Please find below the results of your literature search request.

If you would like the full text of any of the abstracts included, or would like a further search completed on this topic, please let us know.

We’d appreciate feedback on your satisfaction with this literature search. Please visit [http://www.hello.nhs.uk/literature_search_feedback.asp](http://www.hello.nhs.uk/literature_search_feedback.asp) and complete the form.

Thank you

**Literature search results**

<table>
<thead>
<tr>
<th>Search completed for:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Search required by:</td>
<td>ASAP</td>
</tr>
<tr>
<td>Search completed on:</td>
<td>30/05/2013</td>
</tr>
<tr>
<td>Search completed by:</td>
<td>Lesley Firth</td>
</tr>
</tbody>
</table>

**Search details**

Children (1-2 years) and the norovirus (length of symptoms, electrolyte abnormalities and other complications)

**Resources searched**

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

**Database search terms:** exp NOROVIRUS, norovirus*, "winter vomiting", exp CALICIVIRIDAE INFECTIONS, (child* OR infant* OR pediatric* OR paediatric*), exp CHILD, exp INFANT, exp PEDIATRICS

**Evidence search string(s):** norovirus (child* OR infant* OR paediatric*)

**Google search string(s):** norovirus (child OR infant OR paediatric)

**Summary**

I’ve highlighted the relevant results/conclusion sections of each article found. Unfortunately no guidelines of evidence-based reviews pertaining to the clinical symptoms or complications of norovirus infections.

**Guidelines**

Nothing specific

**Evidence-based reviews**
Published research

Title: Infection: Childhood gastroenteritis-the rise of norovirus.
Citation: Nature Reviews Gastroenterology & Hepatology, April 2013, vol./is. 10/5(257), 1759-5045;1759-5053 (2013 Apr 16)
Author(s): Ray K
Language: English
Publication Type: Journal Article
Source: MEDLINE

Title: Norovirus and medically attended gastroenteritis in U.S. children.
Citation: New England Journal of Medicine, 21 March 2013, vol./is. 368/12(1121-1130), 00284793
Author(s): Payne, Daniel C, Vinjé, Jan, Szilagyi, Peter G, Edwards, Kathryn M, Staat, Mary Allen, Weinberg, Geoffrey A, Hall, Caroline B, Chappell, James, Bernstein, David I, Curns, Aaron T, Wikswo, Mary, Shirley, S Hannah, Hall, Aron J, Lopman, Benjamin, Parashar, Umesh D
Language: English
Publication Type: journal article
Source: CINAHL
Full Text: Available from the ULHT Library and Knowledge Services' eJournal collection in New England Journal of Medicine

Title: Prospective study of human norovirus infection in children with acute gastroenteritis in Greece.
Citation: Minerva Pediatrica, June 2012, vol./is. 64/3(333-9), 0026-4946;0026-4946 (2012 Jun)
Author(s): Mammas IN, Koutsaftiki C, Nika E, Vagia F, Voyatzis A, Spandidos DA, Theodoridou M, Myriokefalitakis N
Language: English
Abstract: AIM: Noroviruses are considered as a major cause of acute gastroenteritis in childhood worldwide. This prospective study was undertaken to investigate the frequency and clinical features of norovirus infections in children aged less than 5 years with acute gastroenteritis in Greece.METHODS: Routine stool samples were obtained from 227 children, 119 boys and 108 girls, with acute gastroenteritis, who attended a tertiary paediatric hospital in Athens during the period November 2008 - October 2009. All specimens were tested for the presence of norovirus, rotavirus and adenovirus antigens using validated enzyme-linked immunoassays.RESULTS: Norovirus was detected in 8 (7.9%) out of 101 children during the period November 2008 to April 2009, while the respective rate during the period May 2009 to October 2009 was 1/126 (0.8%). In the total sample, rotavirus was detected in 56 (24.7%) children and adenovirus in 5 (2.2%) children. Three (1.3%) samples grew Campylobacter jejuni, while 6 (2.6%) samples grew Salmonella. In all cases, norovirus was detected as a unique viral pathogen. Among norovirus-positive children, who required hospitalization, the median duration of intravenous fluid administration was 3.5 days. The median duration of hospitalization was 4 days (range 3 days to 5 days) and did not differ from the duration of hospitalization of rotavirus-positive children.CONCLUSION: Our results suggest norovirus as the second most common cause of community-acquired acute gastroenteritis in children in Greece, following rotavirus. We highlight the need to implement norovirus detection assays for the clinical diagnosis and the prevention of viral gastroenteritis in paediatric departments.
**Title:** Norovirus as cause of benign convulsion associated with gastro-enteritis.

