effectiveness of Ca2+-entry blockers in the treatment of coronary vasospasm may be dependent on the nature of the constrictor signal.

Source: MEDLINE

162. The place of cardiac denervation in the surgical treatment of Prinzmetal variant angina.

Author(s): Soots G, Warembourg H Jr, Stankowiak C, Watel A, Bertrand M

Coronary artery spasm has been described as occurring frequently in Prinzmetal variant angina.
variant angina. The relatively poorer results obtained after aorto-coronary bypass grafting carried out in patients with Prinzmetal angina may be due to recurrence of spasm despite the grafts. Accordingly it has been our recent policy since February 1973 to carry out cardiac denervation in all patients with Prinzmetal variant angina. The patients fall into two groups depending on the presence or absence of organic disease in the coronary vessel. The technique of cardiac denervation (plexectomy) as described by Arnulf is fully described and the early and late results of this procedure in the two groups are documented and discussed.

Source: MEDLINE

163. [Strategy of the treatment of vasospastic angina pectoris], [French]
Strategie du traitement de l'angine de poitrine vasospastique.

Author(s): Bertrand ME, Lablanche JM, Tilmant PY, Thieuleux FA

Citation: Archives des Maladies du Coeur et des Vaisseaux, February 1983, vol./is. 76 Spec No/(169-74), 0003-9683;0003-9683 (1983 Feb)

Publication Date: February 1983

Abstract: The strategy of treatment in vasospastic angina is mainly based on the results of coronary angiography. In a series of 165 patients with coronary spasm documented by angiography, 51 patients (31 per cent) had angiographically normal arteries and 69 per cent had organic atherosclerotic lesions. Patients with fixed atherosclerotic lesions were divided in two subgroups depending on whether the lesions were operable. The first subgroup (47 cases) comprised patients with operable lesions and coronary spasm. They underwent aorto-coronary bypass associated with a procedure to prevent spasm (plexectomy) (40 cases). Depending on the site of the lesions, some patients with operable lesions may benefit from coronary angioplasty followed by treatment with calcium antagonist drugs. Patients in the second subgroup (67 cases) with inoperable fixed atherosclerotic lesions were treated with calcium antagonists. Betablockers, which may be considered in organic coronary artery disease, are theoretically contra-indicated because of the vasospastic factor. The remaining patients with "angiographically normal" vessels (51 cases) were treated with nitrate derivatives and calcium antagonists. Treatment should be directed to the suppression of the clinical symptoms and, above all, of ECG signs of ischemia as proved by repeated Holter monitoring. The clinical course may also be assessed by repeated provocation tests. Results may depend on the doses and their timing during the 24 hour period. Duration of treatment in patients with angiographically normal vessels has not yet been established. Isolated cardiac denervation may be indicated in these patients who fail to respond to medical treatment (8 cases).

Source: MEDLINE

164. The short and long-term efficacy of diltiazem for the treatment of variant angina pectoris.

Author(s): Ginsburg R, Schroeder JS

Citation: Archives des Maladies du Coeur et des Vaisseaux, February 1983, vol./is. 76 Spec No/(149-52), 0003-9683;0003-9683 (1983 Feb)

Publication Date: February 1983

Abstract: We studied 42 consecutive patients with coronary artery spasm (CS) who where treated with the Ca2+ entry blocker diltiazem for a mean period of 11 months (range 2-29 months). Patient population consisted of 26 females (age X = 52.1) and 16 males (age X = 59.1). All patients had diagnosis of CS confirmed by coronary arteriography (CA) with no patient having 70 per cent CAD. CS was equally distributed between LAD and RCA. 81 per cent of patients were cigarette smokers, 55 per cent had Raynaud's phenomenon, and 9 per cent had a history of migraine, 2 patients had previous MI, 2 previous bypass surgery (CABS), 1 previous angioplasty, 3 syncope with heartblock requiring pacemaker, and 2 with sudden death (VF-resuscitated). All patients were placed on diltiazem 240 or 360 mg/day to achieve pain free state. During follow-up there was no mortality. 2 patients hd uncomplicated inferior MI's. 1 patient had CABS for progressive 90 per cent LAD lesion, and 2 required hospitalization for dose adjustment due to frequent chest pain. No patient has drug-related side effects. Thus, long-term follow-up of patients with CS treated with
Diltiazem revealed no mortality, low morbidity (12 per cent) and no adverse drug side effects.

Source: MEDLINE

165. Nifedipine therapy for coronary vasospasm.

Author(s): Stone PH, Antman EM, Muller JE

Citation: Archives des Maladies du Coeur et des Vaisseaux, February 1983, vol./is. 76 Spec No/(137-42), 0003-9683;0003-9683 (1983 Feb)

Publication Date: February 1983

Abstract: In conclusion, we observed first that nifedipine is highly efficacious in preventing the coronary vasospasm of Prinzmetal's variant angina. Secondly, nifedipine appears to be efficacious in preventing episodes of recurrent rest angina following an acute myocardial infarction. Although coronary vasospasm has not been clearly documented in patients with recurrent rest angina after infarction, a primary decrease in coronary blood flow is the most likely cause of this syndrome since the ischemia occurs at rest, at a time when myocardial oxygen demands are not elevated. In this highly unstable group of patients with coronary disease nifedipine may eliminate the need for bypass surgery or may provide clinical stability prior to more elective cardiac catheterization and surgery.

Source: MEDLINE


Author(s): Theroux P, Taeymans Y, Waters DD

Citation: Drugs, February 1983, vol./is. 25/2(178-95), 0012-6667;0012-6667 (1983 Feb)

Publication Date: February 1983

Abstract: Angina pectoris results from an imbalance between the oxygen supply and the oxygen needs of the myocardium. While the classic form of angina is usually caused by demands exceeding supply, a primary and transient decrease in coronary blood flow is more and more often recognised as an aetiological factor of myocardial ischaemia. Calcium antagonists, although new in cardiovascular therapeutics, are already recognised as the treatment of choice for some forms of angina and as useful therapeutic adjuncts in others. Few contraindications to their use exist. They are potent vasodilators and they can prevent the occurrence of coronary artery spasm responsible for the Prinzmetal's variant form of angina. They can also reduce coronary artery tone, which if high, can compromise flow through a narrowed coronary artery. Nifedipine, diltiazem and verapamil can also influence the various determinants of myocardial oxygen consumption to reduce myocardial oxygen needs. Their effects on heart rate, blood pressure and on the inotropic state of the left ventricle is, in vivo, the balance between their direct effects on the vascular wall and myocardial muscular cells and their indirect effects represented by the reflex physiological responses. Significant variations in these effects exist between the 3 calcium antagonists such that treatment can be individualised to a particular patient's needs. Precautions with their use as well as most of their side effects can be understood from a knowledge of their direct and indirect properties. Other pharmacological effects of these drugs include a regional redistribution of coronary blood flow, cardioprotection, delay in cell death and possibly in the progression of atherosclerosis. The clinical significance of these properties remains to be investigated.

Source: MEDLINE

167. Long-term efficacy of diltiazem for control of symptoms of coronary artery spasm.

Author(s): Rosenthal SJ, Lamb IH, Schroeder JS, Ginsburg R

Citation: Circulation Research, February 1983, vol./is. 52/2 Pt 2(153-7), 0009-7330;0009-7330 (1983 Feb)

Publication Date: February 1983

Abstract: In order to evaluate long-term efficacy of a new calcium antagonist, diltiazem, for therapy of coronary artery spasm, 16 patients with clinical variant angina due to
documented coronary artery spasm participated in a 44-week prospective, randomized, double-blind cross-over trial of 240 mg of diltiazem vs. placebo. The study involved eleven 28-day cycles of which one of the first five cycles (phase 1) and one of the last six cycles (phase 2) were placebo, with the remainder being active medication. Response was assessed with the dairy technique, measuring frequency of angina and side effects. When diltiazem was compared with the placebo period during phase 1, there was a 73% decrease in frequency of angina from 1.1 to 0.3 episodes per day (P less than 0.01). When diltiazem was compared with the placebo during phase 2, there was an 80% decrease in frequency of angina from 0.5 to 0.1 episodes per day (P less than 0.05). When phase 1 placebo cycle was compared with phase 2 placebo cycle, there was a 55% decrease in frequency of angina which approached statistical significance (P less than 0.10). This marked disease attenuation demonstrated during the 44-week study reflects the variability of symptoms of variant angina and possibly reflects a carry-over therapeutic effect of the calcium entry blocker. Adverse side effects were absent in our small group of patients. Diltiazem is effective for the long-term control of symptoms of active coronary artery spasm.

Source: MEDLINE

Full Text:
Available in fulltext at Highwire Press

168. Value and limitations of provocative testing to assess the efficacy of treatment in variant angina.

Author(s): Waters DD
Citation: Cardiovascular Clinics, 1983, vol./is. 14/1(87-98), 0069-0384;0069-0384 (1983)
Publication Date: 1983
Source: MEDLINE

169. Treatment of vasospastic angina.

Author(s): MacAlpin R
Citation: Cardiovascular Clinics, 1983, vol./is. 14/1(129-72), 0069-0384;0069-0384 (1983)
Publication Date: 1983
Source: MEDLINE

170. Percutaneous transluminal coronary angioplasty in patients with variant angina.

Author(s): David PR, Waters DD, Scholl JM, Crepeau J, Szlachcic J, Lesperance J, Hudon G, Bourassa MG
Citation: Circulation, October 1982, vol./is. 66/4(695-702), 0009-7322;0009-7322 (1982 Oct)
Publication Date: October 1982
Abstract: Among the first 83 patients treated with percutaneous transluminal coronary angioplasty (PTCA) at our institution, typical variant angina was recognized beforehand in five cases and was discovered within 4 months of PTCA in six others. All patients had a 65-95% proximal left anterior descending coronary artery stenosis and only one had a coronary lesion greater than 50% in other coronary arteries. Before PTCA, all patients were premedicated with calcium-antagonist drugs. Thirteen of 15 PTCA's, including three of four repeat PTCA's, were technically successful. However, variant angina recurred after successful PTCA in three of the five patients in whom it was documented beforehand and in an additional two of two patients with variant angina before a successful repeat PTCA. Overall, among the nine patients with variant angina after successful PTCA, five had restenosis at the site of PTCA and two others developed severe lesions adjacent to the site of PTCA within 4 months of the procedure. The three patients without restenosis have been treated with calcium-antagonist drugs from soon after PTCA and have remained angina-free. These results suggest that PTCA is technically feasible in patients with variant angina who have organic lesions, but symptoms due to coronary spasm usually persist or recur,
often with restenosis.

Source: MEDLINE

Full Text:
Available in fulltext at Highwire Press
Available in fulltext at Ovid

171. Long-term follow-up of verapamil and nitrate treatment for coronary artery spasm.

Author(s): Freedman SB, Richmond DR, Kelly DT

Citation: American Journal of Cardiology, October 1982, vol./is. 50/4(711-5), 0002-9149;0002-9149 (1982 Oct)

Publication Date: October 1982

Abstract: Thirty-seven patients with coronary artery spasm and minor coronary atherosclerosis (34) or normal coronary arteries (3) were followed up long-term. All had angina at rest, 32 had nocturnal angina, and 13 had a positive exercise test with S-T elevation. Three had a previous subendocardial infarction; 10 had had serious arrhythmias, which caused syncope in 7. At last review, 21 months (range 1 to 61) after starting therapy, 27 patients continued on verapamil, 314 (120 to 600) mg/day; 4 who did not respond to verapamil were taking nifedipine, 58 (30 to 80) mg/day; and 16 were also taking isosorbide dinitrate, 41 (20 to 80) mg/day. Of the 31 patients on therapy, 21 were asymptomatic, 9 were improved (1 to 4 attacks/month), and 1 had an average of 8 anginal attacks/month; the remaining 6 had stopped therapy and 5 were asymptomatic a mean of 10 (3 to 18) months after stopping. The exercise test became negative in all 12 patients tested on therapy, although 3 required nitrates in addition to verapamil or nifedipine. In 26 supervised treatment withdrawals in the hospital, a mean of 15 (1 to 55) months on therapy, 10 developed angina in less than 48 hours. Angina recurred in all 6 unsupervised, patient-initiated withdrawals. Failure to stop smoking was positively associated with recurrence of angina on treatment withdrawal (p less than 0.02). Long-term treatment of coronary artery spasm with verapamil or nifedipine together with isosorbide dinitrate was well tolerated and effectively relieved angina. No documented serious arrhythmias, syncopal episodes, myocardial infarction, or death occurred during follow-up.

Source: MEDLINE

172. Inpatient treatment of unstable angina: clinical perspective and sequential management.

Author(s): Helfant RH

Citation: American Heart Journal, September 1982, vol./is. 104/3(697-701), 0002-8703;0002-8703 (1982 Sep)

Publication Date: September 1982

Abstract: In the last decade, increasing information has become available to the effect that an increase in coronary artery tone and coronary artery spasm play an important role in patients with various ischemic heart disease syndromes. Coronary spasm may be superimposed on a coronary vessel already severely obstructed by atherosclerosis. Conversely, spasm may occur in an artery that is only minimally involved with atherosclerosis. The majority of patients studied in the United States with both stable and unstable angina pectoris have underlying severe organic obstructive coronary artery disease. There has now emerged a considerable amount of information from several centers showing that the calcium-channel blockers or calcium-flux antagonists are highly effective in the treatment of stable and unstable angina pectoris. This report focuses on the uses and limitations of one of these agents, nifedipine, in patients with unstable angina and provides a sequential approach to their management.

Source: MEDLINE

173. Randomized withdrawal from nifedipine: placebo-controlled study in patients with coronary artery spasm.
Abstract: A multicenter randomized double-blind withdrawal study was conducted to compare the efficacy of nifedipine to that of placebo in vasospastic angina. Following a 2-week single-blind nifedipine baseline period, during which nifedipine was maintained at prestudy levels, 38 patients, 19 taking placebo and 19 continuing nifedipine therapy, either completed a 4-week randomized phase or were prematurely withdrawn because of therapeutic failure. During the randomized phase, an increase in median anginal frequency (2.8 attacks/wk, p less than 0.003) and nitroglycerin usage (0.5 tablets/wk, p less than 0.03) occurred only in the placebo group. The randomized phase was prematurely terminated because of anginal exacerbation in 7 of 19 placebo patients (37%) (only 1 patient receiving nifedipine [p = 0.02] experienced anginal exacerbation). Double-blind therapy was judged effective in 16 patients (84%) receiving nifedipine and in 3 patients (16%) receiving placebo (p less than 0.001). Nifedipine was well tolerated. This study establishes the efficacy of nifedipine in the treatment of variant and validates previous clinical experience.

Source: MEDLINE

174. Regional coronary artery dilation response in variant angina.

Abstract: We examined segmental left coronary artery responses to nitroglycerin in 17 variant angina patients and in 34 nonvariant angina patients using a quantitative angiography technique. In those patients with left anterior descending vasospasm, there was a marked exaggeration in the degree of dilation to nitroglycerin in those segments which at other times were involved with spasm. This observation was consistent when these segments were compared to (1) other left coronary segments in the same patient, (2) the same left coronary segments in nonvariant angina patients, and (3) the same left coronary segments in patients with right coronary spasm. These data suggest that a localized disorder in coronary vasomotion is present in patients with coronary spasm that is not limited to constriction but also involves increased dilation in response to nitroglycerin.

Source: MEDLINE


Author(s): Bertrand ME, Lablanche JM, Tilmant PY, Thieuleux FA, Hethuin JM, Warembourg H Jr, Stankowiak C, Soots G

Full Text: Available in fulltext at National Library of Medicine
The results of coronary bypass surgery are generally not as good in Prinzmetal angina as in classical angina pectoris. The percentage of myocardial infarction, recurrent angina and death is much higher. One reason for these failures could be the persistence of coronary spasm. In order to prevent this, denervation of the pre-supra and retro aortic nerve plexuses was carried out in 56 patients (54 male, 2 female) with Prinzmetal angina and operable coronary arterial lesions. Forty patients had documented coronary spasm mainly of the left anterior descending (20 cases) or the right coronary artery (13 cases).

Surgery consisted of cardiac denervation associated with direct myocardial revascularisation by implantation of 1 (37 cases), 2 (13 cases) or 3 (6 cases) aorto coronary bypass grafts. Two deaths were observed in the perioperative period (one low output syndrome and one severe arrhythmia) and one myocardial infarction in 40 cases. Continuous electrocardiographic recordings (Holter method) in 33 patients was negative for ischemia and of 25 bypass grafts controlled, 24 were patent. Seventy five methylergometrine provocation tests were performed: only 2 were positive, both in patients with recurrent attacks. Therefore, with respect to the total numbers of recurrent angina (2), post operative infarction (1), peri and post operative deaths (3), the percentage of poor results was only 10,7 p. 100, almost three times lower than in previously reported series. In conclusion, we can say that the association of cardiac denervation with coronary bypass surgery significantly improves the percentage of good results (89,3 p. 100 of patients presenting with Prinzmetal angina).

Source: MEDLINE

177. The use of diltiazem hydrochloride in cardiovascular disorders.

Author(s): McAuley BJ, Schroeder JS

Citation: Pharmacotherapy, May 1982, vol./is. 2/3(121-33), 0277-0008;0277-0008 (1982 May-Jun)

Abstract: Diltiazem, a calcium channel blocking agent, has potent cardiovascular effects that are directly related to its influence on vascular smooth muscle, ventricular myocardium, and specialized conducting tissue. It causes coronary and peripheral vasodilation, has a negative chronotropic and dromotropic effect, and little to no negative inotropic effect in patients with normal ventricular function. Diltiazem has potential use in a wide variety of cardiovascular disorders. It has been shown extremely effective in relieving the coronary artery spasm associated with variant angina. When compared with nitrates in patients with exertional angina, diltiazem has similar efficacy. Preliminary work indicates it will have a therapeutic role in the treatment of unstable angina. Because of its ability to improve the balance between myocardial oxygen supply and demand and reduce cellular injury secondary to ischemia, it is likely that diltiazem will be of benefit in the treatment of acutely ischemic myocardium during cardiopulmonary bypass and possibly acute myocardial infarction. It has proven efficacy in treating re-entrant supraventricular tachycardia. Adverse effects are seen in less than 5% of patients, indicating that it is well tolerated.

Source: MEDLINE

178. Coronary artery spasm: prevalence, clinical significance, and provocative testing.

Author(s): Conti CR, Feldman RL, Pepine CJ

Citation: American Heart Journal, April 1982, vol./is. 103/4 Pt 2(584-8), 0002-8703;0002-8703 (1982 Apr)

Abstract: Recent clinical and laboratory observations indicate that coronary artery spasm may play a role in the pathophysiology of ischemic heart disease. The majority of patients...
with ischemic heart disease have coronary atherosclerosis. The prevalence of coronary artery spasm in these patients is unknown. However, current evidence suggests that patients with rest angina have a higher incidence of coronary artery spasm than do patients with reproducible effort angina. Coronary artery spasm may initiate or contribute to acute myocardial infarction, but recent evidence obtained in patients undergoing thrombolytic therapy during the early phases of myocardial infarction suggests that it is not a common occurrence. Although numerous examples of ventricular tachycardia and ventricular fibrillation occur during episodes of coronary artery spasm, the incidence of coronary artery spasm in association with sudden death is unknown. Provocative testing with ergonovine maleate reveals that the highest incidence of provocable coronary artery spasm is found in patients with rest angina. In patients with the syndrome of variant angina, coronary artery spasm is nearly always provocative.

Source: MEDLINE


Author(s): Tanser PH, Stanton E, Stolberg HO

Citation: Angiology, March 1982, vol./is. 33/3(206-11), 0003-3197:0003-3197 (1982 Mar)

Publication Date: March 1982

Abstract: Ergonovine maleate was given to a patient suspected as a case of Prinzmetal's variant angina following demonstration of normal coronary arteries by angiography. Profound shock, heart block, and severe pain accompanied marked spasm of the left coronary artery. Direct infusion of nitroglycerin into the left coronary artery reversed the spasm when sublingual and intraaortic nitroglycerin failed to prevent further hemodynamic and clinical deterioration.

Source: MEDLINE

Full Text:
Available in fulltext at EBSCO Host

180. Diltiazem for long-term therapy of coronary arterial spasm.

Author(s): Schroeder JS, Lamb IH, Ginsburg R, Bristow MR, Hung J

Citation: American Journal of Cardiology, February 1982, vol./is. 49/3(533-7), 0002-9149;0002-9149 (1982 Feb 18)

Publication Date: February 1982

Abstract: The first 36 patients with coronary arterial spasm treated with diltiazem and followed up at the Stanford University Coronary Artery Spasm Clinic for 6 months or longer are described. There were 13 men and 23 women with a mean age of 50.2 years; the mean duration of angina was 36.1 months. All patients had angina at rest with a good or fail response to sublingual nitroglycerin. During a mean of 17.5 months of diltiazem therapy, the frequency of angina was reduced from a mean of 21.5 to 1.3 attacks/week. This 94 percent reduction in pain frequency occurred when either 240 or 360 mg of diltiazem was administered daily. Sixteen patients required the addition of isosorbide dinitrate to achieve a painfree state. Pain breakthrough occurred a mean of 1.7 times during the 17.5 month follow-up period but tended to be of short duration. Six patients had trace to 1+ pedal edema and no other adverse effects occurred. It is concluded that diltiazem is highly effective and well tolerated for the long-term prophylaxis and treatment of angina in patients with coronary spasm.

Source: MEDLINE


Author(s): Pepine CJ, Feldman RL, Conti CR

Citation: Circulation, February 1982, vol./is. 65/2(411-4), 0009-7322;0009-7322 (1982 Feb)

Publication Date: February 1982
Abstract: Coronary artery spasm usually responds to sublingual nitroglycerin. This report describes four patients with variant angina and one patient with rest angina who had coronary spasm that was refractory to sublingual or i.v. nitroglycerin. In four patients, spasm occurred spontaneous and in one patient after 0.05 mg of ergonovine. In each case, 25-100 micrograms of intracoronary nitroglycerin promptly (30-45 seconds) resulted in reopacification of the vessel involved in spasm and resolution of evidence for ischemia. Thus, intracoronary nitroglycerin can reverse coronary artery spasm that does not respond to systemic nitroglycerin administration.

