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### Literature search results

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#### Search details

Is there any evidence that smoking is associated with ocular ischaemic syndrome?

#### Resources searched

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

**Database search terms:** "ocular ischaemic syndrome"; "ocular ischemic syndrome"; ocular adj2 (ischaem* OR ischem*); OCULAR ISCHEMIC SYNDROME; ISCHEMIA AND exp EYE; smok*; exp SMOKING; tobacco; TOBACCO PRODUCTS; TOBACCO SMOKE POLLUTION; cigarette*; cigar*

**Evidence search string(s):** "ocular ischaemic syndrome" OR "ocular ischemic syndrome" OR "ocular ischaemic syndromes" OR "ocular ischemic syndromes"

**Google search string(s):** ("ocular ischaemic syndrome" OR "ocular ischemic syndrome") (smoking OR smoke OR smokes OR smoker OR smokers OR smoked OR tobacco OR cigarette OR cigarettes OR cigar OR cigars)

#### Summary

There is limited research available on the influence of smoking on ocular ischaemic syndrome.

#### Guidelines and Policy

None found.
<table>
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<th>Evidence-based reviews</th>
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<td>None found.</td>
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**Published research – Databases**

1. **Ophthalmic features of systemic diseases**
   - **Author(s)** Hazin R., Lum F., Daoud Y.J.
   - **Citation:** Annals of Medicine, May 2012, vol./is. 44/3(242-252), 0785-3890;1365-2060 (May 2012)
   - **Publication Date:** May 2012
   - **Abstract:** The eye is intricately integrated with the functions of the body. Ocular changes may precede or run concurrently with various systemic conditions and often represent important prognostic indicators of disease progression. In addition to a thorough diagnostic evaluation and treatment of underlying processes, individuals with systemic diseases and concurrent ocular changes may need comprehensive ophthalmic examination to reduce the risk of visual impairment and morbidity. In this review the authors highlight the clinically relevant ocular signs that occur parallel with systemic conditions. In particular, the study focuses on the varied clinical presentations that can lead to rapid diagnosis to improve management of eye disorders that accompany systemic diseases. 2012 Informa UK, Ltd.
   - **Source:** EMBASE

2. **The potential role of epigenetics in ocular diseases**
   - **Author(s)** Nickells R.W., Merbs S.L.
   - **Citation:** Archives of Ophthalmology, April 2012, vol./is. 130/4(508-509), 0003-9950;1538-3601 (April 2012)
   - **Publication Date:** April 2012
   - **Source:** EMBASE
   - Available in fulltext from Archives of Ophthalmology at Highwire Press
   - Available in fulltext from Archives of Ophthalmology at Silverchair Information Systems

3. **Clinical features of chronic ocular ischemic syndrome**
   - **Author(s)** Zhang X.-C.
   - **Citation:** International Journal of Ophthalmology, November 2010, vol./is. 10/11(2202-2203), 1672-5123 (November 2010)
   - **Publication Date:** November 2010
   - **Abstract:** AIM: To analyze the characteristics, risk factors and prognosis of the chronic ocular ischemic syndrome, and to provide the basis on early diagnosis and prevention therapy of this disease. METHODS: Detailed clinical data of 12 patients with chronic ocular ischemic syndrome were analysed retrospectively, including gender, age, medical history, routine eye examination, color Doppler ultrasound and head MRI. The results of treatment and examination of visual function were analyzed. RESULTS: Totally 12 patients(mean age 69 years, male/ female ratio of 2:1) systemic complications, including hypertension, cardiovascular disease, high cholesterol, high blood sugar, tobacco and alcohol addiction were analyzed. The time of Vision decreased (from no light perception to 0.12) was from a month to three years, of which 6 cases decreased vision with black pot history in the first half year. Iris neovascularization in 5 cases, high intraocular pressure in 4 cases, fundus characteristic; some small arteries without blood, veins expansion with different degrees and without tortuous, retinal hemorrhage and small pieces cotton wool spots, depending on peripapillary neovascularization and altypical macular cherry red. Color Doppler examination showed the formation of carotid artery plaque, stenosis; ophthalmic artery, central retinal artery present slow blood flow, no blood or speeded up blood flow; FFA of 8
cases presented arterial forward phenomenon, time extension in arm retinal circulation and long retinal circulation time. The head MRI examination in 9 cases, of which the lacunar infarcts, change of white matter ischemic and old cerebral malacia were found in 7 cases. 12 patients underwent dilation of blood vessels and the microcirculation therapy treatment without obvious efficacy. CONCLUSION: Early diagnosis of ocular ischemic syndrome should rely on the FFA and Doppler ultrasound; and advanced cases should be combined with the original treatment of heart, neurology, as the treatment of pure vasodilators and lived blood circulation have poor effect.