**Citation:** Journal of Paediatrics & Child Health, June 2011, vol./is. 47/6(373-7), 1034-4810;1440-1754 (2011 Jun)

**Author(s):** Chan CM, Chan CW, Ma CK, Chan HB

**Language:** English

**Abstract:** AIM: Rotavirus and norovirus gastro-enteritis (GE) are common in children. Complications, except severe dehydration, are rare. Rotavirus was known to cause seizures and even GE encephalopathy, but these complications are less described in norovirus infection. The objective of this study is to compare the demographic features, clinical manifestations including the incidence of afebrile seizure, and the outcomes in children with rotavirus and norovirus infections.

**METHODS:** This is a retrospective review of children between age 1 month and 6 years admitted to the paediatric department of a regional hospital in Hong Kong with rotavirus and norovirus infections over a period of 3 years from 1 June 2006 to 31 May 2009. Their demographic data, clinical features, laboratory results and outcomes were compared and analysed.

**RESULTS:** Two hundred and thirty-two children with rotavirus and 173 children with norovirus GE were admitted within the study period. Afebrile seizure commonly occurred in norovirus infection (8.67% vs. 1.29%, P < 0.001). Children with rotavirus infection had higher temperature and more diarrhoea episodes, while more blood-stained stool was noted in the norovirus group. Rotavirus-infected patients stayed longer in hospital. All of them had full recovery without any complication. Among the 18 patients who developed afebrile convulsions, 17 of them had neuroimaging performed, which was normal. Fourteen of them had electroencephalogram (EEG) performed, demonstrating normal or non-specific findings. None of them developed subsequent seizure attack after the GE episode.

**CONCLUSIONS:** Norovirus is more commonly associated with benign convulsion in GE than rotavirus. We need to identify the presence of virus, in particular norovirus, in children with GE and afebrile generalised tonic-clonic seizure. Further neuro-investigations may not be necessary once the aetiology is established. Prognosis is excellent in this group of children and prophylactic anticonvulsant is not needed. 2011 The Authors. Journal of Paediatrics and Child Health 2011 Paediatrics and Child Health Division (Royal Australasian College of Physicians).

**Publication Type:** Journal Article

**Source:** MEDLINE

**Full Text:** Available from EBSCOhost in Journal of Paediatrics and Child Health

---

**Title:** Can norovirus infection lead to a postinfectious arthritis? Report of 2 possible cases.

**Citation:** Klinische Padiatrie, January 2011, vol./is. 223/1(43-4), 0300-8630;1439-3824 (2011 Jan)

**Author(s):** Gemulla G, Pessler F

**Language:** English

**Publication Type:** Case Reports, Journal Article

**Source:** MEDLINE

---

**Title:** Norovirus as cause of benign convulsion associated with gastro-enteritis.

**Citation:** Journal of Paediatrics & Child Health, 01 June 2011, vol./is. 47/6(373-377), 10344810

**Author(s):** Chan CM, Chan CW, Ma CK, Chan HB

**Language:** English

**Publication Type:** journal article

**Source:** CINAHL
Norovirus GII-4 Causes a More Severe Gastroenteritis Than Other Noroviruses in Young Children.

Citation: Journal of Infectious Diseases, 15 May 2011, vol./is. 203/10(1442-1444), 00221899

Author(s): Huhti L, Szakal ED, Puustinen L, Salminen M, Huhtala H, Valve O, Blazevic V, Vesikari T

Language: English

Abstract: Norovirus (NoV) GII-4 has emerged as the predominant NoV genotype in outbreaks of gastroenteritis worldwide. We determined clinical features of NoV GII-4 associated acute gastroenteritis (AGE) in comparison with AGE associated with other NoV types in infants during seasons 2001 and 2002. During the prospective follow-up period, 128 primary infections of AGE due to NoV were identified in 405 infants; of these, GII-4 was found in 40 cases (31%). NoV GII-4 was associated with longer duration of diarrhea and vomiting than other NoV genotypes, suggesting greater virulence of NoV GII-4.