Source: MEDLINE

Full Text:
Available in fulltext at Highwire Press
Available in fulltext at Ovid

182. Exacerbation of vasotonic angina pectoris by propranolol.
Author(s): Robertson RM, Wood AJ, Vaughn WK, Robertson D
Citation: Circulation, February 1982, vol./is. 65/2(281-5), 0009-7322;0009-7322 (1982 Feb)
Publication Date: February 1982
Abstract: Using a double-blind protocol, we investigated the use of propranolol in patients with coronary artery spasm as assessed by subjective and objective variables. Both low-dose (40 mg every 6 hours) and high-dose (160 mg every 6 hours) propranolol were administered. At both doses, the duration of angina attacks was significantly prolonged but the frequency was not. We conclude that propranolol at doses up to 160 mg every 6 hours as single therapy is frequently detrimental in angina pectoris due to coronary artery spasm and should not be used as the sole treatment of this disorder.

Source: MEDLINE

Full Text:
Available in fulltext at Highwire Press
Available in fulltext at Ovid

183. The role of coronary artery spasm in anginal syndromes.
Author(s): Maze SS, Opie LH, Lloyd EA
Citation: South African Medical Journal. Suid-Afrikaanse Tydskrif Vir Geneeskunde, January 1982, vol./is. 61/5(161-4), 0256-9574;0256-9574 (1982 Jan 30)
Publication Date: January 1982
Abstract: The role of coronary artery spasm in the production of angina at rest is emphasized. Three case reports of variant angina are presented to illustrate the spectrum of presentation and to stress the principles underlying the therapy of coronary artery spasm. This entity should be suspected and diagnosed more frequently in order that patients may derive the benefit of relatively specific therapy which consists of calcium antagonists and long-acting nitrates.

Source: MEDLINE

184. Coronary arterial spasm.
Author(s): Come PC
Citation: Journal of Family Practice, January 1982, vol./is. 14/1(119-9), 0094-3509;0094-3509 (1982 Jan)
Publication Date: January 1982
Abstract: Coronary arterial spasm has been postulated to be a cause of myocardial ischemia for over 100 years. It was not until the work of Prinzmetal et al in 1959, however, that major clinical attention and research began to be addressed to the role of vasospasm.
in the manifestations of ischemic heart disease. It is now known that spasm may be clinically important in patients with significant underlying atherosclerotic coronary artery disease as well as in patients with anatomically normal or subcritically stenosed coronary vessels. Research has suggested that spasm may be associated with symptoms of stable resting and/or exertional angina pectoris and that it almost certainly plays a role in the pathogenesis of unstable angina pectoris and acute myocardial infarction. Symptomatic arrhythmias, including sinus bradycardia, heart block, and ventricular tachyarrhythmias, have been documented to complicate coronary vasospasm. Given the potential importance of coronary arterial spasm in so many different ischemic heart disease syndromes, the development of therapeutic agents that may prevent spasm has obvious clinical importance.

Source: MEDLINE


Citation: Semaine des Hopitaux, January 1982, vol./is. 58/4(213-9) (1982 Jan 28)

Publication Date: January 1982

Abstract: Aorto-coronary by pass, widely accepted in the treatment of patients with coronary artery disease is still controversial in the treatment of Prinzmetal variant angina. Recurrence of attacks, occlusion of grafts and post-operative infarction were frequent by described and seem to be related with the persistence of coronary spasm. Authors propose the association of myocardial revascularization and coronary denervation by resection of periaortic plexi. Results of 50 surgical plexectomies associated with coronary by pass appear far better than by pass alone (mortality 4%, myocardial necrosis 4%, persistence of attacks 4%).

Source: MEDLINE

186. Calcium-channel blocking agents.

Author(s): Leonard RG, Talbert RL

Citation: Clinical Pharmacy, January 1982, vol./is. 1/1(17-33), 0278-2677;0278-2677 (1982 Jan-Feb)

Publication Date: January 1982

Abstract: The role of calcium in the cardiovascular system, and the pharmacology, pharmacokinetics, and studies evaluating the clinical use of three calcium-channel blocking agents--verapamil hydrochloride, nifedipine, and diltiazem hydrochloride--are reviewed. Inhibition of calcium conductance and alteration of calcium availability cause profound changes in: slow inward current of the cardiac action potential, myocardial contractility and metabolism, blood pressure regulation, and smooth-muscle activity. Calcium-channel blocking agents affect the movement of calcium through these channels in smooth and cardiac muscle; the specific agents in this class differ markedly in their inhibitory effects. Verapamil hydrochloride is useful intravenously for treating supraventricular rhythm disturbances. It is absorbed well when taken orally, but there is an extensive first-pass effect, so that about 20% enters the systemic circulation. The incidence of side effects in patients receiving verapamil is 9-10%; about 1% require discontinuation of therapy. Verapamil is contraindicated in patients with sinus-node disease, unstable atrioventricular block, and shock. Nifedipine has proven useful for hypertension, coronary-artery spasm, and exertional angina; it has little negative inotropic effect. Approximately 90% of an oral dose is absorbed, and 65-70% reaches the systemic circulation after first-pass metabolism. Protein binding of nifedipine ranges from 92 to 98%. Side effects of nifedipine, usually associated with the peripheral vasodilatory action, occur in approximately 15% of patients, requiring discontinuance in 2-5%. Diltiazem hydrochloride has been shown effective in the treatment of coronary-artery spasm; limited studies indicate it may be useful in treating exertional angina, hypertension, and possibly arrhythmias. Diltiazem's oral bioavailability is good (90% reaches systemic circulation), but there is significant interindividual variability
between administered dose and resulting plasma concentration. Geriatric patients have delayed absorption and reduced clearance of diltiazem given in sustained-release tablets. Studies of diltiazem are limited at this time. The exact role of calcium-channel blocking agents has not yet been elucidated. However, their ability to influence the calcium channel greatly expands the therapeutic armamentarium for cardiovascular disease and other disorders.

Source: MEDLINE

187. Variant angina: clinical spectrum, pathophysiology, and management.

Author(s): Kennedy GT

Citation: Heart & Lung, November 1981, vol./is. 10/6(1073-83), 0147-9563;0147-9563 (1981 Nov-Dec)

Publication Date: November 1981

Source: MEDLINE

188. Verapamil therapy in variant angina pectoris refractory to nitrates.

Author(s): Freeman WR, Peter T, Mandel WJ

Citation: American Heart Journal, September 1981, vol./is. 102/3 Pt 1(358-62), 0002-8703;0002-8703 (1981 Sep)

Publication Date: September 1981

Abstract: Conventional therapy including nitrates, beta blockers, and surgical bypass has proved to be generally unsatisfactory in patients with variant angina of suspected vasospastic etiology. Recent evidence regarding the role of calcium in the pathogenesis of vascular smooth muscle spasm prompted an open study of the clinical effects of verapamil in seven patients with recurrent rest angina refractory to nitrates. The patients studied met strict clinical ECG and angiographic criteria for vasospastic angina. All patients had rapid (within 24 hours) and complete (without recurrence of symptoms) chronic response to oral verapamil therapy. The pharmacology of verapamil relating to the pathogenesis of vasospastic angina is delineated and guidelines for the clinical application of the agent are presented.

Source: MEDLINE

189. Nifedipine in medically refractory angina pectoris.

Author(s): Sammel NL, O'Rourke MF

Citation: Medical Journal of Australia, September 1981, vol./is. 2/6(288-9), 0025-729X;0025-729X (1981 Sep 19)

Publication Date: September 1981

Abstract: Nifedipine was administered to 21 patients with angina pectoris which was refractory to conventional medication. In no case had coronary artery spasm been demonstrated. The condition of 13 patients (62%) improved with nifedipine, and eight patients (38%) had a long-term response. Nitrate-type side effects were reported by seven patients (33%), all of whom were being treated concurrently with isosorbide dinitrate. We conclude that nifedipine is a promising drug in the management of angina pectoris, even in the absence of documented coronary spasm.

Source: MEDLINE

190. Prinzmetal's angina: atypical angiographic features of atypical angina pectoris.

Author(s): Slack JD

Citation: Angiology, August 1981, vol./is. 32/8(567-80), 0003-3197;0003-3197 (1981 Aug)

Publication Date: August 1981

Abstract: Clinicians have puzzled over the coronary physiology associated with atypical
angina pectoris for the past century. Recent recognition of coronary artery spasm, which has been so thoroughly documented with coronary angiography, has resolved many of these conceptual difficulties. However, several features of coronary artery spasm, both spontaneous and secondary to provocation with ergonovine maleate, remain poorly understood. This paper addresses the management problems associated with spontaneously occurring spasm in the setting of pre-existent atherosclerotic coronary artery disease, angiographically severe spasm unassociated with symptoms of angina pectoris or signs of myocardial ischemia, and the precipitation of angina pectoris by ergonovine maleate administration unaccompanied by demonstrable epicardial coronary artery spasm. The rationale, indications and therapeutic efficacy of a new class of agents known as slow channel inhibitors of calcium antagonists are discussed.

Source: MEDLINE

Full Text:
Available in fulltext at EBSCO Host

191. Provocative testing with ergonovine to assess the efficacy of treatment with nifedipine, diltiazem and verapamil in variant angina.

Author(s): Waters DD, Theroux P, Szlachcic J, Dauwe F

Citation: American Journal of Cardiology, July 1981, vol./is. 48/1(123-30), 0002-9149;0002-9149 (1981 Jul)

Publication Date: July 1981

Source: MEDLINE

192. Surgical therapy of variant angina associated with nonobstructive coronary disease.

Author(s): Sussman EJ, Goldberg S, Poll DS, MacVaugh H 3rd, Simson MB, Silber SA, Kastor JA

Citation: Annals of Internal Medicine, June 1981, vol./is. 94/6(771-4), 0003-4819;0003-4819 (1981 Jun)

Publication Date: June 1981

Abstract: Patients with variant angina refractory to medical therapy pose a difficult management problem. We report two patients with variant angina who had focal spasm in coronary arteries with fixed obstructions of less than 20% of the luminal diameter. Ischemic episodes were accompanied by malignant ventricular arrhythmias and third degree atrioventricular block. Symptoms were refractory to intensive medical management with nitrates and calcium blocking agents in one patient and with nitrates in the other who was treated before calcium blockers were available. Surgery was done; a bypass graft was placed distal to the area of focal spasm and the native artery was ligated proximally. Both patients are asymptomatic 24 and 66 months after surgery and neither takes anginal medication regularly. The surgical procedure outlined should be considered only if therapy to control life threatening ischemic symptoms with nitrates and calcium blocking agents fails.

Source: MEDLINE

Full Text:
Available in fulltext at EBSCO Host


Author(s): Johnson SM, Mauritson DR, Willerson JT, Hillis LD

Citation: American Journal of Cardiology, June 1981, vol./is. 47/6(1295-300), 0002-9149;0002-9149 (1981 Jun)

Publication Date: June 1981

Source: MEDLINE
194. Effect of verapamil and nifedipine on left ventricular function at rest and during exercise in patients with Prinzmetal's variant angina pectoris.

**Author(s):** Johnson SM, Mauritson DR, Corbett J, Dehmer GJ, Lewis SE, Willerson JT, Hillis LD

**Citation:** American Journal of Cardiology, June 1981, vol./is. 47/6(1289-94), 0002-9149;0002-9149 (1981 Jun)

**Publication Date:** June 1981

**Abstract:** To assess the effects of verapamil and nifedipine on left ventricular function at rest and during exercise in patients with Prinzmetal's variant angina pectoris, 10 patients (6 men and 4 women with a mean age of 52 years) with variant angina were each treated for 2 months periods with placebo, verapamil (400 +/- 80 mg/day, mean +/- standard deviation [SD]) and nifedipine (82 +/- 31 mg/day). During the final week of each 2 month treatment period equilibrium gated blood pool scintigraphy was performed at rest and during exercise. At rest, heart rate during verapamil therapy was lower than during treatment with nifedipine; systolic blood pressure and left ventricular volumes and ejection fraction were similar for the three interventions. The maximal work load achieved was similar during placebo, verapamil and nifedipine therapy. At the maximal work load common to all three exercise studies, heart rate and systolic blood pressure were lower with verapamil than with placebo and nifedipine; ventricular volumes and ejection fraction were similar with the three agents. Thus, in patients with variant angina and a wide range of left ventricular function at rest, neither verapamil nor nifedipine significantly alters left ventricular volumes or ejection fraction at rest or during exercise.

**Source:** MEDLINE

195. Verapamil therapy in variant angina: assessment by high-fidelity frequency modulated ambulatory ECG.

**Author(s):** Bala Subramanian V, Millar Craig MW, Davies AB, Raftery EB

**Citation:** American Heart Journal, June 1981, vol./is. 101/6(849-50), 0002-8703;0002-8703 (1981 Jun)

**Publication Date:** June 1981

**Source:** MEDLINE

196. Effect of diltiazem in patients with variant angina: a randomized double-blind trial.

**Author(s):** Pepine CJ, Feldman RL, Whittle J, Curry RC, Conti CR

**Citation:** American Heart Journal, June 1981, vol./is. 101/6(719-25), 0002-8703;0002-8703 (1981 Jun)

**Publication Date:** June 1981

**Abstract:** Effects of diltiazem of frequency of angina and nitroglycerin (NTG) consumption were studied in 12 patients with variant angina (rest pain with ST elevation). Either diltiazem in two dosage schedules (120 mg/day and 240 mg/day), or placebo was administered in a randomized double-blind program over 10 weeks. Significant decreases in angina frequency and TNG consumption were observed when diltiazem treatment periods were compared to placebo periods. Furthermore, when placebo periods following diltiazem were compared to placebo periods following placebo, significant “carry-over” effect with respect to reduced angina frequency was observed. No patient had an increase in angina frequency or TNG consumption on diltiazem compared to placebo. No “rebound effects” or changes in blood pressure or heart rate were observed. One patient complained of dry mouth on diltiazem. These findings, although in a limited number of patients, suggest that diltiazem is effective in decreasing angina frequency and TNG consumption in patients with variant angina. These encouraging results warrant evaluation of diltiazem in a larger patient population over a longer time period.

**Source:** MEDLINE
197. Verapamil administration in variant angina pectoris. Efficacy shown by ecg monitoring.

Author(s): Johnson SM, Mauritson DR, Willerson JT, Cary JR, Hillis LD

Citation: JAMA, May 1981, vol./is. 245/18(1849-51), 0098-7484;0098-7484 (1981 May 8)

Publication Date: May 1981

Abstract: Six patients with Prinzmetal's variant angina were treated with oral verapamil administration. Before and after the initiation of therapy, ambulatory ECG monitoring was performed to assess objectively the response to therapy. With verapamil administration, the frequency of both chest pain and transient ST-segment deviations was sharply diminished.

Source: MEDLINE

198. Treatment of vasospastic angina pectoris at rest with nitroglycerin ointment: a short-term controlled study in the coronary care unit.


Citation: American Journal of Cardiology, May 1981, vol./is. 47/5(1128-33), 0002-9149;0002-9149 (1981 May)

Publication Date: May 1981

Abstract: The effectiveness of nitroglycerin ointment in vasospastic angina pectoris at rest was evaluated in 10 patients selected for study. The study was performed after a 24 hour control period, and a randomized single-blind crossover experimental design was followed. Two percent nitroglycerin ointment (15 mg) or placebo ointment was administered every 6 hours for a period of 48 hours each; the first treatment period was followed by a second in which each preparation was used for a 24 hour period. All patients were hospitalized in the coronary care unit; an objective evaluation was carried out using a multichannel electrocardiographic recording to assure recognition of the painless ischemic episodes. Coronary angiography showed critical stenosis of one or two vessels in 9 of the 10 patients; spasm was demonstrated in 3. Results of the ergonovine test were positive in nine of nine patients. Nitroglycerin ointment produced a significant reduction in the mean daily number of episodes during the first (12.5 +/- 3.9 versus 0.5 +/- 0.4, p less than 0.02) as well as the second treatment period (10.6 +/- 3.8 versus 0.6 +/- 0.4, p less than 0.02). These results demonstrate that nitroglycerin ointment provides effective, long-lasting protection against angina due to coronary spasm.

Source: MEDLINE

199. Coronary-artery spasm immediately after myocardial revascularization: recognition and management.

Author(s): Buxton AE, Goldberg S, Harken A, Hirshfield J Jr, Kastor JA

Citation: New England Journal of Medicine, May 1981, vol./is. 304/21(1249-53), 0028-4793;0028-4793 (1981 May 21)

Publication Date: May 1981

Abstract: We investigated coronary-artery spasm in six patients who had had unexpected hemodynamic collapse within two hours after cardiopulmonary bypass for myocardial revascularization. All six had profound hypotension and recurrent ST-segment elevation in electrocardiographic Leads II, III, and aVF. All had either normal or noncritical luminal irregularities of dominant right coronary arteries and more than 75 per cent occlusions in the left coronary circulation. Right-coronary-artery spasm, which was reversed after intracoronary nitroglycerin, was demonstrated angiographically in one patient; a patent right coronary artery was found at autopsy in another patient. Three patients died despite large intravenous doses of nitroglycerin. Two patients who had been unresponsive to intravenous nitroglycerin recovered after direct infusion of nitroglycerin into the right coronary artery. Coronary-artery spasm immediately after myocardial revascularization may cause circulatory collapse and death; although the spasm may be refractory to usual therapy, it may respond to intracoronary nitroglycerin.
200. A controlled trial of verapamil for Prinzmetal's variant angina.

Author(s): Johnson SM, Mauritson DR, Willerson JT, Hillis LD

Citation: New England Journal of Medicine, April 1981, vol./is. 304/15(862-6), 0028-4793;0028-4793 (1981 Apr 9)

Publication Date: April 1981

Abstract: To assess the efficacy and safety of verapamil in variant angina pectoris, we entered 16 patients in a double-blind, randomized trial of nine months, duration. During treatment with verapamil, the frequency of angina fell substantially (12.6 +/- 25.9 chest pains per week with placebo, 1.7 +/- 2.8 pains per week with verapamil, mean +/- S.D.; P less than 0.01), as did the use of nitroglycerin tablets (14.4 +/- 34.4 tablets per week with placebo, 2.1 +/- 3.3 tablets per week with verapamil; P less than 0.05). The number of hospitalizations for clinical instability was significantly lower with verapamil (P less than 0.01). The number of episodes of transient ST-segment deviation during treatment with verapamil was reduced (33.1 +/- 39.3 ST-segment deviations per week with placebo, 7.7 +/- 11.7 deviations per week with verapamil; P less than 0.01). Verapamil caused no side effects forcing a reduction in dosage or a discontinuation. We conclude that verapamil is safe and effective in the therapy of variant angina pectoris.

Source: MEDLINE

201. Clinical course of patients following the demonstration of coronary artery spasm by angiography.

Author(s): Cipriano PR, Koch FH, Rosenthal SJ, Schroeder JS

Citation: American Heart Journal, February 1981, vol./is. 101/2(127-34), 0002-8703;0002-8703 (1981 Feb)

Publication Date: February 1981

Abstract: The clinical course of 25 patients was determined during an average of 2.7 years following the angiographic demonstration of coronary artery spasm (CAS). Seventeen patients received medical treatment after the demonstration of coronary spasm and six patients had cardiac surgery. Twenty-three patients were living and two patients had died at the time of follow-up. Twenty-one of the 23 surviving patients has either no chest pain or markedly reduced symptoms. However, the demonstration of CAS by angiography was associated with a high incidence of subsequent cardiac complications, which included myocardial infarct (four patients), cardiac arrest (four patients), and death (two patients). We concluded from this study that after the demonstration of CAS by angiography: (1) the clinical course was variable, with most patients (21 of 25 patients, 84%) having improvement of symptoms at the time of follow-up; (2) major cardiac complications were frequent (11 out of 25 patients, 44%) and; (3) although clinical and coronary angiographic features were of limited use in predicting major cardiac complications, most of the patients who had an uncomplicated course (11 of 14 patients, 79%) had either less than 50% fixed coronary artery luminal diameter narrowing (CAN) or coronary artery bypass graft operations, the majority of patients with less than 50% CAN (8 of 11 patients, 73%) had no major cardiac complications, and myocardial infarction or death usually occurred during periods of increased angina pectoris.

Source: MEDLINE


Author(s): Cokkinos DV, Tolis G, Koroxenidis G, Vorides EM

Citation: Acta Cardiologica, 1981, vol./is. 36/6(445-50), 0001-5385;0001-5385 (1981)

Publication Date: 1981

Abstract: A patient had continuous paroxysms of the specific ventricular arrhythmia of the "Torsades de Pointes" type during attacks of variant angina. The arrhythmia was refractory to lidocaine and procainamide and only responded dramatically to verapamil, initially
intravenous and afterwards oral. The low success rate in the treatment of such arrhythmias by other drugs and available experimental data suggest that verapamil should be further evaluated.

Source: MEDLINE

203. Treatment of Prinzmetal’s variant angina. Role of medical treatment with nifedipine and surgical coronary revascularization combined with plexectomy.

Author(s): Bertrand ME, Lablanche JM, Tilmant PY
Citation: American Journal of Cardiology, January 1981, vol./is. 47/1(174-8), 0002-9149;0002-9149 (1981 Jan)
Publication Date: January 1981
Abstract: This study describes three forms of treatment of Prinzmetal’s variant angina. Coronary spasm, frequently found at coronary arteriography in patients with Prinzmetal’s variant angina, can be treated with intravenous or intracoronary injection of nitroglycerin as well as of nifedipine. Nifedipine (0.2 mg) was injected directly into the involved artery in 12 patients and suppressed spasm in 9; in 3 patients, nifedipine increased coronary sinus flow, which had been decreased by spasm in one of the branches of the left coronary artery. Patients with Prinzmetal’s variant angina who have spasm superimposed on atherosclerotic lesions can benefit from coronary arterial bypass grafting combined with partial denervation of the heart. This combination yielded acceptable results (83.4 percent favorable outcome); recurrence of attacks occurred in only 6.7 percent of this group. In those forms of angina in which spasm occurs in angiographically normal coronary arteries, therapy is essentially medical. In 13 patients treated with oral nifedipine (30 to 40 mg/day), suppression of attacks was achieved in 11 instances. During the period of treatment, the methergine provocative test, which had been consistently positive before treatment, converted to negative in 12 patients. Transient withdrawal of nifedipine caused recurrence of pain in two patients.

Source: MEDLINE

204. Early coronary graft thrombosis following surgery for Prinzmetal’s angina: treatment with nifedipine and thrombolysis.

Author(s): Klaus AP, Gorfinkel HJ, Lemmo JJ, Graham BW
Citation: American Heart Journal, January 1981, vol./is. 101/1(110-2), 0002-8703;0002-8703 (1981 Jan)
Publication Date: January 1981
Source: MEDLINE

205. [Clinical, angiographic and therapeutic aspects of variant angina (author’s transl)]. [German] Klinische, angiographische und therapeutische Aspekte bei der Variant-Angina.