Source: EMBASE

4. Fifty-eight cases of ocular ischemic diseases caused by carotid artery stenosis

Author(s) Luo R.-J., Liu S.-R., Li X.-M., Zhuo Y.-H., Tian Z.

Citation: Chinese Medical Journal, October 2010, vol./is. 123/19(2662-2665), 0366-6999 (October 5 2010)

Publication Date: October 2010

Abstract: Background: The blood supply to the eye comes from the retinal central vascular system of the ophthalmic artery and the ciliary vascular system. The ophthalmic artery stems from the ipsilateral internal carotid artery. If occlusion or stenosis occurs in the carotid artery, the blood perfusion to the ophthalmic artery becomes insufficient, leading to signs and symptoms of anterior and posterior ocular ischemia. The objective of this study was to evaluate the clinical characteristics and risk factors of ocular ischemic diseases caused by carotid artery stenosis. Methods: This study was a retrospective review of 145 patients with carotid artery stenosis. Fifty-eight patients who had symptoms of ocular ischemic disease caused by carotid artery stenosis formed group A and the other 87 patients who only had carotid artery stenosis formed group B. We analyzed the causes and course of disease, and relative risk factors, by comparing the two groups. Results: The degree of carotid artery stenosis in group A was higher than that in group B. And group A had a greater decrease of ophthalmic artery flow. Male, hypertension, hyperlipidemia, and smoking were significantly related to carotid artery stenosis. Amaurosis fugax was the most common ocular symptom in group A. The ocular ischemic diseases mainly included ischemic optic neuropathy, central/branch retinal artery occlusion, ophthalmoplegia externa, and ocular ischemic syndrome. Conclusions: Carotid artery stenosis correlates with ocular ischemic diseases. Ophthalmologists must observe for ocular symptoms, which were the onset symptoms in some patients.

Source: EMBASE

5. Clinical characteristics of patients with ischemic ocular nerve palsies and lacunar brain infarcts: A retrospective comparative study

Author(s) Pollak L., Kessler A., Rabey M.J., Hartmann B., Goldhammer Y.

Citation: Acta Neurologica Scandinavica, May 2005, vol./is. 111/5(333-337), 0001-6314 (May 2005)

Publication Date: May 2005

Abstract: Background - Ischemic ocular motor nerve palsies (IOMP) and lacunar brain infarcts share a similar pathological mechanism. The clinical characteristics of patients as well as the protective role of aspirin should therefore be similar in both conditions. Methods - The medical records of 107 consecutive patients with IOMP and 160 patients with lacunar cerebrovascular accidents (CVA) were reviewed and analyzed with respect to patient characteristics, vascular risk factors, and aspirin intake. The data on patients with and without aspirin were compared within each group as well as between both groups. Results - Hyperlipidemia, smoking, high carotid stenosis (> 70%) and the presence of more than one vascular risk factor in an individual patient were found to be more common in patients with lacunar brain infarcts regardless of aspirin intake. Absence of vascular risk factors was encountered more in IOMP patients. The recurrence of lacunar CVA was significantly higher than recurrence of IOMP. A history of Bell's palsy was more common in IOMP patients than in patients with lacunar CVA. Within the IOMP group, the prevalence of vascular risk factors did not differ between the aspirin and non-aspirin group. Ischemic
heart disease (IHD), CVA and recurrence were found more often in the aspirin group. Within the CVA group hypertension, IHD, cardiac arrhythmia and recurrence rate were more common in the aspirin group whereas smoking was found to be more common in the non-aspirin group of patients. Conclusions - Arteriosclerosis is the main cause of lacunar CVA and IOMP. However, IOMP depends less on the presence of vascular risk factors than does lacunar CVA. Furthermore, aspirin - at least at low doses - does not seem to have a protective effect on either of these conditions, but more extensive prospective studies of homogeneous groups of patients are needed to clarify the preventive role of antiplatelet agents in IOMP. Blackwell Munksgaard 2005.

Source: EMBASE
Available in fulltext from Acta Neurologica Scandinavica at EBSCOhost

6. Ocular ischemic syndrome, central retinal artery obstruction, and branch retinal artery obstruction

Author(s) Santiago M.E., Wafapo H., Corbett J.J., Biller J.