Author(s): Leisch F, Schutzenberger W, Bergmann H Jr, Herbinger W
Citation: Wiener Klinische Wochenschrift, January 1981, vol./is. 93/2(49-55), 0043-5325;0043-5325 (1981 Jan 23)
Publication Date: January 1981
Abstract: A report is given on seven patients with Prinzmetal’s variant angina. Rest angina occurred in all patients. In contrast, exertional angina was observed only on patients with significant (greater than 70%) coronary stenosis. Likewise, electrocardiographic changes (negative T) were only demonstrable in patients with severe coronary obstruction. The coronary angiogram was normal in one patient, demonstrated insignificant lesions in two and significant stenosis in four cases. In patients with insignificant coronary lesions obstructive coronary spasm was provoked by ergonovine maleate and this group responded well to a combination of nifedipine and isosorbide dinitrate therapy. The patients with significant coronary stenosis were free from pain after coronary bypass surgery; one of these suffered a perioperative anterior myocardial infarction. On the basis of these observations promising therapy is possible if the coronary morphology is known.
206. Diagnosis and management of coronary vasospasm.

**Author(s):** Gupta SC, Nair KG

**Citation:** Journal of the Association of Physicians of India, January 1981, vol./is. 29/1(29-38), 0004-5772;0004-5772 (1981 Jan)

**Publication Date:** January 1981

**Source:** MEDLINE


**Author(s):** Heupler FA Jr

**Citation:** Cardiovascular Clinics, 1981, vol./is. 12/2(29-41), 0069-0384;0069-0384 (1981)

**Publication Date:** 1981

**Abstract:** Coronary artery spasm may produce angina, major arrhythmias, syncope, myocardial infarction, and death in patients with normal or nearly normal coronary arteriograms. The clinical picture in patients with symptomatic coronary artery spasm is characterized by: (1) predominant angina at rest, with little or no exertional angina; (2) changes of myocardial ischemia, especially ST segment elevation, on the electrocardiogram during pain; and (3) major arrhythmias and syncope during angina. A complete electrocardiogram during pain, or at least a Holter monitor recording, is important in establishing a diagnosis. The ergonovine maleate provocative test is a reliable method of establishing the diagnosis, but it is associated with some risks. Calcium flux antagonists are more effective than nitrates or beta blockers in the treatment of coronary spasm. Coronary bypass surgery is generally ineffective in the treatment of coronary spasm unless the spasm is superimposed on a fixed severe coronary obstruction.

**Source:** MEDLINE

208. 'Variant' angina: evidence for small vessel coronary artery spasm?.

**Author(s):** Pfisterer M, Muller-Brand J, Cueni T, Lutold B, Burkart F

**Citation:** European Journal of Nuclear Medicine, December 1980, vol./is. 5/6(529-33), 0340-6997;0340-6997 (1980 Dec)

**Publication Date:** December 1980

**Abstract:** A unique case of 'variant' angina pectoris has been observed in a patient with normal coronary arteries and typical chest pain appearing spontaneously at rest, and repeatedly provoked by ergonovine maleate (0.1 mg iv) associated with large transmural perfusion defects on 201Tl-imaging (after ergonovine) and a marked increase in T wave voltage despite no demonstrable spasm of a major coronary artery after the same doses of ergonovine. While saline solution could not provoke chest pain and treatment with a beta-blocking agent increased the frequency of ischemic attacks, a calcium antagonist therapy reduced and eventually eliminated the attacks. Thus, this case provides evidence for yet another aspect of a 'variant' form of angina pectoris: small vessel coronary artery spasm.

**Source:** MEDLINE

209. Efficacy of diltiazem for control of symptoms of coronary arterial spasm.

**Author(s):** Rosenthal SJ, Ginsburg R, Lamb IH, Baim DS, Schroeder JS

**Citation:** American Journal of Cardiology, December 1980, vol./is. 46/6(1027-32), 0002-9149;0002-9149 (1980 Dec 1)

**Publication Date:** December 1980

**Abstract:** To evaluate the efficacy of the calcium antagonist diltiazem for therapy of active coronary arterial spasm, 13 patients with clinical variant angina attributed to documented coronary arterial spasm completed a prospective randomized double-blind crossover trial of diltiazem (120 and 240 mg/day) versus placebo. Response was assessed with the diary
technique measuring frequency of angina, consumption of nitroglycerin and percent of pain-free days. When 120 mg of diltiazem/day was compared with the paired placebo period there was a significant increase in percent of pain-free days (from 43 to 71 percent [p = 0.03]), but no significant decrease in frequency of angina (p = 0.06) or consumption of nitroglycerin (p = 0.32). When 240 mg of diltiazem/day was compared with the paired placebo period there was a significant increase in percent of pain-free days (from 50 to 79 percent [p = 0.03]) and a significant decrease in both frequency of angina (from 1.6 to 0.4 episodes/day [p = 0.03]) and consumption of nitroglycerin (from 1.3 to 0.4/day [p = 0.01]). Diltiazem was found to be a highly effective drug for control of symptoms of active coronary arterial spasm, without side effects and with excellent patient tolerance.

Source: MEDLINE


Author(s): Saltups A

Citation: Australian & New Zealand Journal of Medicine, December 1980, vol./is. 10/6(622-8), 0004-8291;0004-8291 (1980 Dec)

Publication Date: December 1980

Abstract: Angiographic coronary artery disease (CAD) was correlated with clinical features, electrocardiographic (ECG) findings and the results of medical management or aortocoronary bypass in 42 patients with angina at rest associated with transient ST segment elevation (variant angina). Patients were divided into three sub-sets based on the coronary arteriographic findings. On the basis of greater than 75% luminal diameter narrowing, 28 patients had multiple vessel, ten had single vessel and four had minimal (less than 50% narrowing) CAD. The angiographic sub-sets did not differ significantly in age, sex, coronary risk factors, time from onset of rest pain to coronary angiography, or in the presence of arrhythmias during ischaemic episodes. Patients with multiple vessel CAD more commonly had prior coronary events (P less than 0.01), an abnormal baseline ECG (P less than 0.05) or both (P less than 0.001). These features did not distinguish patients with single vessel from those with minimal CAD. ST elevation in the inferior leads during episodes of myocardial ischaemia was more common (P less than 0.005) in patients with minimal CAD. Twenty-four patients with multiple vessel and six with single vessel CAD underwent aortocoronary by-pass surgery and relief of variant angina was achieved in all 25 long-term survivors during an average follow-up period of 36 months. Twelve patients (four of each subset) were treated medically. Among those with multiple vessel CAD, the small medically treated numbers precluded valid comparison of medical and surgical results. Patients with single vessel CAD followed for an average period of 17 months compared unfavourably with the operated group. Calcium antagonists with the operated group. Calcium antagonists or nitrates controlled variant angina in patients with minimal CAD followed for an average of 27 months.

Source: MEDLINE


Author(s): Sol JJ, Fergusson DJ, Reeve R

Citation: Hawaii Medical Journal, August 1980, vol./is. 39/8(195-8), 0017-8594;0017-8594 (1980 Aug)

Publication Date: August 1980

Source: MEDLINE

212. Long-term prognosis of “variant” angina with medical treatment.

Author(s): Severi S, Davies G, Maseri A, Marzullo P, L’Abbate A

Citation: American Journal of Cardiology, August 1980, vol./is. 46/2(226-32), 0002-9149;0002-9149 (1980 Aug)

Publication Date: August 1980
213. Medical therapy of Prinzmetal's variant angina.

Author(s): Schroeder JS, Rosenthal S, Ginsburg R, Lamb I

Citation: Chest, July 1980, vol./is. 78/1 Suppl(231-3), 0012-3692;0012-3692 (1980 Jul)

Abstract: Medical therapy for Prinzmetal's variant angina has been treatment of the acute attack with sublingual nitroglycerin. Prophylactic therapy has been more difficult, utilizing long-acting vasodilators that are limited because of their short half-life and side effects when therapeutic doses are used. Alpha-adrenergic blockade has been effective in some patients but is frequently associated with intolerable side effects or apparent development of tolerance to the drug. Preliminary experience from a randomized double-blind trial of diltiazem, a new calcium antagonist, has demonstrated a 90% reduction in pain episodes, with many patients becoming pain-free on the 240-mg daily dose. These data and the lack of adverse side effects demonstrate a dramatically effective therapy for patients with coronary artery spasm.

Source: MEDLINE


Author(s): Paolillo V, Marra S, Aquaro G

Citation: Chest, June 1980, vol./is. 77/6(807-10), 0012-3692;0012-3692 (1980 Jun)

Abstract: A patient had attacks of Prinzmetal's angina, resistant to sublingual nitrates in high doses and to a calcium antagonist. All the crises were resolved by sodium nitroprusside therapy. This report suggests that nitroprusside merits further evaluation in the treatment of Prinzmetal's angina, particularly in cases resistant to usual therapy in which the evolution towards myocardial infarction is very likely.

Source: MEDLINE


Citation: New England Journal of Medicine, June 1980, vol./is. 302/23(1269-73), 0028-4793;0028-4793 (1980 Jun 5)

Abstract: We report clinical experience with the coronary vasodilator nifedipine in 127 patients with symptoms of myocardial ischemia associated with electrocardiographic or angiographic evidence, or both, of coronary-artery spasm. In the majority of patients conventional antianginal therapy including nitrates and beta-adrenergic blockers failed, and in one third of the patients at least one episode of ventricular tachycardia developed during an attack of angina. Nifedipine (40 to 160 mg every 24 hours) significantly reduced the mean weekly rate of anginal attacks from 16 to two (P less than 0.001). Similar marked reductions in the nitroglycerin requirement were noted. In 63 per cent of the patients complete control of anginal attacks was achieved, and in 87 per cent the frequency of angina was reduced by at least 50 per cent. Nifedipine was generally well tolerated, with only 5 per cent of the patients requiring termination of the drug because of intolerable side effects. This experience with nifedipine suggests that it is a highly effective drug for the treatment of coronary-artery spasm and variant angina.

Source: MEDLINE

216. Surgical treatment of variant angina: use of plexectomy with aortocoronary bypass.

Author(s): Bertrand ME, Lablanche JM, Rousseau MF, Warembourg HH Jr, Stankowitz C,
217. Management of variant angina.

Author(s): Yasue H

Citation: Archivos del Instituto de Cardiologia de Mexico, May 1980, vol./is. 50/3(249-57), 0020-3785 (1980 May-Jun)

Publication Date: May 1980

Source: MEDLINE

Abstract: The clinical manifestations of symptomatic coronary arterial spasm were analyzed in 30 patients whose coronary arteriograms demonstrated no fixed severe obstructions. The study group consisted of 14 men and 16 women (average age, 47 years). Angina at rest was invariable and it was usually typical in quality, location, duration and response to nitroglycerin. Exertional angina occurred in 23 percent and syncope with angina in 33 percent. Spontaneous remission of angina for at least 1 month occurred in 57 percent of patients. Prinzmetal's variant angina occurred in 77 percent of patients and only S-T segment depression or T wave changes during angina occurred in 23 percent. Major arrhythmias during ischemia developed in 47 percent. Exercise tests were positive in 24 percent. Myocardial infarction, probably due to coronary spasm, occurred in 7 percent of patients. Isosorbide dinitrate and propranolol were effective therapy in only 39 percent and 6 percent of patients, respectively. Nifedipine, a calcium flux antagonist, was effective in 80 percent of patients. Patients with normal coronary arteriograms who have clinical features suggestive of coronary arterial spasm should be considered for further investigation, including long-term electrocardiographic monitoring and provocative testing for spasm.

Source: MEDLINE

218. Syndrome of symptomatic coronary arterial spasm with nearly normal coronary arteriograms.

Author(s): Heupler FA Jr

Citation: American Journal of Cardiology, April 1980, vol./is. 45/4(873-81), 0002-9149:0002-914 (1980 Apr)

Publication Date: April 1980

Abstract: The clinical manifestations of symptomatic coronary arterial spasm were analyzed in 30 patients whose coronary arteriograms demonstrated no fixed severe obstructions. The study group consisted of 14 men and 16 women (average age, 47 years). Angina at rest was invariable and it was usually typical in quality, location, duration and response to nitroglycerin. Exertional angina occurred in 23 percent and syncope with angina in 33 percent. Spontaneous remission of angina for at least 1 month occurred in 57 percent of patients. Prinzmetal's variant angina occurred in 77 percent of patients and only S-T segment depression or T wave changes during angina occurred in 23 percent. Major arrhythmias during ischemia developed in 47 percent. Exercise tests were positive in 24 percent. Myocardial infarction, probably due to coronary spasm, occurred in 7 percent of patients. Isosorbide dinitrate and propranolol were effective therapy in only 39 percent and 6 percent of patients, respectively. Nifedipine, a calcium flux antagonist, was effective in 80 percent of patients. Patients with normal coronary arteriograms who have clinical features suggestive of coronary arterial spasm should be considered for further investigation, including long-term electrocardiographic monitoring and provocative testing for spasm.

Source: MEDLINE


Author(s): Phaneuf DC, Waters DD, Dauwe F, Theroux P, Pelletier G, Mizgala HF

Citation: Catheterization & Cardiovascular Diagnosis, 1980, vol./is. 6/4(413-21), 0098-6569:0098-6569 (1980)

Publication Date: 1980

Abstract: A young man with a single left coronary artery and refractory variant angina is described. Spontaneous coronary artery spasm developed during coronary arteriography at the site of a 50% fixed left anterior descending coronary artery stenosis. Frequent episodes of rest angina with transient ST segment elevation persisted in hospital in spite of treatment with three different calcium antagonist drugs. Symptoms disappeared only when the combination of nifedipine, diltiazem, isosorbide dinitrate, and nitroglycerin ointment were given. Ergonovine testing was used to objectively assess the response to treatment.

Source: MEDLINE
1. First report of the successful use of bosentan in refractory vasospastic angina

Author(s): Krishnan U., Win W., Fisher M.

Citation: Cardiology, June 2010, vol./is. 116/1(26-28), 0008-6312 (June 2010)

Publication Date: June 2010

Abstract: Variant angina is caused by focal spasm of the epicardial coronary arteries and is variably associated with atherosclerotic coronary disease. We present the clinical course of profound coronary spasm in a woman which resulted in life-threatening symptoms. Although not previously reported, administration of the endothelin antagonist bosentan resulted in complete resolution of her symptoms which were refractory to commonly used anti-anginals, and these symptoms recurred when the drug was inadvertently withdrawn, confirming efficacy of the agent. The details of her clinical outcome and a review of the role of endothelin and its antagonists in coronary vasospasm are discussed. Copyright 2010 S. Karger AG.

Source: EMBASE

2. Is medical therapy enough for the prevention of sudden death in patients with variant angina?

Author(s): Park H.W., Lee M.G., Yoon N.S., Hong Y.J., Kim J.H., Ahn Y.K., Jeong M.H., Cho J.G., Park J.C., Kang J.C.

Citation: European Heart Journal, September 2009, vol./is. 30/(693-694), 0195-668X (September 2009)

Publication Date: September 2009

Abstract: Objectives: Coronary artery spasm usually presents with chest pain but sometimes cause sudden cardiac death (SCD). Vasodilator is useful for chest pain and SCD but there is still controversy. This study was done to evaluate whether medical treatment is enough for the prevention of sudden cardiac death in variant angina patients. Methods: From Jan 2000 to Dec 2007, 262 patients were divided into 2 groups according to presentation pattern, group I presented with chest pain (238, M:F=183:79, 52+/-10 years) and group II with SCD (24, M:F=18:6, 49+/-11 years). Both groups had vasospasm at coronary angiogram without significant stenosis. Results: Incidence of SCD in patients with coronary vasospasm was 9.2% (24/262) and occurred more commonly in men (M:F=18:6, p<0.05). Hypertension, diabetes, dyslipidemia or smoking rate, blood cell counts, serum lipid profiles were not different between the 2 groups. Fibrinogen level was higher in group II (263+/-107 vs. 304+/-103 mg/dL, p=0.143) but it was not statistically significant Total occlusion, multivessel spasm, mixed lesion (insignificant stenosis with spasm) rate in spasm provocation test were not different either. Sudden cardiac death was the first symptom in 16 patients (6.1%) and occurred during the treatment for stable angina or variant angina in 8 (3.1%). Sudden cardiac death occurred twice in only 1 (0.4%). Eventual death occurred in 7 patients. Three patients resulted in death at the first presentation and 4 during treatment of stable angina pectoris or variant angina. Calcium channel blockers (CCB) and nitrates were used less frequently in patients with SCD (37.5% vs. 16%, 25% vs. 22%, p<0.05%) than without SCD. Conclusions: Sudden cardiac death in variant angina occurred more frequently in men and associated with less use of CCB or nitrate. Because recurrence of SCD was relatively rare, medical treatment may be enough for patients with variant angina.

Source: EMBASE

Available in fulltext at Highwire Press

3. The conventional treatment did not improve the 123I-BMIPP myocardial uptake in patients with vasospastic angina
Background: Treatment with vasodilator prevents angina attack in patients with vasospastic angina (VSA). However, only a handful of studies have reported the effectiveness of conventional therapy using myocardial nuclear imagings in those patients. 

Purpose: This study investigated and evaluated the effect of conventional drug treatment using myocardial fatty acid metabolic images with 123I-beta-methyl-iodophenylpentadecanoic acid (123I-BMIPP) in VSA patients. 

Methods: 123I-BMIPP myocardial radionuclide study was conducted on 17 VSA patients (mean age: 61.4 +/- 10.6 years). Acetylcholine provocation test for coronary vasospasm using cardiac catheter was performed to determine VSA. All patients were treated with calcium blocker, isosorbide dinitrate, nicorandil, angiotensin converting enzyme inhibitors or angiotensin receptor blockers. At 2 weeks after cardiac catheterization (0M) and 6 months after the provocation test (6M), 123I-BMIPP myocardial scintigraphic images were obtained at the early and delayed phases (15 minutes and 4 hours after tracer injection, respectively). The heart-to-mediastinum (H/M) ratio and the washout rate (WR) were calculated from planar images. Left ventricular ejection fraction (EF) was assessed on a basis of echocardiograms. Further events due to VSA were determined by an episode of chest pain or use of nitroglycerin/additional medications. All patients were divided into the responder (n=8) or non-responder (n=9) group based on the presence or absence of clinical event during the entire study period. 

Results: 1) There was no differences in EF between the responder and non-responder groups (66.6 +/- 2.69 vs. 57.3 +/- 2.145%, p >0.1). 2) At 0M, no significant differences between the responder and non-responder were observed in the early H/M (2.3 +/- 0.3 vs. 2.0 +/- 0.3, p >0.2), the delayed H/M (1.8 +/- 0.3 vs. 1.7 +/- 0.2, p >0.2) and the global WR (41.3 +/- 9.1%, vs. 47.7 +/- 7.0%, p >0.1). 3) At 6M, no significant differences between the responder and non-responder groups were observed in the early H/M (2.2 +/- 0.2 vs. 2.1 +/- 0.3, p >0.2), the delayed H/M (1.8 +/- 0.2 vs. 1.7 +/-0.2, p >0.2) and the global WR (41.3 +/- 7.3%, vs. 46.5 +/- 8.5%, p >0.1). 4) Between 0M and 6M, no improvement of 123I-BMIPP myocardial uptake was observed in the both groups. 

Conclusion: These data suggested that 123I-BMIPP myocardial scintigraphy in VSA patients depicted the presence of fatty acid metabolism disorder even in a stable condition. These results might indicate silent myocardial ischaemia due to microcirculatory insufficiency in VSA patients.

Source: EMBASE

Full Text:
Available in fulltext at Highwire Press

4. Management of cardiac arrest caused by coronary artery spasm: Epinephrine/adrenaline versus nitrates

Author(s): Kiss G., Corre O., Gueret G., Nguyen Ba V., Gilard M., Boschat J., Arvieux C.C.

Citation: Heart and Lung: Journal of Acute and Critical Care, May 2009, vol./is. 38/3(228-232), 0147-9563 (May/June 2009)

Publication Date: May 2009

Abstract: Cardiopulmonary resuscitation guidelines imply the use of epinephrine/adrenaline during cardiopulmonary arrest. However, in cardiac arrest situations resulting from coronary artery spasm (CAS), the use of epinephrine/adrenaline could be deleterious. Methods and Results: A 49-year-old patient underwent an emergency coronarography with an attempt to stent the coronary arteries. Radiologic imaging revealed a positive methylergonovine maleate (Methergine, Novartis Pharmaceuticals, East Hanover, NJ) test, with subocclusive CAS in several coronary vessels leading to electromechanical dissociation. Cardiopulmonary resuscitation was performed, and intracoronary boluses of isosorbide dinitrate were given to treat CAS. Epinephrine/adrenaline was not administered during resuscitation. Spontaneous circulation was obtained after cardioversion for ventricular fibrillation, and the patient progressively
regained consciousness. Conclusion: Resuscitation guidelines do not specify the use of trinitrate derivatives in cardiac arrest situations caused by CAS. The pros and cons of the use of nitrates and epinephrine/adrenaline during cardiac arrest caused by CAS are analyzed in this case report.

Source: EMBASE

5. Impact of temporal cessation of vasodilators on coronary artery spasm as assessed with the intracoronary acetylcholine provocation test


Citation: American Journal of Cardiology, April 2009, vol./is. 103/9(91B-92B), 0002-9149 (22 Apr 2009)

Publication Date: April 2009

Abstract: Background: Vasodilators are usually temporally stopped before the intracoronary acetylcholine (ACh) provocation test, a widely used method for detecting vasospastic angina. However, little has been known about the impact of temporal cessation on coronary artery spasm (CAS) as assessed with this method. Methods: A total of 1,199 patients presenting with chest pain who underwent coronary angiography were enrolled. ACh was injected into the left coronary artery in incremental doses of 20 mug/min, 50 mug/min, and 100 mug/min. Vasodilators were withheld 3 days before the test. Significant CAS was defined as a transient >70% luminal narrowing with concurrent chest pain and/or ischemic ST-segment change. Results: After the 3-day cessation, patients treated with nitrates, nicorandil, diltiazem, and/or molsidomine had a significantly higher incidence of CAS than those without previous treatment (p <0.001). There was a trend toward a significantly higher incidence of CAS in patients who stopped other calcium channel blockers (CCBs) for blood pressure control (35.6% vs 29.2%, p = 0.055). The incidence of CAS in patients who stopped angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARBs), and beta-blockers were similar to those in patients without previous treatment. Multivariate logistic analysis showed that the cessation of nitrates, nicorandil and diltiazem was significantly associated with the higher incidence of CAS, whereas the cessation of beta-blockers was associated with reduced CAS. The cessation of other CCBs, ACE inhibitors, ARBs, and trimetazine did not significantly influence the incidence of CAS. Conclusion: The temporal cessation of antianginal agents for 3 days was independently associated with a higher incidence of CAS. Therefore, the cessation of antianginal agents should be cautious, and the confounding effect of vasodilators should be taken into account when the ACh provocation test is performed.

Source: EMBASE

6. Role of coronary vasoconstriction in ischemic heart disease and search for novel therapeutic targets

Author(s): Maseri A., Beltrame J.F., Shimokawa H.

Citation: Circulation Journal, March 2009, vol./is. 73/3(394-403), 1346-9843;1347-4820 (March 2009)

Publication Date: March 2009

Abstract: Atherothrombosis has long been recognized as an important mechanism of cardiac events in ischemic heart disease, and large multicenter clinical studies have shown the benefit of antiplatelet agents, statins, beta-blockers and angiotensin converting enzyme inhibitors in preventing these events. However, more recent studies have been less successful at showing incremental gains in targeting these mechanisms, suggesting that the limits of this strategy have been exploited. Coronary vasoconstriction is another important mechanism in ischemic heart disease but has received little attention and yet is a potential therapeutic target. In the current review, the reasons why coronary vasoconstriction has received insufficient consideration are explored. In particular, we need to change our approach from lumping heterogeneous clinical entities together to focusing on clinically-discrete homogeneous groups with a common mechanism and thus therapeutic target. The role of coronary vasoconstriction is examined in the various ischemic syndromes (variant angina, chronic stable angina, acute coronary syndromes and syndrome X) and the
underlying mechanisms discussed. Finally, in order to advance studies in this field, an innovative research strategy is proposed, including: (1) selection of paradigmatic cases for the various ischemic syndromes; (2) candidate therapeutic targets; and (3) approaches in assessing the clinical efficacy of these potential therapies.

Source: EMBASE

7. Impact of temporal cessation of vasodilators on coronary artery spasm as assessed with intracoronary acetylcholine provocation test


Citation: Journal of the American College of Cardiology, 2009, vol./is. 53/10(A86), 0735-1097 (2009)

Publication Date: 2009

Abstract: Background: Vasodilators are usually temporally stopped before the intracoronary acetylcholine (ACh) provocation test, a widely used method for detecting vasospastic angina. However, little has been known about the impact of temporal cessation on coronary artery spasm (CAS) as assessed with this method. Methods: A total of 1199 patients (pts) presented with chest pain underwent coronary angiography were enrolled. Acetylcholine was injected into left coronary artery in incremental doses of 20mug/min, 50mug/min and 100mug/min. Vasodilators were withheld 3 days before the test. Significant CAS was defined as a transient > 70% luminal narrowing with concurrent chest pain and/or ischemic ST-segment change. Results: After 3-day cessation, pts treated with nitrates, nicorandil, diatiazem and/or molsidomine had significantly higher incidence of CAS than those without previous treatment (P < 0.001). There was a trend toward significantly higher incidence of CAS in pts who stopped other calcium channel blockers (CCB) for blood pressure control (35.6% vs 29.2%, P = 0.055). The incidences of CAS in pts who stopped angiotensin converting enzyme inhibitors (ACEI), angiotensin receptor blockers (ARB) and beta-blockers were similar to those in pts without previous treatment. Multivariate logistic analysis showed that the cessation of nitrates, nicorandil and diltiazem had significantly higher incidence of CAS than those without previous treatment (P < 0.001). There was a trend toward significantly higher incidence of CAS in pts who stopped other calcium channel blockers (CCB) for blood pressure control (35.6% vs 29.2%, P = 0.055). The incidences of CAS in pts who stopped angiotensin converting enzyme inhibitors (ACEI), angiotensin receptor blockers (ARB) and beta-blockers were similar to those in pts without previous treatment. Multivariate logistic analysis showed that the cessation of nitrates, nicorandil and diltiazem had significantly higher incidence of CAS than those without previous treatment. The cessation of other CCB, ACEI, ARB and trimetazine did not significantly influence on the incidence of CAS. Conclusions: The temporal cessation of antianginal agents for 3 days was independently associated with higher incidence of CAS. Therefore, the cessation of antianginal agents should be cautious, and the confounding effect of vasodilator should be taken into account when we perform the ACh provocation test.

Source: EMBASE

Full Text: Available in fulltext at Highwire Press

8. Calcium antagonists and vasospastic angina: History and therapeutic changes

Author(s): Sueda S.

Citation: Respiration and Circulation, September 2005, vol./is. 53/9(953-961), 0452-3458 (Sep 2005)

Publication Date: September 2005

Source: EMBASE

9. Is there a role for provocation testing to diagnose coronary artery spasm?

Author(s): Adlam D., Azeem T., Ali T., Gershlick A.

Citation: International Journal of Cardiology, June 2005, vol./is. 102/1(1-7), 0167-5273 (22 Jun 2005)

Publication Date: June 2005

Abstract: Spontaneous coronary artery spasm is an important cause of morbidity both in
patients with coronary artery disease and in those with variant angina. A number of pharmacological agents have been identified which can provoke coronary artery spasm in susceptible patients. The role of provocation testing in the clinical diagnosis of coronary spasm is controversial. This is reflected by variations in the clinical use of provocation testing between specialist cardiac centres. Provocation testing appears to be a sensitive method of identifying patients with variant angina and active disease but such patients can often be diagnosed clinically. The specificity is less clear. There is little evidence that altering patient therapy on the basis of a positive test modifies prognosis. There may be a role for provocation testing in rare patients with refractory disease to identify a target site for coronary stenting. A more widespread use of these tests in patients with undiagnosed chest pain syndromes would not currently be recommended. 2005 Elsevier Ireland Ltd. All rights reserved.

Source: EMBASE

10. Effect of antispastic agents (calcium antagonists and/or isosorbide dinitrate) on high-sensitivity C-reactive protein in patients with coronary vasospastic angina pectoris and no hemodynamically significant coronary artery disease

Author(s): Hung M.-J., Cherng W.-J., Cheng C.-W., Yang N.-I.

Citation: American Journal of Cardiology, January 2005, vol./is. 95/1(84-87), 0002-9149 (01 Jan 2005)

Publication Date: January 2005

Abstract: Levels of high-sensitivity C-reactive protein were measured before and after 3 months of treatment with antispastic agents (calcium antagonists and/or isosorbide dinitrate) in 27 patients who had coronary vasospastic angina pectoris and no hemodynamically significant coronary artery disease. Levels of high-sensitivity C-reactive protein decreased after treatment with antispastic agents. 2005 by Excerpta Medica Inc.

Source: EMBASE

11. Efficacy of acupuncture treatment on patients with variant angina pectoris and its effect on the function of vascular endothelial system


Citation: Chinese Journal of Clinical Rehabilitation, May 2004, vol./is. 8/15(2874-2875), 1671-5926 (May 2004)

Publication Date: May 2004

Abstract: Aim: To explore the efficacy of acupuncture in treating variant angina pectoris and its effect on the function of vascular endothelial system. Methods: Sixty-two patients with variant angina pectoris were randomly divided into acupuncture group (n = 32) and control group (n = 30). All the patients were treated with 5-isosorbide mononitrate, diltiazem hydrochloride and aspirin respectively for 4 weeks, besides, patients in the acupuncture group received acupuncture treatment at the appoints of neiguan, sanyinjiao, zusanli, xinyu, taichong and shenmen. Results: There were 24 cases with significant effect, 6 with effect and 2 without effect in the acupuncture group, while those in the control group were 20, 5 and 5 cases respectively. The curative effect of the acupuncture group was significantly better than that of the control group (X^2 =95.38, P < 0.05). Plasma nitric oxide after treatment in the acupuncture group was (86.92 +/- 23.15) mumol/L, significantly increased compared with before treatment [(63.78 +/- 22.67) mumol/L] (t = 2.925, P < 0.01), also obviously higher than that in the control group (t = 17.785, P < 0.05). Conclusion: Acupuncture treatment can obviously improve clinical symptoms of variant angina pectoris, increase plasma nitric oxide level and ameliorate the function of vascular endothelial system.

Source: EMBASE

12. Vasodilating beta-adrenoceptor blockers as cardiovascular therapeutics

Author(s): Toda N.

Citation: Pharmacology and Therapeutics, December 2003, vol./is. 100/3(215-234), 0163-
**Publication Date:** December 2003

**Abstract:** Beta-adrenoceptor blocking agents (beta-blockers) have been established as therapeutics for treatment of patients with hypertension, ischemic heart diseases, chronic heart failure, arrhythmias, and glaucoma. However, their clinical use is limited because some patients are adversely affected by their side effects. The discovery of cardioselective (beta₁-selective) blockers has overcome some of the problems. Current retrospective studies have revealed that vasodilating beta-blockers (so-called beta-blockers of the third generation) have advantages over the conventional type of beta-blockers in terms of minimizing the adverse effects and improving the disease-derived dysfunction, thus enhancing the quality of life variables. Some of the possible advantages include improvement of insulin resistance, decrease in low-density lipoprotein cholesterol in association with increase in high-density lipoprotein cholesterol, attenuation of bronchial asthma attack and respiratory dysfunction, alleviation of coronary vasospasm provocation, peripheral circulatory disturbances, and erectile dysfunction, and better patient compliance. Release of nitric oxide, antioxidant action, beta₂-adrenoceptor activation, Ca²⁺ entry blockade, and other mechanisms underlying the vasodilating action may be responsible for the beneficial therapeutic effects of these agents. 2003 Elsevier Inc.

**Source:** EMBASE

13. **Comparative results of coronary intervention in patients with variant angina versus those with non-variant angina**

**Author(s):** Sueda S., Suzuki J., Watanabe K., Mineoi K., Kondou T., Yano K., Ochi T., Ochi N., Kawada H., Hayashi Y., Uraoka T.

**Citation:** Japanese Heart Journal, 2001, vol./is. 42/6(657-667), 0021-4868 (2001)

**Publication Date:** 2001

**Abstract:** Coronary angioplasty is reported to be feasible and safe in patients with coronary spasm and fixed stenosis. However, the long-term results are not positive. We compared the results of coronary angioplasty in 20 patients with variant angina versus 17 patients with non-variant angina among 231 consecutive patients with vasospastic angina. Coronary angioplasty was performed successfully in all 37 patients without any complications. Stenting for coronary dissection or recoil was performed in 8 patients, directional coronary atherectomy was selected for ostial lesion of left anterior descending coronary artery stenosis in 2 patients, and standard balloon angioplasty was performed in 27 patients. There were no clinical differences between the two groups. The restenosis rate in patients with variant angina was similar to that in patients with non-variant angina (30% vs 29%, ns). There was no relationship between the provoked spasm and restenosis. During the follow-up period, no major complications were observed in patients with variant angina or those with non-variant angina. In conclusion, full medication with calcium channel antagonists and isosorbide dinitrate, and treatment by coronary angioplasty including the use of new devices, were useful treatments for patients with coronary vasospasm and significant organic stenosis. There was no difference concerning the results of coronary intervention between the patients with variant angina and those with non-variant angina.

**Source:** EMBASE

14. **Variant angina: An update and review**

**Author(s):** Fearon W.F., Shah H., Froelicher V.F.

**Citation:** Journal of Interventional Cardiology, 2000, vol./is. 13/5(403-414), 0896-4327 (2000)

**Publication Date:** 2000

**Source:** EMBASE

15. **Beneficial effect of additional administration of benidipine hydrochloride on the control of anginal attacks in refractory coronary vasospasm: A report of two cases**

**Author(s):** Nakagawa I., Matsubara T., Yamazoe M., Hori T., Ida T., Imai S., Ozaki K.
Hatada K., Aizawa Y.

Citation: Respiration and Circulation, 2000, vol./is. 48/6(639-644), 0452-3458 (2000)

Publication Date: 2000

Abstract: It is widely recognized that calcium antagonists are effective in the prevention of anginal attacks in patients with coronary vasospasm. Here, we report two cases of refractory vasospastic angina which could be controlled by the combination therapy of benidipine hydrochloride and diltiazem hydrochloride, while other calcium antagonists were ineffective in preventing anginal attacks. This report suggests that benidipine hydrochloride may be regarded as one of the drugs which should be tried for uncontrollable vasospastic angina.

Source: EMBASE

16. Effect of tongxinluo capsule in treating variant angina pectoris patients and its influence on endothelial function

Author(s): Jia Z., Gu F., Xue Y.

Citation: Zhongguo Zhong xi yi jie he za zhi Zhongguo Zhongxiyi jiehe zazhi = Chinese journal of integrated traditional and Western medicine / Zhongguo Zhong xi yi jie he xue hui, Zhongguo Zhong yi yan jiu yuan zhu ban, November 1999, vol./is. 19/11(651-652), 1003-5370 (Nov 1999)

Publication Date: November 1999

Abstract: OBJECTIVE: To assess the efficacy of Tongxinluo capsule (TXLC) in treating variant angina pectoris and its effect on endothelial function. METHODS: Sixty-four patients with variant angina pectoris were enrolled in the study for four weeks by a randomized clinical trial treatment with TXLC or isosorbide mononitrate. RESULTS: (1) The symptoms of both groups were significantly improved, the total effective rate of TXLC and isosorbide were 86.67% and 87.10% respectively; (2) The level of serum nitric oxide was increased, and the serum endothelin was decreased after treatment, there was no significant difference between these two groups. CONCLUSION: TXLC could effectively improve the symptoms of variant angina pectoris, the mechanism of which may likely be mediated by nitric oxide and endothelin.

Source: EMBASE

17. Refractory coronary artery spasm with superimposed thrombosis: successful treatment with Palmaz-Schatz stent

Author(s): Sganzerla P., Child M., Savasta C., Passaretti B., Tavasci E.

Citation: Cardiologia (Rome, Italy), March 1999, vol./is. 44/3(295-298), 0393-1978 (Mar 1999)

Publication Date: March 1999

Abstract: Prinzmetal variant angina due to epicardial coronary artery spasm is a disease usually treated with drug therapy with successful results. A case of variant angina, refractory to conventional pharmacological treatment, and complicated by coronary artery thrombosis, was treated with percutaneous transluminal coronary angioplasty and stenting with good immediate and late clinical results.

Source: EMBASE

18. Coronary stent for variant angina: Atypical presentation

Author(s): Gupta S., Schiele F., Vuillemenot A., Appfel F., Bassand J.P.

Citation: Catheterization and Cardiovascular Diagnosis, December 1998, vol./is. 45/4(439-441), 0098-6569 (Dec 1998)

Publication Date: December 1998

Abstract: Pharmacological therapy remains the treatment of choice for Prinzmetal angina. We report an unconventional approach of coronary artery stenting to treat coronary artery spasm in variant angina refractory to triple drug therapy. Favorable clinical and
angiographic results and a negative Ergonovine test, under less aggressive medical therapy, are valuable arguments for stenting. Four-month angiographic follow-up showed absence of intrastent restenosis with a negative Ergonovine test. However, long-term follow-up is necessary before advocating this as a systematic approach.

**Source:** EMBASE

19. Vitamin E administration improves impairment of endothelium-dependent vasodilation in patients with coronary spastic angina

**Author(s):** Motoyama T., Kawano H., Kugiyama K., Hirashima O., Ohgushi M., Tsunoda R., Moriyama Y., Miyao Y., Yoshimura M., Ogawa H., Yasue H.

**Citation:** Journal of the American College of Cardiology, November 1998, vol./is. 32/6(1672-1679), 0735-1097 (15 Nov 1998)

**Publication Date:** November 1998

**Abstract:** Objectives. We examined the effects of oral administration of vitamin E, an antioxidant, on endothelium-dependent vasodilation in patients with coronary spastic angina. Background. We have recently reported that endothelium-dependent vasodilation is impaired in patients with coronary spastic angina (CSA). Furthermore, it is known that oxidative stress may play an important role in the impairment of endothelium-dependent vasodilation in cardiovascular diseases. Methods. With the ultrasound technique, flow-dependent vasodilation of the brachial arteries during reactive hyperemia was examined before and after treatment for a month with either oral administration of vitamin E (alphatocopherol acetate, 300 mg/day) or placebo, which is randomly assigned, in patients with CSA (n = 60). Results. Before treatment, patients with CSA had impaired flow-dependent vasodilation, lower plasma levels of alphatocopherol and higher plasma levels of thiobarbituric acid reactive substances (TBARS), as compared with age- and sex-matched control subjects (n = 60) (flow-dependent vasodilation: 3.1 +/- 1.8 vs. 7.1 +/- 2.5%, p < 0.001; alphatocopherol levels: 8.9 +/- 1.8 vs. 10.8 +/- 1.8 mug/ml, p < 0.001). In patients with CSA, treatment with vitamin E restored flow-dependent vasodilation (3.1 +/- 1.7 vs. 8.3 +/- 2.0%, p < 0.001), and this improvement was associated with the decreases in plasma TBARS levels and anginal attacks. Conclusions. The results indicate that vitamin E treatment improved endothelium-dependent vasodilation and decreased plasma TBARS levels in patients with CSA. Thus, increased oxidative stress may contribute to endothelial dysfunction and anginal attacks in patients with CSA.

**Source:** EMBASE

**Full Text:**
Available in fulltext at Highwire Press

20. Is Palmaz-Schatz stent effective for coronary artery spasm coexistent with organic stenosis?: A case report

**Author(s):** Okada H., Tanaka N., Kubo R., Yamasita T., Sawai R., Kuwahara K., Iwade K., Aosaki M.

**Citation:** Japanese Journal of Interventional Cardiology, 1998, vol./is. 13/2(157-162), 0914-8922 (1998)

**Publication Date:** 1998

**Abstract:** Recent advances on catheter treatment, particularly by new devices, of ischemic heart disease are remarkable, with progressive expansion of the indications to include vasospastic angina (VSA) refractory to medical therapy, and herein a case is reported on whom after deploying the Palmaz-Schatz stent, a challenge of acetylcholine (Ach) resulted in spasm and allowed to make observations of the changes of the implanted stent during the spasm. Slight coronary spasm developed at both ends (proximal and distal) as well as the midportion (corresponding to the articulation). From this experience we believe the Palmaz-Schatz stent strength is enough to tolerate the spasm and is useful to deal with coronary spasm accompanying organic stenosis making possible the reduce the dosage of vasodilators.

**Source:** EMBASE
21. The placement of a Wiktor stent for the treatment of vasospastic angina: a case report [Spanish] Colocacion de stent de Wiktor para el tratamiento de angina vasoespastica: presentacion de un caso

Author(s): Rodriguez Diez S., Lazaro R., Ruiz Nodar J.M., Enero J., Romero C., Gomez Recio M., Martinez Elbal L.

Citation: Revista espanola de cardiologia, November 1997, vol./is. 50/11(808-811), 0300-8932 (Nov 1997)

Publication Date: November 1997

Abstract: A 46-year-old male with a fixed stenosis in the mid-segment of the left anterior descending artery underwent balloon angioplasty. The procedure included the placement of two Wiktor stents because of severe dissection. Five months later he complained of Prinzmetal angina with ST elevation in the anterior wall. A metilergobasine test during the coronary arteriogram showed a discrete, severe spasm on the proximal segment of the left anterior descending artery. Because of a lack of symptomatic improvement with high-dose nitrates and calcium blockers, a Wiktor coronary stent was successfully implanted in the proximal left anterior descending artery, resulting in complete relief of the angina.

Source: EMBASE

22. Directional coronary atherectomy for coronary artery spasm refractory to medical therapy

Author(s): Hilton T.C., Blackshear J.L., Utset B., Kern M.J.

Citation: Clinical Cardiology, August 1996, vol./is. 19/8(662-664), 0160-9289 (Aug 1996)

Publication Date: August 1996

Abstract: A patient with severe medically refractory coronary artery spasm was treated successfully with coronary atherectomy of a mild (40%) left anterior descending artery stenosis. Before the procedure, the patient was dependent on intravenous nitroglycerin because of daily episodes of angina with ST-segment elevation despite receiving multiple combinations of antianginal therapies. Clinical response to coronary atherectomy was prompt and dramatic.

Source: EMBASE

23. Effect of calcium antagonists in variant or Prinzmetal angina

Author(s): Pepine C.J.

Citation: Canadian Journal of Cardiology, 1995, vol./is. 11/10(952-956), 0828-282X (1995)

Publication Date: 1995

Abstract: Variant angina, first described by Prinzmetal in 1959, is a syndrome of recurrent ischemic-type chest pain that occurs at rest and is associated with ST segment elevation. The syndrome has been convincingly demonstrated to be caused by temporary occlusion at a site of local spasm. The objectives of this article are to review treatment of the patient with variant angina and to address the important role of calcium antagonists.

Source: EMBASE

24. Gianturco-Roubin stent placement for variant angina refractory to medical treatment

Author(s): Lopez J.A., Angelini P., Leachman D.R., Lufschanowski R.

Citation: Catheterization and Cardiovascular Diagnosis, 1994, vol./is. 33/2(161-165), 0098-6569 (1994)

Publication Date: 1994

Abstract: A 43-yr-old man with mild, fixed obstruction of the left anterior descending (LAD) coronary artery and severe, uncontrolled variant angina underwent placement of an endovascular stent to preserve patency of the artery. The decision for stent placement was
based on several factors, including refractoriness to medical treatment and standard balloon angioplasty, documented spasm localized to the proximal LAD lesion, and the morbidity, mortality, and costs associated with the surgical approach in this type of patient. At follow-up, there was moderate restenosis of the stented coronary segment; the vasospastic angina syndrome had totally resolved.

Source: EMBASE

25. Refractory vasospastic angina relieved by denopamine

Author(s): Inoue S., Miyazawa Y., Iguchi N., Kasahara S., Kodama S., Haruta S., Katou J., Hiroswa K., Hosada S.

Citation: Respiration and Circulation, 1994, vol./is. 42/4(387-391), 0452-3458 (1994)

Publication Date: 1994

Abstract: A 78-year-old man was admitted with severe chest pain not relieved by nitroglycerine, and ST elevation appeared in leads II, III, (a)V(F) of the ECG. Emergent coronary angiography showed total obstruction in the distal portion of the right coronary artery (Seg. 4), and 90% stenosis in the proximal portion of the left anterior descending branch (Seg. 7). After intracoronary administration of isosobide dinitrate, obstruction and stenosis disappeared and no organic stenosis was seen in coronary arteries. It proved to be spasm. The patient was refractory to conventional treatment with calcium antagonists (nifedipine, diltiazem and benidipine), nitrates and nicorandil. Prazosin was also unsuccessful in preventing the attacks. But denopamine, an adrenergic beta-1 agonist, abolished anginal attacks completely. After a month of attack-free period under denopamine treatment, intracoronary injection of 1 mug noradrenaline (NA) dilated the coronary artery, but spasms were provoked by 5 mug NA. These findings suggest that both adrenergic alpha and beta-1 receptors play an important role in the production of spasm, and denopamine is a useful therapeutic agent for refractory vasospastic angina which is used without lowering blood pressure.