Citation: Seminars in Cerebrovascular Diseases and Stroke, March 2004, vol./is. 4/1(39-52), 1528-9931 (March 2004)

Publication Date: March 2004

Abstract: Ocular ischemic syndrome is a condition characterized by visual loss described mainly in males 50 years and older secondary to carotid artery stenosis or occlusion. Loss of vision results from chronic ischemic changes to the anterior and posterior segments of the eye. Pain around the eye has been reported in up to 40% of the patients. Also, these patients may report difficulty adjusting to a darker environment after light exposure. Neovascularization of the iris and retina is common. Associated systemic conditions include arterial hypertension, coronary artery disease, diabetes mellitus, cerebrovascular disease and tobacco use. Digital subtraction angiography can demonstrate carotid artery obstruction in the majority of patients, however less invasive procedures such as contrast enhanced MR angiography in combination with duplex ultrasound correlates with the degree of carotid stenosis. Carotid endarterectomy in addition to management of neovascularization of iris or retina is the treatment of choice, however, the prognosis for visual recovery is still limited. Acute retinal arterial obstruction is a dramatic and usually irreversible painless loss of vision that can involve the central retinal artery or an arterial branch, most commonly secondary to cerebrovascular and cardiovascular disease. Other associated conditions include various hematological, infectious and metabolic abnormalities. In central retinal artery occlusion a common finding includes a cherry red spot in the macula. A careful evaluation of all potential sources of emboli is essential in this condition since there is a strong association with fatal outcome due to cardiovascular disease and stroke. Other etiologies such as coagulopathies, collagen vascular diseases and viral infections have been identified in patients with retinal arterial obstructions. Despite aggressive intervention the visual prognosis of central retinal artery occlusion remains poor. 2004 Elsevier Inc. All rights reserved.

Source: EMBASE

7. Isolated ocular ischemic syndrome with no cerebral involvement in common carotid artery occlusion

Author(s) Karacostas D., Terzidou C., Voutas S., Rafou J., Artemis N., Georgiadis N.

Citation: European Journal of Ophthalmology, 2001, vol./is. 11/1(97-101), 1120-6721 (2001)

Publication Date: 2001

Abstract: Purpose. The ocular ischemic syndrome (OIS) is sometimes a complication of common carotid artery (CCA) occlusion causing complete interruption of blood flow through both the internal and external carotid arteries we investigated a single case of an isolated als that remained undiagnosed for two years, because the underlying CCA pathology caused no cerebral involvement. Case Report. A 57-year-old man presented with subacute painful visual loss in the right eye in a setting of hypertension, smoking and coronary artery
disease. Results. Neurological examination, a brain CT and MRI scan were all normal. Extensive laboratory work-up excluded small artery disease, inflammatory arteritis or cardiac causes of retinal embolism. Ophthalmologic evaluation and fluorescein angiography gave findings consistent with OIS, while vascular ultrasound evaluation and aortic arch angiography verified right CCA occlusion accompanied by an extensive collateral network. Conclusions. Had this patient been referred sooner for a simple carotid artery work-up, both the CCA occlusion and the als could probably had been prevented.

Source: EMBASE


Author(s) Wakakura M, Ishikawa S

Citation: Current Opinion in Ophthalmology, December 1994, vol./is. 5/6(18-22), 1040-8738;1040-8738 (1994 Dec)

Publication Date: December 1994

Abstract: One of the most susceptible sites to vascular diseases is the optic nerve head. By innovative approaches using morphometry and in situ hybridization, vascular and extracellular characteristics of the human optic nerve head were examined. Nonarteritic ischemic optic neuropathy occurs due to vascular insufficiency within the optic nerve head. Various local and systemic risk factors have been proposed among which smoking and acute hypotension are now included. Anatomically abnormal discs such as the small optic disc, tilted disc, and optic nerve drusen are recognized as "disks at risk" and hyperopia may be an additional predisposing factor. Ocular, neurological, and vascular disorders due to giant cell arteritis were reviewed. Intravenous high-dose methylprednisone should be administered in certain cases. Differentiating nonarteritic from arteritic ischemic optic neuropathy is sometimes difficult. Isolated choroidal ischemia or choroidal filling delay may be an indication of giant cell arteritis. Studies have been conducted on the vascular event, amaurosis fugax (transient monocular visual loss), and the results of some of these studies are discussed.

Source: Medline

9. Risk factors for ischemic ocular motor nerve palsies.

Author(s) Jacobson DM, McCanna TD, Layde PM

Citation: Archives of Ophthalmology, July 1994, vol./is. 112/7(961-6), 0003-9950;0003-9950 (1994 Jul)