Source: EMBASE

26. Efficacy of amlodipine besilate therapy for variant angina: Evaluation by 24-hour holter monitoring

Author(s): Watanabe K.-I., Izumi T., Miyakita Y., Koyama S., Ohshima M., Inomata T., Suzuki M., Takahashi M., Shibata A.

Citation: Cardiovascular Drugs and Therapy, 1993, vol./is. 7/6(923-928), 0920-3206 (1993)

Publication Date: 1993

Abstract: The efficacy of amlodipine, a calcium antagonist, was investigated in 12 patients with variant angina. Amlodipine was administered at a dose of 5 mg once daily, and efficacy was assessed from the frequency of anginal attacks, the frequency of ST elevation or depression, and the extent of ST segment changes [ST segment elevation or depression (mm) x duration (seconds)] on the Holter ECG before and after treatment. The frequency of ST elevation during the observation period was 1.67 +/- 0.33 times/day (symptomatic attacks: 1.17 +/- 0.21/day; asymptomatic attacks: 0.50 +/- 0.19/day), and this significantly decreased to zero per day (both symptomatic and asymptomatic attacks) after treatment (p < 0.05). The extent of ST segment elevation during the observation period was 507.5 +/- 156.6 mmsec/day (symptomatic: 382.5 +/- 102.9 mmsec/day; asymptomatic: 125.0 +/- 62.0 mmsec/day), and such changes were completely suppressed (both symptomatic and asymptomatic) by treatment (p < 0.05). The frequency of ST depression was 2.08 +/- 0.12 times/day (symptomatic: 0.25 +/- 0.13/day; asymptomatic: 1.83 +/- 0.37/day) during the observation period, while it was 1.50 +/- 0.36 times/day (symptomatic: 0.25 +/- 0.13/day; asymptomatic: 1.25 +/- 0.30/day) after treatment. Although anginal attacks remained unchanged, asymptomatic attacks tended to decrease (p = 0.07). The extent of ST depression during the observation period was 632.5 +/- 239.4 mmsec/day (symptomatic: 105.0 +/- 64.4 mmsec/day; asymptomatic: 527.5 +/- 189.5 mmsec/day), and this significantly decreased to 333.8 +/- 111.4 mmsec/day (symptomatic: 50.0 +/- 31.2 mmsec/day; asymptomatic: 283.8 +/- 102.6 mmsec/day) after treatment (p < 0.05). The frequency of anginal attacks during the observation period was 1.27 +/- 0.18 times/day, and
this significantly decreased to 0.40 +/- 0.12/day after 1 week of treatment and to 0.22 +/- 0.07/day after 2 weeks of treatment (p < 0.05). These results suggest that amlodipine is effective for treating variant angina at a daily dose of 5 mg.

**Source:** EMBASE

27. **Effect of nisoldipine on variant angina: Assessment by 24-hour Holter monitoring**

**Author(s):** Morimoto S.-I., Mizuno Y., Hirasawa K., Hosoda S., Hiramori K., Haze K., Hayasaki K., Hirosawa K.

**Citation:** Current Therapeutic Research - Clinical and Experimental, 1992, vol./is. 52/4(548-555), 0011-393X (1992)

**Publication Date:** 1992

**Abstract:** Nisoldipine, a newly developed coronary vasodilating agent, was administered to 12 patients with variant angina to assess its efficacy in this condition. A placebo was administered during an observation period of >= 2 days, after which nisoldipine 10 mg/day was administered as a single daily dose during a 3- to 4-day treatment period. The number of angina attacks significantly decreased from 5.4 +/- 1.4 times/day/patient during the observation period to 1.1 +/- 0.4 times/day/patient during the treatment period (P < 0.05). On 24-hour Holter monitoring, the number of ST segment deviations in the total group decreased from 91 times/day during the observation period to 19 times/day during the treatment period, and ST segment deviations were no longer observed in 7 of the 12 patients. The number of ST segment elevations also significantly decreased from 6.5 +/- 1.7 times/day/patient to 1.5 +/- 0.9 times/day/patient (P < 0.01). Side effects were limited to epigastric discomfort and lower leg numbness in one patient. These results suggest that once-daily administration of nisoldipine 10 mg is of benefit in the treatment of variant angina.

**Source:** EMBASE

28. **Medical treatment of refractory coronary artery spasm**

**Author(s):** Lefroy D.C., Crake T., Haider A.W., Maseri A.

**Citation:** Coronary Artery Disease, 1992, vol./is. 3/8(745-752), 0954-6928 (1992)

**Publication Date:** 1992

**Abstract:** Background: Patients with refractory coronary artery spasm continue to experience frequent episodes of myocardial ischemia, often associated with life-threatening arrhythmias, despite treatment with the recommended maximal doses of calcium antagonists. We report our experience of treating these patients with very high doses, sometimes exceeding twice the recommended maximal dose, of calcium antagonists. Methods: Five patients required admission to our coronary care unit with severe angina and life-threatening arrhythmias due to coronary artery spasm resistant to the recommended maximum doses of the calcium antagonists, either diltiazem or verapamil. Four had ventricular arrhythmias associated with myocardial ischemia. Two patients had coronary artery disease, and three had angiographically normal coronary arteries. Ischemic and arrhythmic episodes were documented by ECG. Results: In all five patients, control of coronary artery spasm, and hence symptoms and arrhythmias, was achieved by progressively increasing the doses of either verapamil or diltiazem well above the maximum recommended doses; in two, the addition of nifedipine was necessary, and all were treated with nitrates. All patients tolerated the treatment regimens well. Follow-up over 4 to 48 months confirmed control of symptoms. In one patient, the dose of calcium antagonist was gradually reduced, but in four patients attempted reduction in dose led to recurrence of their symptoms. Conclusions: Very high doses of calcium antagonists, sometimes exceeding twice the recommended maximum dose, are effective in treating coronary artery spasm.

**Source:** EMBASE

29. **Calcium antagonists for the treatment of various anginal syndromes**

**Author(s):** Winniford M.D., Hillis L.D.
Abstract: The three calcium antagonists-verapamil, nifedipine, and diltiazem-have proved to be effective in patients with a variety of anginal syndromes. All three agents have been shown to be highly efficacious (either alone or in combination with long-acting nitrate preparations) in patients with Prinzmetal's variant angina, which is due to coronary arterial spasm. Each of these agents has proved to be superior to placebo in patients with angina of effort, and verapamil has been shown to be more effective than beta-adrenergic blockade in these individuals. Furthermore, in patients with especially severe angina of effort, both a propranolol-verapamil and a propranolol-nifedipine combination have proved to be more effective than any of these agents alone. Finally, all three calcium antagonists have been shown to be highly effective in patients hospitalized with unstable angina at rest. In short, verapamil, nifedipine, and diltiazem-administered alone or in conjunction with nitrates and even with beta-adrenergic blocking agents-are becoming increasingly popular in the treatment of several anginal syndromes.

Source: EMBASE

30. Intracoronary verapamil for the treatment of distal microvascular coronary artery spasm following PTCA

Author(s): Pomerantz R.M., Kuntz R.E., Diver D.J., Safian R.D., Baim D.S.

Publication Date: 1991

Abstract: Distal microvascular spasm is a somewhat uncommon occurrence following PTCA and often does not respond well to nitroglycerin. We report several patients who developed distal microvascular spasm that was refractory to intracoronary nitroglycerin but responded promptly to intracoronary verapamil.

Source: EMBASE

31. The calcium antagonists in vasospastic angina

Author(s): Chahine R.A.

Publication Date: 1991

Abstract: Coronary vasospasm is an important pathophysiologic mechanism of angina at rest. Because the calcium antagonists are potent vasodilators, they have become widely used and are now considered the treatment of choice for vasospastic angina. Practically all currently available calcium antagonists in the United States have been shown to be efficacious and safe for the therapy of vasospastic angina. However, because spontaneous remissions are common and angina attacks can frequently occur during the nighttime, considerations such as the duration of action of a given agent, the duration of treatment, and patient compliance have become important in the selection of the most appropriate therapy. Amlodipine is a long-acting dihydropyridine derivative that is suitable for use as a once-daily calcium antagonist. There is preliminary evidence that amlodipine is efficacious and well tolerated in vasospastic angina. Amlodipine, therefore, has the potential to become the preferred calcium antagonist for this condition.

Source: EMBASE

32. Refractory variant angina relieved by denopamine. A case report


Publication Date: 1991

Abstract: Coronary vasospasm is an important pathophysiologic mechanism of angina at rest. Because the calcium antagonists are potent vasodilators, they have become widely used and are now considered the treatment of choice for vasospastic angina. Practically all currently available calcium antagonists in the United States have been shown to be efficacious and safe for the therapy of vasospastic angina. However, because spontaneous remissions are common and angina attacks can frequently occur during the nighttime, considerations such as the duration of action of a given agent, the duration of treatment, and patient compliance have become important in the selection of the most appropriate therapy. Amlodipine is a long-acting dihydropyridine derivative that is suitable for use as a once-daily calcium antagonist. There is preliminary evidence that amlodipine is efficacious and well tolerated in vasospastic angina. Amlodipine, therefore, has the potential to become the preferred calcium antagonist for this condition.
Abstract: A 48-year-old man with severe variant angina refractory to conventional treatment with calcium antagonists and nitrates, or prazosin, or trihexyphenidyl hydrochloride, became symptom free rapidly when treated with denopamine, a adrenergic beta-1 agonist. Denopamine may prove to be an additional therapeutic agent in the management of severe variant angina. Therefore the response to denopamine and the lack of response to prazosin in this patient suggests that not only the adrenergic alpha receptor but also the adrenergic beta-1 receptor plays an important role in the production of coronary spasm, at least in some patients.

Source: EMBASE

33. Clinical effects of nitrendipine on variant angina pectoris

Author(s): Kishida H., Kato K., Toyama S., Ikeda M., Yanaga T., Suzuki K.

Citation: Japanese Heart Journal, 1991, vol./is. 32/3(297-305), 0021-4868 (1991)

Publication Date: 1991

Abstract: The clinical effects of nitrendipine, a new calcium antagonist, were investigated in a single-blind test on 21 patients with variant angina pectoris. The efficacy of the drug was evaluated on the basis of frequency of anginal attacks and Holter electrocardiographic findings during different treatment periods at doses of 10 mg once a day (period I) and 20 mg once a day (period II). The number of anginal attacks decreased significantly from a pretreatment level of 2.1 +/- 0.3 per day to 0.7 +/- 0.2 per day in treatment period I and 0.3 +/- 0.1 per day in treatment period II (p < 0.01, p < 0.001, respectively). The consumption of sublingual nitroglycerin tablets decreased significantly in both treatment periods in comparison with the observation period before treatment (p < 0.01, p < 0.001, respectively). In 20 patients with continuous ECG monitoring, the frequency of ST-segment elevation was 4.5 +/- 1.0 per day during the pretreatment period; it decreased significantly to 0.9 +/- 0.6 per day in treatment period I and 0.5 +/- 0.3 per day in treatment period II (p < 0.01, p < 0.001, respectively). The duration and the maximum magnitude of ST-segment elevation also improved significantly in both treatment periods. These results demonstrate the efficacy of nitrendipine in the treatment of variant angina at a single daily dose of 10 mg.

Source: EMBASE

34. Calcium inhibitors in the treatment of coronary artery spasm

Author(s): Bory M., Bonnet J.L., D'Houdain F.

Citation: Revue du Praticien - Medecine Generale, 1991, vol./is. /123(134-140), 0989-2737 (1991)

Publication Date: 1991

Source: EMBASE

35. Pathophysiology and therapy of coronary vasospasm

Author(s): Yasue H., Okumura K.

Citation: Nihon Naika Gakkai zasshi. The Journal of the Japanese Society of Internal Medicine, November 1990, vol./is. 79/11(1518-1522), 0021-5384 (10 Nov 1990)

Publication Date: November 1990

Source: EMBASE

36. Coronary artery spasm following coronary artery bypass grafting. Treatment with intracoronary ISDN followed by systemic intravenous nifedipine infusion

Author(s): Zaiac M., Renzulli A., Hilton C.J.

Citation: European journal of cardio-thoracic surgery : official journal of the European Association for Cardio-thoracic Surgery, 1990, vol./is. 4/2(109-111), 1010-7940 (1990)

Publication Date: 1990

Abstract: Coronary artery spasm following coronary artery bypass grafting (CABG) has
been described previously. The cause and underlying risk factors are mainly speculative and treatment therefore symptomatic. We present the successful management of this condition by administration of an intravenous Nifedipine infusion after intracoronary Isosorbide dinitrate (ISDN) had failed to relieve the spasm.

Source: EMBASE

Full Text:
Available in fulltext at Highwire Press

37. A case of variant angina. Provocative testing with acetylcholine to evaluate the efficacy of treatment with nifedipine


Citation: Japanese Archives of Internal Medicine, 1990, vol./is. 37/6(151-155), 0021-4809 (1990)

Publication Date: 1990

Source: EMBASE

38. Comparison of isosorbide dinitrate and nifedipine in the treatment of variant angina pectoris. Randomized study [Czech] Srovnani isosorbid dinitratu a nifedipinu v lecbe variantni anginy pectoris. Randomizovana studie

Author(s): Aschermann M., Bultas J., Karetova D., Kolbel F., Simper D., Kozakova M.

Citation: Casopis lekaru ceskych, September 1989, vol./is. 128/37(1178-1181), 0008-7335 (8 Sep 1989)

Publication Date: September 1989

Abstract: The effects of isosorbide dinitrate single dose 120 mg daily and nifedipine 20 mg twice daily were studied in 17 patients with variant angina pectoris due to coronary artery spasm. After a placebo phase the patients were randomized to treatment with either isosorbide dinitrate or nifedipine. After six weeks the patients were crossed over for another six weeks period of treatment. There was significant decrease of number of angina attacks during both treatment regimens. Using 24 hours Holter monitoring we also proved significant decrease of number of ST segment elevation or depression, either symptomatic or asymptomatic. There was increase of performed work during exercise tests after both treatment periods. The efficacy of Isoket 120 mg and Adalat Retard 2 x 20 mg daily in the treatment of patients with active variant angina pectoris was comparable in our study. 3 patients suffered untolerable headache during isosorbide dinitrate phase and had to terminate treatment after first day only.

Source: EMBASE

39. Randomized double-blind comparison of isosorbide dinitrate and nifedipine in the treatment of variant angina pectoris

Author(s): Aschermann M., Bultas J., Karetova D., Kolbel F., Simper D., Kozakova M.

Citation: Casopis Lekaru Ceskych, 1989, vol./is. 128/37(1178-1181), 0008-7335 (1989)

Publication Date: 1989

Source: EMBASE

40. Spontaneous coronary artery spasm in variant angina is caused by a local hyperreactivity to a generalized constrictor stimulus

Author(s): Kaski J.C., Maseri A., Vejar M., Crea F., Hackett D., Halson P.

Citation: Journal of the American College of Cardiology, 1989, vol./is. 14/6(1456-1463), 0735-1097 (1989)

Publication Date: 1989

Abstract: To assess whether spontaneous coronary artery spasm in patients with variant
angina results from local coronary hyperreactivity to a generalized constrictor stimulus or from a stimulus generated only at the site of the hyperreactive segment, the behavior of spastic and nonspastic coronary segments was studied in six patients with variant angina in whom focal coronary spasm developed spontaneously during cardiac catheterization. None of the patients had critical (> 50% luminal diameter reduction) organic coronary stenoses. Coronary diameters were measured by computerized quantitative arteriography during control, spontaneous spasm and ergonovine-induced spasm and after intracoronary nitrates were given. During spontaneous spasm, the luminal diameter of spastic and both proximal and distal nonspastic coronary segments was significantly reduced from control values, 64.2%, 13.2% and 14.8%, respectively. Average diameter reduction of unrelated arteries was 12.3%. Ergonovine, which was also administered to four patients, provoked focal spasm at the same site as spontaneous spasm. During intravenous ergonovine, luminal diameter of spastic segments was reduced by 91.5%, that of nonspastic proximal segments by 17.8% and that of nonspastic distal segments by 11.5%. Luminal diameter of unrelated arteries during ergonovine-induced spasm was reduced by 17.7%. Constriction of spastic segments was greater during ergonovine-induced spasm (p < 0.05), whereas the extent of diameter reduction of nonspastic segments was not significantly different during spontaneous spasm and ergonovine-induced spasm. Intracoronary isosorbide dinitrate dilated spastic and nonspastic coronary segments to a similar extent from control (20.7%, 18% and 16.5%, respectively; p = NS). This study demonstrates that spontaneous focal coronary spasm in variant angina results from a local exaggerated coronary constrictor response to a generalized stimulus that produces only mild constriction in other coronary segments.

Source: EMBASE

41. **Role of vasospasm in the prognosis of patients with variant angina**

Author(s): MacAlpin R.

Citation: Cardiology Board Review, 1989, vol./is. 6/9(51-62+69), 0888-8418 (1989)

Publication Date: 1989

Source: EMBASE

42. **Use of sublingual nifedipine in the treatment of coronary artery spasm**

Author(s): Davis W.R.

Citation: Catheterization and cardiovascular diagnosis, 1988, vol./is. 15/3(215), 0098-6569 (1988)

Publication Date: 1988

Source: EMBASE

43. **Effect of a new calcium antagonist, nilvadipine, on variant angina pectoris evaluated by 24-hour Holter electrocardiography**

Author(s): Kishida H., Toyama S., Yanaga T., Suzuki K.

Citation: Japanese Heart Journal, 1988, vol./is. 29/6(781-793), 0021-4868 (1988)

Publication Date: 1988

Abstract: The clinical effect of nilvadipine, a new calcium antagonist, was investigated in a single blind trial in 19 patients with variant angina pectoris. The efficacy of the drug was evaluated on the basis of frequency of anginal attacks and Holter electrocardiographic findings during observation periods and during two treatment periods when the drug was given in doses of 4 mg twice a day or 4 mg 3 times a day. The frequency of anginal attacks and the consumption of sublingual nitroglycerin tablets decreased significantly in both treatment periods in comparison with those in the observation period before treatment, but in the observation period after treatment tended to increase in comparison with those during the second treatment period. The frequency and duration of ST-segment elevation and the maximum ST-segment elevation confirmed by Holter electrocardiography also improved significantly in both treatment periods, compared with those in the observation period before treatment. Our findings show that nilvadipine is effective for variant angina
pectoris at doses of 4 mg twice a day.

Source: EMBASE

44. Refractory variant angina relieved by guanethidine and clonidine

Author(s): Frenneaux M., Kaski J.C., Brown M., Maseri A.

Citation: American Journal of Cardiology, 1988, vol./is. 62/10 PART I(832-833), 0002-9149 (1988)

Publication Date: 1988

Abstract: Coronary spasm may be provoked by a variety of physiologic and pharmacologic stimuli but specific receptor blockade has not been consistently shown to prevent attacks. Most patients with variant angina respond well to treatment with calcium antagonists and nitrates. A small proportion of patients, however, are refractory to this therapy to the extent that some have had cardiac denervation and even autotransplantation. We report the case of a patient with a 7-year history of variant angina who became refractory to extremely high doses of calcium antagonists and nitrates. The repeated addition of guanethidine or clonidine was consistently effective in abolishing both symptoms and objective evidence of myocardial ischemia in this patient.

Source: EMBASE

45. Calcium antagonists for Prinzmetal's variant angina, unstable angina and silent myocardial ischemia: Therapeutic tool and probe for identification of pathophysiologic mechanisms

Author(s): Stone P.H.

Citation: American Journal of Cardiology, 1987, vol./is. 59/3(101B-115B), 0002-9149 (1987)

Publication Date: 1987

Abstract: The calcium antagonists provide a unique tool to reduce myocardial oxygen demand and prevent increases in coronary vasomotor tone. For patients with Prinzmetal's variant angina, diltiazem, nifedipine and verapamil are extremely effective in preventing episodes of coronary vasospasm and symptoms of ischemia. Unstable angina pectoris is a more complex pathophysiologic syndrome with episodes of ischemia due to increases in coronary vasomotor tone, intermittent platelet aggregation or alterations in the underlying atherosclerotic plaque. Each of the calcium antagonists is effective as monotherapy in decreasing the frequency of angina at rest. Nifedipine is the only calcium antagonist that has been studied in a combination regimen with beta blockers and nitrates for patients with unstable angina, and control of angina is better with the combination regimen than with either form of therapy alone. Although symptoms of myocardial ischemia in unstable angina are reduced by calcium antagonists, these agents do not seem to decrease the incidence of adverse outcomes. Antiplatelet therapy appears to improve morbidity and mortality in patients with unstable angina, suggesting that thrombus formation may play a central role in that disorder. Episodes of silent or asymptomatic myocardial ischemia, identified by ST-segment monitoring, occur in a variety of disorders of coronary disease. Among patients with Prinzmetal's variant angina and unstable angina, episodes of silent ischemia appear to be as frequent as episodes of angina and the calcium antagonists are effective in decreasing episodes of ischemia regardless of the presence or absence of symptoms. Persisting episodes of silent ischemia among patients with unstable angina despite maximal medical therapy identify patients at high risk for an early unfavorable outcome. Among patients with stable exertional angina, episodes of silent ischemia may be up to 5 times as frequent as episodes of angina, and may be due to increases in coronary vasomotor tone, transient platelet aggregation or increases in myocardial oxygen demand. Preliminary experience suggests that calcium antagonists and beta blockers are effective in decreasing episodes of silent ischemia in patients with stable exertional angina and that a combination regimen may be more effective than either form of therapy alone.

Source: EMBASE

46. Comparison of diltiazem and nifedipine alone and in combination in patients...
with coronary artery spasm

Author(s): Prida X.E., Gelman J.S., Feldman R.L.

Citation: Journal of the American College of Cardiology, 1987, vol./is. 9/2(412-419), 0735-1097 (1987)

Publication Date: 1987

Abstract: Fifteen patients with coronary artery spasm completed a double-blind placebo-controlled trial comparing diltiazem and nifedipine. Increasingly, higher daily doses (diltiazem, 90 to 360 mg; nifedipine, 30 to 120 mg) were administered to achieve optimal effects. Daily diaries and ambulatory electrocardiographic recordings were used to assess efficacy and side effects. Both drugs significantly decreased angina frequency compared with that in the preceding placebo period (diltiazem 1.4 +/- 0.4 [mean +/- SEM] to 0.4 +/- 0.2 episodes per day; nifedipine 1.4 +/- 0.3 to 0.4 +/- 0.1 episodes per day; both p < 0.05). Ambulatory electrocardiographic recordings showed fewer ST shifts than were expected during all treatment periods (0.02/h recorded during placebo, none during diltiazem and 0.02/h during nifedipine therapy). Although some patients responded better to one drug than the other, neither drug resulted in a clearly superior clinical response. Diltiazem was discontinued in one patient because of urticaria, but the total number of side effects was higher with nifedipine (12 of 15 patients) than with diltiazem (5 of 15, p < 0.01). Nine patients remained symptomatic on single drug treatment and entered open label treatment with the combination of diltiazem and nifedipine. Three patients did not tolerate the combination because of important side effects; the other six also had side effects, but these were relatively minor. Four patients, received no more benefit from the combination than from a single agent; the condition of two patients improved. Both diltiazem and nifedipine provide effective antianginal therapy for coronary spasm, but diltiazem has fewer side effects. The combination of these drugs is associated with frequent side effects but helps some patients who remain symptomatic despite maximal tolerated doses of a single drug.

Source: EMBASE

47. Use of nitrates in the treatment of unstable and variant angina

Author(s): Nordlander R.

Citation: Drugs, 1987, vol./is. 33 Suppl 4/(131-139), 0012-6667 (1987)

Publication Date: 1987

Abstract: Unstable angina is a clinical syndrome that includes patients with new onset of angina, a change in a previous stable pattern, or the development of chest pain at rest. Generally, more than 90% of patients with this syndrome have significant fixed atherosclerotic coronary artery disease. Other complex, interacting pathophysiological mechanisms may include coronary vasoconstriction, plaque rupture and thrombosis. Therapeutic strategies aim at either reduction of myocardial oxygen demand or restoration of coronary blood flow. Both alternatives have been suggested as treatment of choice. However, as long as the pathophysiological mechanism(s) is unknown in the individual case, the treatment will mainly be empirical or based on results from clinical trials of heterogeneous groups of patients with unstable angina with probably varying aetiology. The results from such studies indicate that some strategies may be of value, but others may even be harmful in treatment of patients with this unstable syndrome. In this situation nitrates seem to be a safe drug which may be used in most forms of irrespective of the underlying pathophysiological mechanism(s).

Source: EMBASE

48. Comparison of the effects of bepridil and diltiazem in Prinzmetal's angina. A crossed, randomized double-blind study of 14 observations [French]

COMPARAISON DES EFFETS DU BEPRIDIL ET DU DILTIAZEM DANS L'ANGOR DE PRINZMETAL. ETUDE EN DOUBLE AVEUGLE, RANDOMISEE, CROISEE. A PROPOS DE 14 OBSERVATIONS

Author(s): Ducloux G., Manouvrier J., Bajolet A., Guermonprez J.L.

Citation: Annales de Cardiologie et d'Angeiologie, 1986, vol./is. 35/3(167-172), 0003-3928 (1986)
Abstract: The efficacy of bepredil was compared with that of diltiazem in treatment of Prinzmetal's angina, in a crossed, randomized double-blind study of 14 observations using repeated Holter recordings (a total of 9 for each patient). Clinical and electrical monitoring showed that the efficacy of bepridil is comparable to that of diltiazem in treatment of spastic angina.

Source: EMBASE

49. The place of transluminal coronary angioplasty in the management of variant angina: A warning
Author(s): Frank M.J.
Citation: Journal of the American College of Cardiology, 1986, vol./is. 8/3(509-510), 0735-1097 (1986)
Publication Date: 1986
Source: EMBASE

50. New insights into the cellular mechanisms of vasospasm
Author(s): Ganz P., Alexander R.W.
Citation: American Journal of Cardiology, 1985, vol./is. 56/9(11E-15E), 0002-9149 (1985)
Publication Date: 1985
Abstract: Previous attempts to define the etiology of coronary artery spasm have focused on such mechanisms as autonomic nervous system dysfunction or enhanced platelet activation leading to high levels of circulating vasoconstrictors. More recent evidence, however, suggests that the basic abnormality may be hypercontractility of the arterial wall associated with the atherosclerotic process itself. Results of both animal experiments and clinical studies support a role for certain cellular events in atherogenesis, including endothelial injury, presence of mitogenic factors and leukotrienes generated by platelets and macrophages, changes in histamine and serotonin receptor density of vascular smooth muscle and neovascularization of atherosclerotic plaque. The mechanisms postulated to underlie coronary vasospasm are discussed, relative to the clinical characteristics of vasospastic angina and the possible therapeutic implications.
Source: EMBASE

51. Management of a case of refractory variant angina with benzhexol hydrochloride (trihexyphenidyl hydrochloride)
Author(s): Joy M., Haywood G.A., Webb-Peploe M.M.
Citation: British Heart Journal, 1985, vol./is. 54/4(448-451), 0007-0769 (1985)
Publication Date: 1985
Abstract: A patient with severe variant angina that was refractory to conventional treatment became symptom free when she was treated with benzhexol (trihexyphenidyl hydrochloride), a cholinergic blocking agent used in the management of Parkinson's disease. There was a brief psychotic reaction when a large dose was taken and some memory impairment on the maintenance dose. Benzhexol should be used with caution but may prove to be an additional therapeutic agent in the management of severe variant angina.
Source: EMBASE

Full Text:
Available in fulltext at National Library of Medicine

52. Surgical treatment of variant angina with positive cold pressor test
Author(s): Amano J., Okamura T., Sunamori M., Suzuki A.
Coronary artery spasm is provoked by exercise, cold pressor test and pharmacological agents during cardiac catheterization. We describe a patient in whom the coronary artery was excessively sensitive to cold pressor test, and who was treated by coronary artery bypass grafting (CABG) combined with cardiac denervation. Postoperative coronary arteriogram showed decreased sensitivity to cold pressor test with patent graft. These observations suggest that combined CABG with cardiac denervation is indicated for patients with fixed organic coronary artery narrowing and positive provocative test, and that postoperative cold pressor test during coronary arteriography is a useful, low risk method for the evaluation of the efficacy of cardiac plexectomy.

Author(s): Nussmeier N.A., Slogoff S.
Citation: Anesthesiology, 1985, vol./is. 62/4(539-541), 0003-3022 (1985)
Publication Date: 1985
Abstract: This article describes the successful treatment of apparent intraoperative coronary vasospasm with iv verapamil. Because of the established efficacy of the calcium entry blocking drugs, the advantages of availability, ease of administration, and rapid and consistent absorption, iv verapamil may be the preferred drug for perioperative coronary artery spasm.

Author(s): Mata-Bourcart L.A., Waters D.D., Bouchard A.
Citation: Canadian Journal of Cardiology, 1985, vol./is. 1/3(168-171), 0828-282X (1985)
Publication Date: 1985
Abstract: Six patients hospitalized with active variant angina were treated for 3 days with the serotonin antagonist ketanserin after a 3 day control period on no medication. The number of variant angina episodes per patient per day was 1.52 +/- 1.42 during the control period and 2.05 +/- 2.30 during ketanserin therapy (p = NS). Ergonovine was administered in incremental doses of 0.0125 mg to 0.4 mg in the control period, during intravenous ketanserin administration and after 3 days of oral treatment. All 6 patients developed ST elevation during all 3 ergonovine tests. The ergonovine dose at which ST elevation developed was similar in each of the 3 periods. It is concluded that ketanserin is of no value in the treatment of variant angina and that both spontaneous and ergonovine-induced spasm in man are unlikely to be mediated by a serotonergic mechanism.

Author(s): Foley J., Brown B.G.
Citation: Cardio-vascular nursing, September 1984, vol./is. 20/5(25-29), 0008-6355 (1984 Sep-Oct)
Publication Date: September 1984
Source: EMBASE

Author(s): Takemasa A.
Citation: Kokyu to junkan. Respiration & circulation, June 1984, vol./is. 32/6(595-599), 0452-3458 (Jun 1984)
57. **Coronary artery spasm: Nifedipine therapy**  
Author(s): Hill J.A., Conti C.R.  
Citation: Primary Cardiology, 1984, vol./is. 10/11(16-24), 0363-5104 (1984)  
Publication Date: 1984  
Source: EMBASE

58. **Calcium blockers in angina: How they work, when to prescribe**  
Author(s): Heupler Jr. F.A.  
Citation: Postgraduate Medicine, 1984, vol./is. 75/6(127-132), 0032-5481 (1984)  
Publication Date: 1984  
Abstract: The calcium channel blocking drugs - nifedipine, verapamil, and diltiazem - are an important adjunct to treatment of typical exertional angina and are the treatment of choice for angina due to coronary artery spasm. These drugs are as effective as nitrates and beta-adrenergic blocking agents in treatment of patients with ischemic heart disease. With certain precautions, they may also be used in combination with nitrates and beta blockers. The three calcium blockers are not completely interchangeable because each has distinctive therapeutic applications and side effects. Detailed knowledge of each drug is important for its intelligent application in treatment of angina pectoris.  
Source: EMBASE

59. **Rebound of vasospastic angina after cessation of long-term treatment with nifedipine**  
Author(s): Lette J., Gagnon R.M., Lemire J.G., Morissette M.  
Citation: Canadian Medical Association Journal, 1984, vol./is. 130/9(1169-1173+1174), 0820-3946 (1984)  
Publication Date: 1984  
Abstract: The beneficial effect of calcium antagonists in the treatment of vasospastic angina is now well recognized. Although withdrawal symptoms have been reported following abrupt cessation of therapy with some cardiovascular drugs, there is no detailed report on similar complications of the cessation of therapy with calcium antagonists. In a 4-month period eight patients with well documented and well controlled vasospastic angina experienced a marked increase in the frequency and duration of anginal episodes at rest following the involuntary cessation of treatment with nifedipine, 10 to 20 mg four times a day. The increase began within 2 to 5 days after the cessation of treatment. Substitute therapy with isosorbide dinitrate, 30 mg, and verapamil, 80 to 120 mg, each four times a day, was effective in all cases. Although the mechanism responsible for this rebound phenomenon is not known, awareness of its existence is essential considering the widespread use of calcium antagonists.  
Source: EMBASE

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Available in fulltext at [National Library of Medicine](#)

60. **Magnesium sulfate in the treatment of variant angina**  
Author(s): Cohen L., Kitzes R.  
Citation: Magnesium, 1984, vol./is. 3/1(46-49), 0252-1156 (1984)  
Publication Date: 1984
Abstract: 41 episodes of anginal attacks were promptly terminated by a bolus of Mg sulfate administered intravenously in 15 patients with variant angina. Pretreatment with parenterally administered Mg sulfate in four of these patients prevented further attacks.

Source: EMBASE

61. Titrates for treatment of unstable angina pectoris and coronary vasospasm

Author(s): Conti R.C., Hill J.A., Feldman R.L., Mehta J.L., Pepine C.J.

Citation: The American journal of medicine, June 1983, vol./is. 74/6 B(40-44), 0002-9343 (27 Jun 1983)

Publication Date: June 1983

Abstract: The treatment of a patient with unstable angina at the time of the initial presentation of the physician can begin with nitrates. The beneficial action of nitrates are several. Nitrates dilate epicardial coronary arteries as well as many coronary artery stenoses. They may be effective because of this action plus a marked effect on decreasing ventricular volume and ventricular end diastolic pressure. Perhaps the best way to manage patients with severe angina that may be in part related to coronary artery vasoconstriction is to combine a long-acting nitrate with a calcium antagonist. The combined use of nitrates and calcium antagonists will (1) dilate the coronary arteries to maintain coronary blood flow, (2) decrease systemic arterial pressure and thus decrease peripheral vascular resistance, and (3) dilate peripheral veins and thus decrease ventricular volume and pressure. When proper doses are used, the combination may be more effective than either drug alone. Of course, proper dosing must be determined for the individual patient by the physician. Initial treatment with the nitrates should begin with small doses and gradually build up. Similar dosing schedules should be used for the calcium antagonists. Both doses can be increased to high levels is the clinical situation warrants it.

Source: EMBASE

62. Surgical treatment for variant angina--diltiazem drip infusion to prevent perioperative spasm

Author(s): Shimamoto M., Shinozaki T., Chihara K., Takahashi K., Imura M., Yamazaki F., Kawarazaki S., Akiyama F.

Citation: Kyobu geka. The Japanese journal of thoracic surgery, May 1983, vol./is. 36/5(399-404), 0021-5252 (May 1983)

Publication Date: May 1983

Source: EMBASE

63. Alpha-adrenergic blockade in vasotonic angina: Lack of efficacy of specific alpha1-receptor blockade with prazosin

Author(s): Robertson R.M., Bernard Y.D., Carr R.K., Robertson D.

Citation: Journal of the American College of Cardiology, 1983, vol./is. 2/6(1146-1150), 0735-1097 (1983)

Publication Date: 1983

Abstract: To clarify the possible role of the alpha1-adrenergic receptor in angina due to coronary artery spasm, a double-blind, randomized, placebo-controlled trial of the specific alpha1-antagonist, prazosin, was performed. Six patients with vasotonic angina were studied, with efficacy measured by continuous electrocardiographic recording and the tabulation of chest pain and nitroglycerin usage. Despite plasma prazosin levels adequate to produce a six-fold shift in the response to phenylephrine, there was no significant difference in the number of ischemic episodes while taking prazosin (9.8 +/- 6.3 episodes/24 h) compared with placebo (10.5 +/- 6.9). There was also no difference in the length of ischemic episodes, which averaged 231 +/- 35 seconds with placebo and 231 +/- 33 with prazosin. Chest pain and nitroglycerin usage were not altered by prazosin. These data suggest that coronary artery spasm is not primarily caused by an effect on or an abnormality of the coronary vascular alpha1-receptor.
64. Treatment strategy in vasospastic angina pectoris [French] STRATEGIE DU TRAITEMENT DE L'ANGINE DE POITRINE VASOSPASTIQUE

Author(s): Bertrand M.E., Lablanche J.M., Tilmant P.Y., Thieuleux F.A.


Publication Date: 1983

Abstract: The strategy of treatment in vasospastic angina is mainly based on the results of coronary angiography. In a series of 165 patients with coronary spasm documented by angiography, 51 patients (31 per cent) had angiographically normal arteries and 69 per cent had organic atherosclerotic lesions. Patients with fixed atherosclerotic lesions were divided in two subgroups depending on whether the lesions were operable. The first subgroup (47 cases) comprised patients with operable lesions and coronary spasm. They underwent aorto-coronary bypass associated with a procedure to prevent spasm (plexectomy) (40 cases). Depending on the site of the lesions, some patients with operable lesions may benefit from coronary angioplasty followed by treatment with calcium antagonist drugs. Patients in the second subgroup (67 cases) with unoperable fixed atherosclerotic lesions were treated with calcium antagonists. Betablockers, which may be considered in organic coronary artery disease, are theoretically contra-indicated because of the vasospastic factor. The remaining patients with 'angiographically normal' vessels (51 cases) were treated with nitrate derivatives and calcium antagonists. Treatment should be directed to the suppression of the clinical symptoms and, above all, of ECG signs of ischemia as proved by repeated Holter monitoring. The clinical course may also be assessed by repeated provocation tests. Results may depend on the doses and their timing during the 24 hour period. Duration of treatment in patients with angiographically normal vessels has not yet been established. Isolated cardiac denervation may be indicated in these patients who fail to respond to medical treatment (8 cases).

Source: EMBASE

65. The short and long-term efficacy of diltiazem for the treatment of variant angina pectoris

Author(s): Ginsburg R., Schroeder J.S.

Citation: Archives des Maladies du Coeur et des Vaisseaux, 1983, vol./is. 76/Spec. Feb.(149-152), 0003-9683 (1983)

Publication Date: 1983

Abstract: We studied 42 consecutive patients with coronary artery spasm (CS) who were treated with the Ca^{2+} entry blocker diltiazem for a mean period of 11 months (range 2-29 months). Patient population consisted of 26 females (age X = 52.1) and 16 males (age X = 59.1). All patients had diagnosis of CS confirmed by coronary arteriography (CA) with no patient having 70 per cent CAD. CS was equally distributed between LAD and RCA. 81 per cent of patients were cigarette smokers, 55 per cent had Raynaud's phenomenon, and 9 per cent had a history of migraine, 2 patients had previous MI, 2 previous bypass surgery (CABS), 1 previous angioplasty, 3 syncope with heartblock requiring pacemaker, and 2 with sudden death (VF-resuscitated). All patients were placed on diltiazem 240 or 360 mg/day to achieve pain free state. During follow-up there was no mortality. 2 patients had uncomplicated inferior MI's. 1 patient had CABS for progressive 90 per cent LAD lesion, and 2 required hospitalization for dose adjustment due to frequent chest pain. No patient has drug-related side effects. Thus, long-term follow-up of patients with CS treated with diltiazem revealed no mortality, low morbidity (12 per cent) and no adverse drug side effects.

Source: EMBASE

66. Spasmolytic effects of nicorandil (SG-75), a new potent coronary dilator, in variant angina pectoris

Author(s): Kato K., Aizawa T., Ogasawara K., Fujii J.
67. Continuous intracoronary nitroglycerin infusion for spasm after angioplasty

Author(s): Kern K.B., Temkin L.P., Fenster P.E.

Abstract: A patient with reversible coronary artery spasm superimposed on fixed atherosclerotic coronary disease was treated with percutaneous transluminal angioplasty. The procedure successfully dilated the atherosclerotic lesion. However, 20 minutes later, the patient developed coronary artery spasm at the angioplasty site. Sublingual nitroglycerin, sublingual nifedipine, intravenous nitroglycerin, and repeated boluses of intracoronary nitroglycerin alleviated episodes of spasm, but failed to prevent recurrence. The patient was successfully treated with a continuous intracoronary infusion of nitroglycerin. Patients with coronary artery spasm in addition to fixed obstructive coronary disease may be at higher risk for spasm after percutaneous transluminal angioplasty. Continuous intracoronary infusion of nitroglycerin may be an effective therapy for recurrent coronary artery spasm occurring in the catheterization laboratory.

Source: EMBASE

68. Intra operative coronary artery spasm and its management

Author(s): Suzuki A.

Abstract: In order to evaluate long-term efficacy of a new calcium antagonist, diltiazem, for therapy of coronary artery spasm, 16 patients with clinical variant angina due to documented coronary artery spasm participated in a 44-week prospective, randomized, double-blind cross-over trial of 240 mg of diltiazem vs. placebo. The study involved eleven 28-day cycles of which one of the first five cycles (phase 1) and one of the last six cycles (phase 2) were placebo, with the remainder being active medication. Response was assessed with the diary technique, measuring frequency of angina and side effects. When diltiazem was compared with the placebo period during phase 1, there was a 73% decrease in frequency of angina from 1.1 to 0.3 episodes per day (P < 0.01). When diltiazem was compared with the placebo during phase 2, there was an 80% decrease in frequency of angina from 0.5 to 0.1 episodes per day (P < 0.05). When phase 1 placebo cycle was compared with phase 2 placebo cycle, there was a 55% decrease in frequency of angina which approached statistical significance (P < 0.10). This marked disease attenuation demonstrated during the 44-week study reflects the variability of symptoms of variant angina and possibly reflects a carry-over therapeutic effect of the calcium entry blocker. Adverse side effects were absent in our small group of patients. Diltiazem is effective for the long-term control of symptoms of active coronary artery spasm.

Source: EMBASE

Full Text: Available in fulltext at Highwire Press
70. **Calcium channel blockers for the treatment of coronary artery spasm: Rationale, effects, and nursing responsibilities**

**Author(s):** Braun L.T.

**Citation:** Heart and Lung: Journal of Acute and Critical Care, 1983, vol./is. 12/3(226-231), 0147-9563 (1983)

**Publication Date:** 1983

**Abstract:** Coronary artery spasm is recognized as a cause of ischemic heart disease, producing a syndrome of the variant form of angina that occurs at rest. Spasm also may play a role in other types of rest angina (unstable angina) and exertional angina. Calcium is essential for the basis tonus of vascular smooth muscle. The accentuated contraction that occurs in coronary artery spasm is the result of an increase in intracellular calcium ions. Current therapy is aimed at blocking the slow calcium currents that are responsible for electrical activation and contraction of smooth muscle cells. A marked coronary vasodilation is produced with calcium channel blockers, thus demonstrating effective therapy for coronary artery spasm. A similar effect is achieved by nitrates, and these agents will continue to have a role in the therapy of spasm. Calcium channel blockers produce beneficial effects on myocardial oxygen supply and demand and, therefore, are also useful in the prevention of classic exertional angina caused by fixed obstruction. Verapamil and diltiazem possess electrophysiological effects and have, in addition, proved useful in the treatment of supraventricular dysrhythmias.

**Source:** EMBASE

71. **Nifedipine and erythromelalgia**

**Author(s):** Fisher J.R., Padnick M.B., Olstein S.

**Citation:** Annals of Internal Medicine, 1983, vol./is. 98/5(671-672), 0003-4819 (1983)

**Publication Date:** 1983

**Abstract:** A 44-year-old woman with Prinzmetal's angina had intermittent chest pain, unrelieved by oral nitrates and beta-adrenergic blocking agents. Nifedipine, 20 mg three times a day, was begun and produced marked improvement in her episodic chest discomfort. However, 8 weeks later the patient developed severe burning pain and swelling in her feet and lower legs, especially when walking or standing. The discomfort was relieved by aspirin and elevation of her legs, but was not influenced by external temperature. Her feet and lower legs were fiery red, tender, and decidedly warm to the touch. Pedal pulses and peripheral nerve functions were normal. Nifedipine was discontinued and her symptoms and abnormal physical findings resolved in 2 days. With resumption of the drug 1 week later the same abnormalities recurred. Normal or negative results were found for: skin biopsy, complete blood count, fasting blood glucose, rheumatoid factor, antinuclear antibody, and serum protein electrophoresis. Skin temperature measured on the right great toe was 9°F greater with nifedipine therapy than the baseline temperature of 80°F. A photoplethysmographic study, however, did not show a measurable difference in peripheral blood flow.

**Source:** EMBASE

**Full Text:**

Available in fulltext at EBSCO Host

72. **Detrimental effect of propranolol in patients with coronary arterial spasm countered by combination with diltiazem**

**Author(s):** Tilmant P.Y., Lablanche J.M., Thieuleux F.A.

**Citation:** American Journal of Cardiology, 1983, vol./is. 52/3(230-233), 0002-9149 (1983)

**Publication Date:** 1983

**Abstract:** This study determines, with quantitative variables, if propranolol is detrimental in patients with documented coronary arterial spasm and if this drug can be used in combination with calcium antagonists. Eleven patients with documented coronary spasm
were entered prospectively in a study with 4 phases of 2 days each: (1) control, (2) diltiazem or propranolol (mean 225 +/- 75 mg/day), (3) propranolol or diltiazem (360 mg/day), (4) propranolol and diltiazem. The effects of the drugs were assessed by the detection of ischemic electrocardiographic episodes (24-hour electrocardiographic monitoring) and provocative tests with ergonovine. During the period of treatment with propranolol, the number and the duration of attacks increased and provocative tests had positive results in all patients. Diltiazem completely abolished spontaneous episodes, but 6 of 11 patients remained sensitive to the administration of ergonovine. The association of the 2 drugs led to a disappearance of ischemic episodes. In conclusion, propranolol is ineffective in patients with coronary artery spasm. It can be used in combination with diltiazem, but without any advantage over diltiazem alone.