Publication Date: July 1994

Abstract: OBJECTIVE: To identify risk factors associated with neurologically isolated ischemic ocular motor nerve palsies.DESIGN: Case-control study.SETTING: Multispecialty clinic providing primary, secondary, and tertiary care in central and northern Wisconsin.STUDY PARTICIPANTS: After applying strict, predetermined, inclusion and exclusion criteria to the medical records of patients with ocular motor nerve palsies, 65 case patients 50 years of age or older were identified with ischemic ophthalmoplegia. A control subject, matched for sex and exact year of age, was randomly selected for each case patient from individuals undergoing a comprehensive medical evaluation.MAIN OUTCOME MEASURES: Prevalence of potential risk factors in case patients and controls, including diabetes, hypertension, hypercholesterolemia, coronary artery disease, left ventricular hypertrophy, adiposity, tobacco use, prior ocular motor nerve palsy, and hematocrit. Risk factors were assessed using standardized definitions.RESULTS: After adjustment for potential confounding factors, significant risk factors and their associated odds ratios (ORs) and 95% confidence intervals (CIs) were as follows: previously diagnosed diabetes, OR = 5.75 (CI = 1.68 to 19.77); left ventricular hypertrophy, OR = 5.20 (CI = 1.30 to 20.82); and, hematocrit (per percentage increase), OR = 1.35 (CI = 1.13 to 1.61).CONCLUSION: In addition to the generally accepted risk factor of diabetes, left ventricular hypertrophy and elevated hematocrit appeared to be important determinants of ischemic ocular motor nerve palsy. Additional studies should be undertaken to confirm these findings.
10. Ischemic optic neuropathy after lumbar spine surgery.

Author(s) Katz DM, Trobe JD, Cornblath WT, Kline LB

Citation: Archives of Ophthalmology, July 1994, vol./is. 112/7(925-31), 0003-9950;0003-9950 (1994 Jul)

Publication Date: July 1994

Abstract: OBJECTIVE: Study of clinical features of ischemic optic neuropathy (ION) developing as a complication of multilevel lumbar spine surgery. DESIGN: Review of all cases of ION that developed within 2 weeks of spine surgery at two academic institutions from 1990 to 1992, and a review of adequately reported cases of ION after other non-ophthalmic procedures. RESULTS: Four new cases are reported in patients who ranged in age from 41 to 65 years. All four had undergone uneventful but prolonged (8 to 9 hours) spine surgery, during which blood pressure was deliberately maintained between 85 and 100 mm Hg systolic and 45 to 65 mm Hg diastolic to reduce bleeding. Hemoglobin values fell 30 to 78 g/L during surgery. Arteriosclerotic risk factors, including systemic hypertension, diabetes, coronary artery disease, and smoking, were present in three cases. There was no evidence of orbital soft-tissue injury, retinal artery occlusion, or other neurologic deficits. The combination of hypotension and anemia has been noted in most of the 30 previously well-documented cases of ION after other non-ophthalmic procedures. CONCLUSIONS: Multilevel lumbar laminectomy should be added to the list of procedures that may produce ION as an isolated complication. Deliberate hypotension maintained for long operative periods in patients with arteriosclerotic risk factors may be the cause.
More

Analysis and curative effect of ocular ischemic diseases caused by carotid artery stenosis

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... 14 patients (12 males 2 females; mean age 62.3±5.4 years; range 47 to 71 years) with ocular ischemic syndrome due to internal carotid artery stenosis (>80% stenosis), who were to be treated by a carotid endarterectomy. The risk factors were identified as smoking in 12 ...

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VA Lyons-Wait, SF Anderson… - Optometry & Vision …, 2002 - journals.lww.com

... Patients with HSCAS were 1.8 times more likely to have retinal vascular occlusions, 1.9 times more likely to have normotensive glaucoma, 2.4 times more likely to have peripheral retinal hemorrhages, and 2.6 times more likely to be smokers, although none of these factors were ...

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Influence of age, systemic blood pressure, smoking, and blood viscosity on orbital blood velocities.

TH Williamson, GD Lowe, GM Baxter - British journal of ophthalmology, 1995 - bjo.bmj.com

... as one ofthe following: (1) Non-smoker, (2) ex-smoker, (3) smokers less than 20 cigarettes each day, (4) smokers at least ... There were no significant differences found Smoker Non-smoker Age(years) 49-0(17-9) 49-1(16-9) Systolic blood pressure (mm ...

EDV CIGARETTE SMOKING ...

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YM Wong, JB Clark, IB Faris, CB Styles, JA Kiss - Eye, 1998 - nature.com

... | PubMed | ISI | ChemPort | Williamson TH, Lowe GDO, Baxter GM. Influence of age, systemic blood pressure, smoking, and blood viscosity on orbital blood velocities. ... The ocular ischemic syndrome. III. ... Color Doppler imaging of the ocular ischaemic syndrome. ...

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R Malhotra, K Gregory-Evans - British journal of ophthalmology, 2000 - bjo.bmj.com

... would include aspirin or another antiplatelet drug, treatment of hypertension and
diabetes, and advice to stop smoking.28 The ... Mizener JB.; Podhajsky P.; Hayreh SS. (1997) Ocular ischemic syndrome. ... [Medline]. «: Brown GC.; Magargal LE. (1988) The ocular ischaemic syndrome ...
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Ophthalmic features of systemic diseases
R Hazin, F Lum, YJ Daoud - Annals of Medicine, 2012 - informahealthcare.com
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