Source: EMBASE

73. Nitrates for treatment of unstable angina pectoris and coronary vasospasm

Author(s): Conti R.C., Hill J.A., Feldman R.L.

Citation: American Journal of Medicine, 1983, vol./is. 74/6 B(40-44), 0002-9343 (1983)

Publication Date: 1983

Abstract: The treatment of a patient with unstable angina at the time of the initial presentation to the physician can begin with nitrates. The beneficial action of nitrates are several. Nitrates dilate epicardial coronary arteries as well as many coronary artery stenoses. They may be effective because of this action plus a marked effect on decreasing ventricular volume and ventricular end diastolic pressure. Perhaps the best way to manage patients with severe angina that may be in part related to coronary artery vasoconstriction is to combine a long-acting nitrate with a calcium antagonist. The combined use of nitrates and calcium antagonists will (1) dilate the coronary arteries to maintain coronary blood flow, (2) decrease systemic arterial pressure and thus decrease peripheral vascular resistance, and (3) dilate peripheral veins and thus decrease ventricular volume and pressure. When proper doses are used, the combination may be more effective than either drug alone. Of course, proper dosing must be determined for the individual patient by the physician. Initial treatment with the nitrates should begin with small doses and gradually build up. Similar dosing schedules should be used for the calcium antagonists. Both doses can be increased to high levels if the clinical situation warrants it.

Source: EMBASE

74. The place of cardiac denervation in the surgical treatment of Prinzmetal variant angina

Author(s): Soots G., Warembourg Jr. H., Stankowiak C.

Citation: Journal of Cardiovascular Surgery, 1983, vol./is. 24/2(150-155), 0021-9509 (1983)

Publication Date: 1983

Source: EMBASE

75. Calcium antagonists and angina at rest

Author(s): Winniford M.D., Hillis L.D.

Citation: Cardiovascular Reviews and Reports, 1983, vol./is. 4/1(105-114), 0197-3118 (1983)

Publication Date: 1983

Abstract: Prinzmetal's variant angina is associated with transmural myocardial ischemia due to coronary arterial spasm with or without obstructive coronary artery disease. Unstable angina may be caused by a reduction in coronary blood flow due to spasm or enhanced platelet aggregability or to an increase in myocardial oxygen requirements precipitated by physical activity, emotional excitement, or other factors. Since calcium channel blocking agents both prevent coronary spasm and reduce one or more determinants of myocardial oxygen consumption, they should be useful in the treatment of both Prinzmetal's and unstable angina. Many clinical trials, including some randomized and
controlled studies, have convincingly demonstrated the efficacy of verapamil, nifedipine, and diltiazem in Prinzmetal's angina. Although there are few comparative trials, studies from this laboratory have found verapamil and nifedipine similar in efficacy. In unstable angina, three randomized and controlled clinical trials demonstrated that angina was reduced by verapamil in most but not in all patients. One large trial using nifedipine showed it to be superior to placebo, especially in patients whose angina was accompanied by ST-segment elevation. Only uncontrolled reports are available for diltiazem, but calcium antagonists, either alone or in combination with conventional medical therapy, appear effective in unstable angina.

Source: EMBASE

76. Calcium-channel blockers in vasospastic angina: A review

Author(s): Ambrosio G.

Citation: Postgraduate Medical Journal, 1983, vol./is. 59/SUPPL. 3(26-29), 0032-5473 (1983)

Publication Date: 1983

Abstract: The treatment of variant angina represents a major challenge to practising cardiologists and calcium-channel blockers have been used in this condition over the last few years. Considerable experience has been obtained with verapamil, nifedipine and diltiazem, and will be considered in this paper.

Source: EMBASE

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Available in fulltext at National Library of Medicine

77. Short- and long-term responses to diltiazem in patients with variant angina

Author(s): Feldman R.L., Pepine C.J., Whittle J., Conti C.R.

Citation: American Journal of Cardiology, 1982, vol./is. 49/3(554-559), 0002-9149 (1982)

Publication Date: 1982

Abstract: Short- and long-term effects of diltiazem on angina frequency were studied in 12 patients with variant angina (pain at rest with S-T elevation). Each patient first entered a double-blind short-term trial. Either diltiazem, in two dosage schedules (120 and 240 mg/day), or placebo was administered in a randomized double-blind program over 10 weeks. Significant decreases in frequency of angina were observed when diltiazem treatment periods were compared with placebo periods. Six patients were asymptomatic, one had 50 percent or greater decrease, and two had a smaller decrease in angina frequency. Two patients showed no important improvement during short-term diltiazem therapy. One patient experienced ventricular fibrillation in the placebo period and was advanced to treatment with open label diltiazem before responses could be ascertained in the double-blind trial. All other patients were then advanced to open label diltiazem therapy and followed up for an average of 16 months (range 8 to 23). Responses during the short-time trial accurately predicted responses during long-term therapy. Of the six patients who were asymptomatic during short-term therapy, five remained asymptomatic and one had rare episodes of angina. One other patient continued to have a good response (50 percent or greater decrease in angina frequency) and two other patients had a partial response. The two patients who did not respond during short-term therapy did not respond during long-term therapy.

Source: EMBASE

78. Inpatient treatment of unstable angina: Clinical perspective and sequential management

Author(s): Helfant R.H.
Abstract: In the last decade, increasing information has become available to the effect that an increase in coronary artery tone and coronary artery spasm play an important role in patients with various ischemic heart disease syndromes. Coronary spasm may be superimposed on a coronary vessel already severely obstructed by atherosclerosis. Conversely, spasm may occur in an artery that is only minimally involved with atherosclerosis. The majority of patients studied in the United States with both stable and unstable angina pectoris have underlying severe organic obstructive coronary artery disease. There has now emerged a considerable amount of information from several centers showing that the calcium-channel blockers of calcium-flux antagonists are highly effective in the treatment of stable and unstable angina pectoris. This report focuses on the uses and limitations of one of these agents, nifedipine, in patients with unstable angina and provides a sequential approach to their management.

Source: EMBASE
Abstract: To assess the efficacy of a new calcium entry blocker, diltiazem (Cardizem), for prophylaxis of Prinzmetal's angina, 48 patients were studied in randomized, multiple crossover multiclinic study (2 weeks single-blind, 8 weeks double-blind). Diltiazem dosage in one crossover phase was 120 mg per day; in the other, 240 mg per day. Therapeutic response was measured by patients' diary records of angina frequency and nitroglycerin tablet consumption. Treatment with 120 mg of diltiazem per day reduced angina by 41 percent from the entry placebo period and 20 percent from the paired placebo period (p < 0.005). Treatment with 240 mg of diltiazem per day reduced angina frequency by 68 percent from the entry placebo period and 43 percent from the paired placebo period (p < 0.01). There were similar reductions in nitroglycerin consumption. Adverse experience that may have been related to the medication were noted in only 5 percent of patients. There were no alterations in blood pressure or heart rate. The PR interval increased 3 per cent at the 240 mg dosage level. We conclude that diltiazem is an effective and safe agent for control of symptoms of Prinzmetal's angina.

Abstract: Fifty two patients underwent coronary artery bypass grafting between 1973 and 1979 for variant angina, defined as pain, usually at rest, associated with S-T segment elevation. Only patients with fixed occlusive coronary artery disease, defined as greater than 70% narrowing in diameter, were included. When fixed coronary artery stenosis is present, variant angina - whether presenting as stable, unstable, or postinfarction angina, and regardless of the number of vessels diseased - is effectively treated by myocardial revascularization. Preoperative intraaortic balloon pumping is a useful therapeutic adjunct in the unstable subset refractory to medical therapy. The results of revascularization in patients with Prinzmetal's variant angina and fixed coronary disease were no different from those in patients with classic angina pectoris of comparable clinical categories.

Abstract: The medical treatment of angina pectoris has made considerable progress over the past ten years with the introduction of beta-blockers, calcium inhibitors, and amiodarone and perhexiline maleate, in addition to the classical nitrate derivatives. The therapeutic choice derives from the clinical distinction between stable angina, which may be severe or moderate, and unstable angina, with or without a vasospastic component. Contraindications to each anti-anginal agent will also determine the therapeutic choice. In stable angina of moderate severity, fast-acting nitrate derivatives may be used alone. In more severe angina, the use of beta-blockers or, in the case of a contraindication, calcium inhibitors or amiodarone combined with long-acting nitrate derivatives is recommended. The same regimen is indicated for unstable angina except for Prinzmetal's angina due to coronary spasm and which should be treated with calcium inhibitors. The efficacy of medical treatment should not overshadow the fact that there are coronary lesions amenable to surgery and which should be detected by coronary angiography and ventriculography.

Publication Date: 1982

Source: EMBASE
This study was performed (1) to assess the efficacy and safety of verapamil in patients with variant angina, and (2) to compare verapamil and nifedipine in patients with this clinical syndrome. In 27 patients, placebo and verapamil were administered in a long-term, randomized, and double-blind study of 9 month's duration. In comparison to placebo, verapamil reduced the frequency of angina, nitroglycerin usage, transient episodes of electrocardiographic S-T segment deviation (as assessed by 2-channel Holter monitoring), and hospitalizations required for clinical instability. Subsequently, 23 patients were treated with nifedipine in a nonblind fashion for 2 months, and this agent exerted a beneficial effect similar to that of verapamil. Finally, gated equilibrium blood pool scintigraphy, performed in 10 patients at rest and during exercise during treatment with placebo, verapamil, and nifedipine, demonstrated that neither calcium antagonist caused a deterioration of left ventricular performance. Thus, (1) long-term oral verapamil and nifedipine are each superior to placebo and are of similar efficacy in patients with variant angina, and (2) neither agent adversely influences left ventricular performance in patients with relatively normal left ventricular function.

Source: EMBASE

85. Comparison of betablockers and calcium antagonists in the treatment of patients with coronary artery spasm

Author(s): Tilmant P.Y., Lablanche J.M., Thieleux F.P.

Citation: American Journal of Cardiology, 1982, vol./is. 49/4 II(976), 0002-9149 (1982)

Publication Date: 1982

Source: EMBASE

86. Intraoperative use of nifedipine for hemodynamic collapse due to coronary artery spasm following myocardial revascularization

Author(s): Kopf G.S., Riba A., Zito R.


Publication Date: 1982

Abstract: Sudden hemodynamic collapse in the perioperative period following myocardial revascularization may be due to coronary artery spasm. Nitroglycerin has been the standard treatment for this; however, it is not always effective, and the resultant morbidity and mortality are high. We present the case of a patient in whom sudden hemodynamic collapse due to coronary artery spasm was refractory to intravenously administered nitroglycerin but was relieved quickly with sublingually administered nifedipine. In certain selected patients in whom coronary artery spasm is responsible for myocardial collapse, the drug nifedipine may be effective in relieving this spasm and allowing for myocardial recovery.

Source: EMBASE

87. Randomized double-blind comparison of nifedipine and isosorbide dinitrate therapy in variant angina pectoris due to coronary artery spasm

Author(s): Ginsburg R., Lamb I.H., Schroeder J.S.

Citation: American Heart Journal, 1982, vol./is. 103/1(44-48), 0002-8703 (1982)

Publication Date: 1982

Abstract: Twelve patients were entered prospectively into a randomized double-blind study comparing the efficacy of nifedipine and isosorbide dinitrate (ISDN) in the treatment of variant angina pectoris due to coronary artery spasm. Using the diary technique, both anginal episodes and nitroglycerin tablets consumed were recorded during the pretrial, no drug period, and both active drug phases. During the baseline pretrial period, an average of
1.1 anginal episodes/day occurred with reduction to 0.28/day during nifedipine treatment and 0.39/day during ISDN treatment. Headache was the major side effect during ISDN treatment, occurring in 9 of 11 (81%) patients; and nonheart failure related pedal edema during nifedipine treatment, occurred in 4 of 12 (33%) patients. Intolerable side effects necessitating cessation of treatment, occurred in 2 patients during nifedipine treatment and in 3 patients during ISDN treatment. Patients preferred nifedipine over ISDN because of increased efficacy and fewer uncomfortable side effects. We conclude that both nifedipine and ISDN are effective therapy for coronary spasm, but that nifedipine was more effective and was preferred by the majority of patients.

Source: EMBASE

88. Verapamil kinetics in normal subjects and patients with coronary artery spasm

Author(s): Freedman S.B., Richmond D.R., Ashley J.J., Kelly D.T.

Citation: Clinical pharmacology and therapeutics, November 1981, vol./is. 30/5(644-652), 0009-9236 (Nov 1981)

Publication Date: November 1981

Abstract: Verapamil kinetics after intravenous and single and long-term oral dosing were studied in 12 patients with coronary artery spasm and four normal subjects. The decline in plasma concentration after intravenous doses was described by triexponential decay equation, with a terminal half-life (t1/2) of 5 hr. After a single oral dose the bioavailability was only 24%, probably because of the first-pass metabolism. During long-term oral doses of 80 mg every 6 hr, mean peak and trough concentrations were 255 +/- 90 and 105 +/- 38 ng/ml, and mean time at which peak concentration occurred was 1.2 +/- 0.5 hr. Norverapamil, the major active metabolite of verapamil, cumulated during oral dosing and may account for a small proportion of the overall pharmacologic effect. Mean elimination t1/2 during long-term oral dosing was longer than after a single dose (9.6 and 5.7 hr, P less than 0.05). Also, during long-term dosing the area under the curve was more than double that of a single dose, and the apparent oral clearance fell from 4.2 to 1.8 l/min (P less than 0.01). These changes may partly be explained by reduction in presystemic metabolism during long-term therapy. Kinetic predictions based on single doses will not give reliable estimates for long-term oral dosage. Less frequent dose schedule may be possible for prolonged therapy.

Source: EMBASE

89. Effect of verapamil and nifedipine on left ventricular function at rest and during exercise in patients with Prinzmetal's variant angina pectoris

Author(s): Johnson S.M., Mauritson D.R., Corbett J., Dehmer G.J., Lewis S.E., Willerson J.T., Hillis L.D.

Citation: The American journal of cardiology, June 1981, vol./is. 47/6(1289-1294), 0002-9149 (Jun 1981)

Publication Date: June 1981

Abstract: To assess the effects of verapamil and nifedipine on left ventricular function at rest and during exercise in patients with Prinzmetal's variant angina pectoris, 10 patients (6 men and 4 women with a mean age of 52 years) with variant angina were each treated for 2 months periods with placebo, verapamil (400 +/- 80 mg/day, mean +/- standard deviation [SD]) and nifedipine (82 +/- 31 mg/day). During the final week of each 2 month treatment period equilibrium gated blood pool scintigraphy was performed at rest and during exercise. At rest, heart rate during verapamil therapy was lower than during treatment with nifedipine; systolic blood pressure and left ventricular volumes and ejection fraction were similar for the three interventions. The maximal work load achieved was similar during placebo, verapamil and nifedipine therapy. At the maximal work load common to all three exercise studies, heart rate and systolic blood pressure were lower with verapamil than with placebo and nifedipine; ventricular volumes and ejection fraction were similar with the three agents. Thus, in patients with variant angina and a wide range of left ventricular function at rest, neither verapamil nor nifedipine significantly alters left ventricular volumes or ejection
fraction at rest or during exercise.

Source: EMBASE

90. Complete denervation of the heart (autotransplantation) for treatment of severe, refractory coronary spasm

Author(s): Bertrand M.E., LaBlanche J.M., Tilmant P.Y.

Citation: American Journal of Cardiology, 1981, vol./is. 47/6(1375-1378), 0002-9149 (1981)

Publication Date: 1981

Abstract: A 49 year old man had severe refractory Prinzmetal's variant angina and angiographically documented coronary arterial spasm of a dominant circumflex artery. The spasm was provoked by methergine (an ergot alkaloid) and seemed resistant to various forms of medical therapy including administration of nitrates, nifedipine, verapamil, diltiazem and amiodarone. The attacks of angina at rest persisted at the rate of 7 to 15/day and were frequently associated with atrioventricular (A-V) block. After unsuccessful plexectomy performed in another institution, the patient underwent complete cardiac denervation (produced by autotransplantation). The follow-up data have interesting implications in relation to treatment of refractory variant angina, as well as possible mechanisms of coronary arterial spasm.

Source: EMBASE

91. Effect of diltiazem in patients with variant angina: A randomized double-blind trial

Author(s): Pepine C.J., Feldman R.L., Whittle J.

Citation: American Heart Journal, 1981, vol./is. 101/6(719-725), 0002-8703 (1981)

Publication Date: 1981

Abstract: Effects of diltiazem on frequency of angina and nitroglycerin (NTG) consumption were studied in 12 patients with variant angina (rest pain with ST elevation). Either diltiazem in two dosage schedules (120 mg/day and 240 mg/day), or placebo was administered in a randomized double-blind program over 10 weeks. Significant decreases in angina frequency and TNG consumption were observed when diltiazem treatment periods were compared to placebo periods. Furthermore, when placebo periods following diltiazem were compared to placebo periods following placebo, significant 'carry-over' effect with respect to reduced angina frequency was observed. No patient had an increase in angina frequency or TNG consumption on diltiazem compared to placebo. No 'rebound effects' or changes in blood pressure or heart rate were observed. One patient complained of dry mouth on diltiazem. These findings, although in a limited number of patients, suggest that diltiazem is effective in decreasing angina frequency and TNG consumption in patients with variant angina. These encouraging results warrant evaluation of diltiazem in a larger population over a longer time period.

Source: EMBASE

92. Treatment of vasospastic angina pectoris at rest with nitroglycerin ointment: A short-term controlled study in the coronary care unit

Author(s): Salerno J.A., Previtali M., Medici A.

Citation: American Journal of Cardiology, 1981, vol./is. 47/5(1128-1133), 0002-9149 (1981)

Publication Date: 1981

Abstract: The effectiveness of nitroglycerin ointment in vasospastic angina pectoris at rest was evaluated in 10 patients selected for study. The study was performed after a 24 hour control period, and a randomized single-blind crossover experimental design was followed. Two percent nitroglycerin ointment (15 mg) or placebo ointment was administered every 6 hours for a period of 48 hours each; the first treatment period was followed by a second in which each preparation was used for a 24 hour period. All patients were hospitalized in the coronary care unit; an objective evaluation was carried out using a multichannel
electrocardiographic recording to assure recognition of the painless ischemic episodes. Coronary angiography showed critical stenosis of one or two vessels in 9 of the 10 patients; spasm was demonstrated in 3. Results of the ergonovine test were positive in nine of nine patients. Nitroglycerin ointment produced a significant reduction in the mean daily number of episodes during the first (12.5 +/- 3.9 versus 0.5 +/- 0.4, p<0.02) as well as the second treatment period (10.6 +/- 3.8 versus 0.6 +/- 0.4, p<0.02). These results demonstrate that nitroglycerin ointment provides effective, long-lasting protection against angina due to coronary spasm.

Source: EMBASE

93. A controlled trial of verapamil for Prinzmetal's variant angina

Author(s): Johnson S.M., Mauritson D.R., Willerson J.T., Hillis L.D.

Citation: New England Journal of Medicine, 1981, vol./is. 304/15(862-866), 0028-4793 (1981)

Publication Date: 1981

Abstract: To assess the efficacy and safety to verapamil in variant angina pectoris, we entered 16 patients in a double-blind, randomized trial of nine month's duration. During treatment with verapamil, the frequency of angina fell substantially (12.6 +/- 25.9 chest pains per week with placebo, 1.7 +/- 2.8 pains per week with verapamil, mean +/- S.D.; P < 0.01), as did the use of nitroglycerin tablets (14.4 +/- 34.4 tablets per week with placebo, 2.1 +/- 3.3 tablets per week with verapamil; P < 0.05). The number of hospitalizations for clinical instability was significantly lower with verapamil (P < 0.01). The number of episodes of transient ST-segment deviation during treatment with verapamil was reduced (33.1 +/- 39.3 ST-segment deviations per week with placebo, 7.7 +/- 11.7 deviations per week with verapamil; P < 0.01). Verapamil caused no side effects forcing a reduction in dosage or a discontinuation. We conclude that verapamil is safe and effective in the therapy of variant angina pectoris.

Source: EMBASE

94. Treatment of angina pectoris with diltiazem [French] LE TRAITEMENT DE L'ANGINE DE POITRINE PAR LE DILTIAZEM

Author(s): Grolleau R., Renevier D., Puech P.

Citation: Annales de Cardiologie et d'Angeiologie, 1981, vol./is. 30/5(361-365), 0003-3928 (1981)

Publication Date: 1981

Abstract: In a group of hospital patients with severe angina who resisted other powerful drugs, diltiazem was found to be very effective and well tolerated. It is therefore worth prescribing not only for Prinzmetal's angina and the forms where spasm is likely but also for chronic and invalidating angina where it has proved its value alone or in combination with beta blockers or amiodarone.

Source: EMBASE

95. Verapamil therapy in variant angina pectoris refractory to nitrates

Author(s): Freeman W.R., Peter T., Mandel W.J.

Citation: American Heart Journal, 1981, vol./is. 102/3 I(358-362), 0002-8703 (1981)

Publication Date: 1981

Abstract: Conventional therapy including nitrates, beta blockers, and surgical bypass has proved to be generally unsatisfactory in patients with variant angina of suspected vasospastic etiology. Recent evidence regarding the role of calcium in the pathogenesis of vascular smooth muscles spasm prompted an open study of the clinical effects of verapamil in seven patients with recurrent rest angina refractory to nitrates. The patients studied met strict clinical ECG and angiographic criteria for vasospastic angina. All patients had rapid (within 24 hours) and complete (without recurrence of symptoms) chronic response to oral verapamil therapy. The pharmacology of verapamil relating to the pathogenesis of vasospastic angina is delineated and guidelines for the clinical application
of the agent are presented.

**Source:** EMBASE

#### 96. Treatment of Prinzmetal's variant angina. Role of medical treatment with nifedipine and surgical coronary revascularization combined with plexectomy

**Author(s):** Bertrand M.E., Lablanche J.M., Tilmant P.Y.

**Citation:** American Journal of Cardiology, 1981, vol./is. 47/1(174-176), 0002-9149 (1981)

**Publication Date:** 1981

**Abstract:** This study describes three forms of treatment of Prinzmetal's variant angina. Coronary spasm, frequently found at coronary arteriography in patients with Prinzmetal's variant angina, can be treated with intravenous or intracoronary injection of nitroglycerin as well as of nifedipine. Nifedipine (0.2 mg) was injected directly into the involved artery in 12 patients and suppressed spasm in 9; in 3 patients, nifedipine increased coronary sinus flow, which had been decreased by spasm in one of the branches of the left coronary artery. Patients with Prinzmetal's variant angina who have spasm superimposed on atherosclerotic lesions can benefit from coronary arterial bypass grafting combined with partial denervation of the heart. This combination yielded acceptable results (83.4% favorable outcome); recurrence of attacks occurred in only 6.7% of this group. In those forms of angina in which spasm occurs in angiographically normal coronary arteries, therapy is essentially medical. In 13 patients treated with oral nifedipine (30 to 40 mg/day), suppression of attacks was achieved in 11 instances. During the period of treatment, the methergine provocative test, which had been consistently positive before treatment, converted to negative in 12 patients. Transient withdrawal of nifedipine caused recurrence of pain in two patients.

**Source:** EMBASE

#### 97. Coronary artery spasm during exercise: Treatment with verapamil

**Author(s):** Freedman B., Dunn R.F., Richmond D.R., Kelly D.T.

**Citation:** Circulation, 1981, vol./is. 64/1(68-75), 0009-7322 (1981)

**Publication Date:** 1981

**Abstract:** Six patients had documented coronary spasm and no coronary artery with organic obstruction > 50% developed angina and ST-segment elevation on exercise testing. Oral verapamil, 160-480 mg/day, prevented exercise-induced ischemia in all patients and increased maximal work capacity from 611 +/- 250 kpm to 808 +/- 160 kpm (p <0.02). In two patients, a relationship between the prevention of exercise-provoked ischemia and the plasma concentration of verapamil was demonstrated, and in one of these, the relationship had a diurnal pattern. Patients with variant angina may develop coronary spasm on effort and often respond to verapamil.

**Source:** EMBASE

**Full Text:**

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Available in fulltext at [Ovid](#)

#### 98. Management of variant angina

**Author(s):** Yasue H.

**Citation:** Archivos del Instituto de Cardiologia de Mexico, May 1980, vol./is. 50/3(249-257), 0020-3785 (1980 May-Jun)

**Publication Date:** May 1980

**Source:** EMBASE

#### 99. Refractory variant angina controlled with combined drug therapy in a patient with a single coronary artery
Author(s): Phaneuf D.C., Waters D.D., Dauwe F.
Citation: Catheterization and Cardiovascular Diagnosis, 1980, vol./is. 6/4(413-421), 0098-6569 (1980)
Publication Date: 1980
Source: EMBASE

100. Variant angina - correlation of clinical, electrocardiographic and angiographic features: results of medical and surgical management
Author(s): Saltups A.
Citation: Australian and New Zealand Journal of Medicine, 1980, vol./is. 10/6(622-628), 0004-8291 (1980)
Publication Date: 1980
Abstract: Angiographic coronary artery disease (CAD) was correlated with clinical features, electrocardiographic (ECG) findings and the results of medical management of aortocoronary bypass in 42 patients with angina at rest associated with transient ST segment elevation (variant angina). Patients were divided into three sub-sets based on the coronary arteriographic findings. On the basis of >75% luminal diameter narrowing, 28 patients had multiple vessel, ten had single vessel and four had minimal (<50% narrowing) CAD. The angiographic sub-sets did not differ significantly in age, sex, coronary risk factors, time from onset of rest pain to coronary angiography, or in the presence of arrhythmias during ischaemic episodes. Patients with multiple vessel CAD more commonly had prior coronary events (P<0.01), an abnormal baseline ECG (p<0.05) or both (P<0.001). These features did not distinguish patients with single vessel from those with minimal CAD. ST elevation in the inferior leads during episodes of myocardial ischaemia was more common (P<0.005) in patients with minimal CAD. Twenty-four patients with multiple vessel and six with single vessel CAD underwent aortocoronary by-pass surgery and relief of variant angina was achieved in all 25 long-term survivors during an average follow-up period of 36 months. Twelve patients (four of each sub-set) were treated medically. Among those with multiple vessel CAD, the small medically treated numbers precluded valid comparison of medical and surgical results. Patients with single vessel CAD followed for an average period of 17 months compared unfavourably with the operated group. Calcium antagonists or nitrates controlled variant angina in patients with minimal CAD followed for an average of 27 months.
Source: EMBASE

101. Calcium antagonists
Author(s): Opie L.H.
Citation: Lancet, 1980, vol./is. 1/8172(806-809+810), 0140-6736 (1980)
Publication Date: 1980
Abstract: The striking clinical differences between nifedipine, verapamil, perchexilene, and also other calcium antagonists suggest that there may be more than one calcium channel for calcium-antagonist drugs to act on. The predominant action on the A-V node is the explanation for the striking efficacy of intravenous verapamil in acute therapy of paroxysmal supraventricular tachycardia. As coronary-artery vasodilators, verapamil and nifedipine are first-line therapy for vasospastic or Prinzmetal's angina; and in angina of effort their efficacy is attributed to the peripheral vasodilating and unloading action. Often calcium antagonists can safely and usefully be combined with beta-blockers. But with verapamil and beta-blockade there is a risk that additive effects on the A-V node may result in heart block.
Source: EMBASE
Full Text: Available in fulltext at Elsevier

102. Nifedipine therapy for coronary-artery spasm. Experience in 127 patients
Author(s): Antman E., Muller J., Goldberg S.
We report clinical experience with the coronary vasodilator nifedipine in 127 patients with symptoms of myocardial ischemia associated with electrocardiographic or angiographic evidence, or both, of coronary-artery spasm. In the majority of patients conventional antianginal therapy including nitrates and beta-adrenergic blockers failed, and in one third of the patients at least one episode of ventricular tachycardia developed during an attack of angina. Nifedipine (40 to 160 mg every 24 hours) significantly reduced the mean weekly rate of anginal attacks from 16 to two (P<0.001). Similar marked reductions in the nitroglycerin requirement were noted. In 63 per cent of the patients complete control of anginal attacks was achieved, and in 87 per cent the frequency of angina was reduced by at least 50 per cent. Nifedipine was generally well tolerated, with only 5 per cent of the patients requiring termination of the drug because of intolerable side effects. This experience with nifedipine suggests that it is a highly effective drug for the treatment of coronary-artery spasm and variant angina.
long-acting vasodilators that are limited because of their short half-life and side effects when therapeutic doses are used. Alpha-adrenergic blockade has been effective in some patients but is frequently associated with intolerable side effects or apparent development of tolerance to the drug. Preliminary experience from a randomized doubleblind trial of diltiazem, a new calcium antagonist, has demonstrated a 90 percent reduction in pain episodes, with many patients becoming pain-free on the 240-mg daily dose. These data and the lack of adverse side effects demonstrate a dramatically effective therapy for patients with coronary artery spasm.

Source: EMBASE

106. Nifedipine: Offering successful treatment of refractory life-threatening coronary artery spasm

Author(s): Sol J.J., Fergusson D.J.G., Reeve R.

Citation: Hawaii Medical Journal, 1980, vol./is. 39/8(195-198), 0017-8594 (1980)

Publication Date: 1980

107. The clinical use of intravenous verapamil

Author(s): Schamroth L.

Citation: American Heart Journal, 1980, vol./is. 100/6 II(1070-1075), 0002-8703 (1980)

Publication Date: 1980

Abstract: The mechanisms of action and clinical application of verapamil - a calcium ion antagonist - are reviewed. Verapamil is effective and has important application in the treatment of coronary artery spasm, hypertensive crises, and supraventricular tachyarrhythmias.

Source: EMBASE

108. Efficacy of diltiazem for control of symptoms of coronary arterial spasm

Author(s): Rosenthal S.J., Ginsburg R., Lamb I.H.

Citation: American Journal of Cardiology, 1980, vol./is. 46/6(1027-1032), 0002-9149 (1980)

Publication Date: 1980

Abstract: To evaluate the efficacy of the calcium antagonist diltiazem for therapy of active coronary arterial spasm, 13 patients with clinical variant angina attributed to documented coronary arterial spasm completed a prospective randomized double-blind crossover trial of diltiazem (120 and 240 mg/day) versus placebo. Response was assessed with the diary technique measuring frequency of angina, consumption of nitroglycerin and percent of pain-free days. When 120 mg of diltiazem/day was compared with the paired placebo period there was a significant increase in percent of pain-free days (from 43 to 71 percent \[p=0.03\]), but no significant decrease in frequency of angina \(p=0.06\) or consumption of nitroglycerin \(p=0.32\). When 240 mg of diltiazem/day was compared with the paired placebo period there was a significant increase in percent of pain-free days (from 50 to 79 percent \(p=0.03\)) and a significant decrease in both frequency of angina (from 1.6 to 0.4 episodes/day \(p=0.03\)) and consumption of nitroglycerin (from 1.3 to 0.4/day \(p=0.01\)). Diltiazem was found to be a highly effective drug for control of symptoms of active coronary arterial spasm, without side effects and with excellent patient tolerance.

Source: EMBASE

109. Medical and surgical treatment of Prinzmetal's angina

Author(s): Schroeder J.S., Rosenthal S., Lamb I., Ginsburg R.

Citation: Cleveland Clinic Quarterly, 1980, vol./is. 47/3(168-170), 0009-8787 (1980)

Publication Date: 1980
Abstract: Nitroglycerin remains highly effective for the treatment of angina pain related to coronary artery spasm. Surgical therapy is associated with high risks and is usually not curative. Calcium antagonists, such as diltiazem, appear to be highly effective for the long-term medical therapy of this disease.

Source: EMBASE

110. Treatment of spasm of the coronary artery with nifedipine

Author(s): Bertrand M.E., Lablanche J.M., Tilmant P.Y.

Citation: European Heart Journal, 1980, vol./is. 1/SUPPL. B(65-69), 0195-668X (1980)

Publication Date: 1980

Abstract: In nine out of 13 cases in which, under direct visual control, 0.2 mg of nifedipine was injected into a coronary artery in spasm, prompt vasodilation was noted. In 37 other patients, in whom spasm of the coronary artery had been documented at another time, the oral administration of 30 to 60 mg nifedipine led to the suppression of all pain attacks in 26 individuals (71%) and to a significant reduction of these attacks in another four (14%). Nifedipine is a powerful agent capable of relieving coronary artery spasm in the majority of patients.

Source: EMBASE

111. Comparative study of calcium-ion antagonists in patients with variant angina

Author(s): Walters D.D., Theroux P., Szlachcic J., Mizgala H.F.

Citation: Clinical and Investigative Medicine, 1980, vol./is. 3/1-2(129-135), 0147-958X (1980)

Publication Date: 1980

Abstract: The effect of treatment in variant angina is difficult to evaluate because of spontaneous variations in symptoms. Therefore, we performed ergonovine tests in 31 patients with typical variant angina in our coronary care unit before and during treatment with calcium ion antagonists. All 31 had angina and ST elevation during the control test; 9 patients retested without treatment were all positive at the same or adjacent ergonovine dose, demonstrating reproducibility of the test results. During treatment with nifedipine, 16 of 28 patients had negative tests, 7 improved and 6 were unimproved. Of the 22 patients treated with diltiazem, 10 had negative tests, 8 were improved and 4 were unimproved. Of the 23 treated with verapamil, 10 had negative tests, 7 had improved tests and 6 were unimproved. Only 4 of the 13 patients treated with perhexiline had negative tests, 2 improved and 7 did not. The results of the ergonovine tests before and during treatment correlated well with the level of clinical activity of the disease. We conclude that calcium-ion antagonist drugs, particularly nifedipine, diltiazem and verapamil, can block ergonovine-induced episodes of variant angina.

Source: EMBASE

112. Coronary artery spasm: a review

Author(s): Richmond D.R.

Citation: Journal of the Royal Society of Medicine, 1980, vol./is. 73/8(570-575), 0141-0768 (1980)

Publication Date: 1980

Abstract: Traditionally, myocardial ischaemia was considered to result from an imbalance between a fixed limitation of myocardial oxygen supply and a variable myocardial oxygen demand. The oxygen supply was limited by atherosclerotic lesions encroaching on the lumen of the major epicardial arteries and obstructing blood flow. The oxygen demand could be varied by alterations in preload, afterload, heart rate and contractility, principally from changes in physical activity and levels of stress. This concept was unable to explain some important components in the spectrum of myocardial ischaemia, such as nocturnal and rest angina, and myocardial ischaemia or infarction with angiographically normal
coronary arteries. The importance of coronary spasm in the ischaemic syndrome was therefore re-established, but its relative contribution remained to be determined. In patients with variant angina a continuous spectrum of fixed atherosclerotic disease has been documented at angiography, from normal coronary arteries to high-grade obstructive disease. We have divided patients with variant angina on an arbitrary basis into two groups depending on the presence or absence of severe (> 70%) fixed obstruction. This division implies angiographic study early after presentation and this is recommended because the two groups are managed differently and cannot be distinguished by other means. Thus coronary spasm appears to be reasonably well established as the prime mechanism for the episodic reduction of coronary blood flow causing severe ischaemia in Group 1 patients. It clearly has an important role in Group 2 patients, but alternative mechanisms may also operate and the require further elucidation before a firmer understanding can emerge. Sudden unexpected death is a most important case of mortality in ischaemic heart disease and has been considered to be due to primary arrhythmia. The possibility of coronary spasm being a more frequent contributory factor in sudden death remains of interest but is unsupported at the present time.

Source: EMBASE

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CINAHL results for coronary artery spasm OR prinzmetal’s angina

Did the widespread use of long-acting calcium antagonists decrease the occurrence of variant angina?

Author(s): Sueda S, Kohno H, Fukuda H, Uraoka T
Citation: CHEST, 01 December 2003, vol./is. 124/6(2074-2078), 00123692
Publication Date: 01 December 2003

Abstract: BACKGROUND: We have not often encountered variant angina (VA) since the use of long-acting calcium antagonists (L-CAs) became widespread. OBJECTIVES: This study examined the frequency of VA retrospectively. METHODS: and results: We diagnosed angiographically confirmed coronary spastic angina (CSA) in 349 consecutive patients using selective spasm provocation tests from January 1991 to December 2002. During this period, 3,148 diagnostic cardiac catheterizations and 1,515 selective spasm provocation tests were performed. Seventy-four of these 349 patients (21.2%) had VA. Coronary spasms were defined as transient luminal narrowings of > 99%, and VA was defined as an ST elevation during spontaneous attacks or noninvasive stress tests. We classified the 12 years of the study into four periods of 3 years each. No tendency to decrease for the ratio of the number of patients with CSA and the number of selective spasm provocation tests was observed among the four time periods (18%, 24%, 32%, and 23%, respectively). However, the number of patients with VA (28, 33, 9, and 4) and the VA/CSA ratio (32%, 28%, 14%, and 5%, respectively) in the four group significantly decreased. The frequency of administration of calcium antagonists (CAs) before hospital admission (49% vs 33%, respectively; p < 0.05) was significantly higher in the last time period (from 2000 to 2002) than in the first period (from 1991 to 1993). L-CAs were administered in > 90% of CSA patients who had been medicated with CAs before hospital admission in the last period (from 2000 to 2002), while L-CAs were administered in only 20% in the former period (from 1991 to 1993). The administration of statins and angiotensin-converting enzyme inhibitors/angiotensin receptor blockers before hospital admission gradually increased according to the period passed, but not significantly. CONCLUSION: The frequency of VA has decreased in Japan, possibly due to the widespread use of therapy with L-CAs.

Source: CINAHL

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Available in fulltext at Grantham Hospital Staff Library; Note: Username:
2. Calcium channel blockers: a guide to tailoring therapy for your patient.

Author(s): Prisant LM

Citation: Consultant (00107069), 01 January 1997, vol./is. 37/1(146-153), 00107069

Publication Date: 01 January 1997

Abstract: Despite controversy about the safety of calcium channel blockers, these agents play a key role in the management of hypertension, arrhythmias, and angina. Verapamil is appropriate for patients who have hypertension associated with diastolic dysfunction, hypertrophic cardiomyopathy, or hyperkinetic myocardial contractility, diltiazem and amlodipine are often used for prominent angina. Other options for hypertension include amlodipine, felodipine, isradipine, nicardipine, sustained-release nifedipine, and nisoldipine. IV nifedipine is the only calcium antagonist indicated for hypertensive emergencies. Verapamil and diltiazem are useful for managing certain supraventricular arrhythmias and heart failure secondary to diastolic dysfunction. All calcium channel antagonists are effective in Prinzmetal's angina. While these agents are not the first-line therapy for unstable angina, they may be appropriate for patients whose conditions are refractory to treatment with beta-blockers, aspirin, heparin, and nitrates.

Source: CINAHL


Author(s): Cross JA

Citation: AACN Nursing Scan In Critical Care, 01 May 1993, vol./is. 3/3(20-21), 10558349

Publication Date: 01 May 1993

Abstract: SYNOPSIS: This CEU article reviews the underlying pathophysiology of unstable angina (new onset angina, spontaneous rest angina, crescendo angina, acute coronary insufficiency, variant angina, and post-MI angina) with an emphasis on the associated morbidity and mortality. From 15% to 25% of patients with unstable angina experience a MI within the first week after the event, making this a clinical condition that demands immediate and expert medical and nursing attention. Diagnostic work-up generally involves angiography, low-level exercise stress test, and thallium scintigraphy. Medical therapy remains controversial, with nitrate therapy combined with calcium channel blockers or beta blockers. Antiplatelet or anticoagulant therapy with aspirin or heparin is important in preventing thrombus formation in unstable angina. Surgical revascularization and experimental studies using thrombolytic therapy in the treatment of unstable angina are also discussed. Nursing implications, along with a care plan in a nursing diagnosis format, conclude the article. [Original article accession number: 1993153974 (CEU, exam questions, review, tables/charts)]

Source: CINAHL


Author(s): Simpson RJ Jr.

Citation: Hospital Formulary, 01 June 1984, vol./is. 19/6(461-465), 00986909

Publication Date: 01 June 1984

Source: CINAHL

5. Variant angina. Update on diagnosis and current therapy.

Author(s): McAuley BJ, Ginsburg R
Remnant-like particle cholesterol is a major risk factor for myocardial infarction in **vasospastic angina** with nearly normal coronary artery


... may speculate that RLP-C contributes to thrombus formation at the time of coronary artery spasm. ... J. Sasaki and K. Arakawa, Low serum apolipoprotein level in patients with **vasospastic angina**. ... and A. Kuroiwa, Comparison of serum lipids values in **variant angina** pectoris and ...

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S Takagi, Y Goto, E Hirose, M Terashima… - … journal: official journal …, 2004

... Successful treatment of **vasospastic angina** with a coronary stent. ... (PMID:11174913) Koenig W. Cardiol Rev [2001]. **Coronary artery spasm** and vascular nerve lesion. ... Heart J. [1985]. Medroxyprogesterone interferes with ovarian steroid protection against **coronary vasospasm**. ...

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Nifedipine therapy for **coronary-artery spasm**

E Antman, J Muller, S Goldberg, R MacAlpin… - New England Journal ..., 1980


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... study of eccentric and concentric coronary stenosis vasomotion in patients with **prinzmetal’s variant angina** and patients ... (1997) Disparity between serotonin- and acetylcholine-provoked **coronary artery Spasm**. ... (1991) Lack of association of migraine with **coronary vasospasm**. ...

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Increased QT dispersion in patients with **vasospastic angina**

M Suzuki, M Nishihara, M Arita, T Ashikaga… - Circulation, 1998 - Am Heart Assoc

... was no difference in the degree or severity of **coronary vasospasm** between patients ... specificity of intracoronary injection of acetylcholine for the induction of **coronary artery spasm**. ... J. Carlos Kaski Increased QT dispersion in patients with Prinzmetal’s variant angina and cardiac ...

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D Miller, DD Waters, W Warnica, J Szlachcic... - New England Journal ..., 1981 - nejm.org

... angina as a manifestation of alpha-adrenergic receptor-mediated **coronary artery spasm**: documentation by ... B2 in the peripheral blood of patients with Prinzmetal’s angina ... (2006) **Coronary vasospasm**—induced acute diastolic dysfunction in a patient with Raynaud's phenomenon ...

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... Sensitivity and specificity of intra coronary injection of acetylcholine for the induction of coronary artery spasm. ... Multivessel coronary spasm in patients with variant angina: a study with intracoronary ... of autonomie nervous system in the pathogenesis of Prinzmetal's variant form of ...
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Clinical observation of spontaneous anginal attacks and multivessel spasm in variant angina pectoris with normal coronary arteries: evaluation by 24-hour 12-lead ...
... Prinzmetal M, Kennamer R, Merliss R, Wada T, Bor N. Angina pectoris. ... RF Dunn, DT Kelly, N Sadick and R Uren, Multivessel coronary artery spasm, Circulation 60 (1979), pp. ...
... S Goldberg and JW Hirshfeld et al., Refractory ergonovine-induced coronary vasospasm: importance of ...
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Stenting for coronary artery spasm
S Khatri, JG Webb, RG Carere… - Catheterization and …. , 2002 - Wiley Online Library
... In such circumstances, stents may represent an adjunct in the management of carefully selected patients with focal epicardial coronary artery spasm refractory to medical therapy. ... of Prinzmetal's variant angina. ... coronary vasospasm of proximal left anterior descending artery. ...
Cited by 18 - Related articles - BL Direct - All 3 versions

Prinzmetal's variant angina
S Mayer… - Clinical cardiology, 1998 - Wiley Online Library
... Additional adverse prognostic frictors include the presence of multivessel coronary vasospasm, left ventricular ... S: Statistical analysis of clinical risk factors for coronary artery spasm: Identi- fication ... RM, Winniford MD, Stem L, Johnson SM, Hillis LD: Prinzmetal's variant angina: Is it ...
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Management of vasospastic angina—role of nicorandil
JC Kaski - Cardiovascular drugs and therapy, 1995 - Springer
... 9. Vanhoutte P, Shimokawa H. Endothelium-derived relaxing factor and coronary vasospasm. ... Prinzmetal M, Kennamer R, Merliss R, et al. ... Spontaneous coronary artery spasm in variant angina is caused by a local hyper- reactivity to a generalized constrictor stimulus. ...
Cited by 15 - Related articles - BL Direct - All 3 versions

Prinzmetal's angina
KB Keller… - American Journal of Critical Care, 2004 - AACN
... a manifestation of alpha-adrenergic receptor-mediated coronary artery spasm: documentation by ... Frequency of provoked coronary vasospasm in patients undergoing coronary arteriography with ... Treatment of Prinzmetal's variant angina: role of medical treatment with nifedipine ...
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