Publication Type: journal article

Source: CINAHL

Full Text: Available from EBSCOhost in Journal of Paediatrics and Child Health

Epidemiology and clinical peculiarities of norovirus and rotavirus infection in hospitalized young children with acute diarrhea in Taiwan, 2009.

Citation: Journal of Microbiology, Immunology & Infection, December 2010, vol./is. 43/6(506-14), 1684-1182;1995-9133 (2010 Dec)

Author(s): Yang SY, Hwang KP, Wu FT, Wu HS, Hsiung CA, Chang WC, Lin JS, Yang SC, Huang SL, Huang YC

Language: English

Abstract: BACKGROUND/PURPOSE: Acute diarrhea is one of the most common morbidities in pediatrics worldwide. We conducted a study to investigate the incidence of norovirus in young children hospitalized with acute diarrhea in Taiwan and its clinical peculiarity compared with rotavirus gastroenteritis.METHODS: Between January and December, 2009, patients younger than 5 years and admitted to hospital with acute diarrhea were randomly selected; and their stool samples were collected and tested for presence of rotavirus and norovirus by enzyme immunoassay and reverse transcription-polymerase chain reaction, respectively. The clinical manifestations and laboratory findings of the enrolled patients were analyzed.RESULTS: A total of 989 cases were enrolled with a mean age of 21.6 +/- 13.7 months and a male proportion of 56.0%. Rotavirus and norovirus was detected in 20.2% and 14.6% of all patients, respectively. Genogroup II was the predominant strain of norovirus (80.6%). Children aged 6-36 months accounted for the majority of patients positive for rotavirus and norovirus (73.0% and 81.3%, respectively). The incidences of norovirus and rotavirus infection were higher during winter and early spring. Most patients with rotavirus and norovirus diarrhea experienced vomiting (74.9%vs. 74.8%, respectively) and fever (94.7%vs. 71.3%, respectively).CONCLUSION: Most young diarrheal patients presenting with vomiting were likely to have norovirus or rotavirus infection. Patients with norovirus diarrhea experienced an absence of, or low-grade fever and longer duration of vomiting compared with those positive for rotavirus infection. A family history of current gastroenteritis may suggest the possibility of norovirus infection. Copyright A 2010 Taiwan Society of Microbiology. Published by Elsevier B.V. All rights reserved.

Publication Type: Journal Article

Source: MEDLINE
Title: Norovirus encephalopathy in a previously healthy child.
Citation: Pediatric Infectious Disease Journal, November 2010, vol./is. 29/11 (1057-9), 0891-3668;1532-0987 (2010 Nov)
Author(s): Obinata K, Okumura A, Nakazawa T, Kamata A, Niizuma T, Kinoshita K, Shimizu T
Language: English
Abstract: Norovirus causes acute gastroenteritis in all age groups. Afebrile convulsion is an occasional neurologic complication in norovirus infection, but encephalitis is rare. We report the case of a previously healthy 15-month-old girl with norovirus encephalopathy who had a poor neurologic outcome. Norovirus (genogroup II) was detected in plasma and stool by real-time reverse transcription polymerase chain reaction, but the cerebrospinal fluid showed negative result for genome. Elevated concentrations of cerebrospinal fluid interleukin-6, interleukin-10, interferon-, and tumor necrosis factor- were observed on the third day of illness. The encephalopathy in our patient may be related to hypercytokinemia rather than to direct viral invasion.
Publication Type: Case Reports, Journal Article
Source: MEDLINE

Title: Acute renal failure due to obstructive urate stones associated with norovirus gastroenteritis.
Citation: Pediatric Nephrology, November 2010, vol./is. 25/11 (2377-8), 0931-041X;1432-198X (2010 Nov)
Author(s): Ashida A, Shirasu A, Nakakura H, Tamai H
Language: English
Publication Type: Case Reports, Comment, Letter
Source: MEDLINE
Full Text: Available from EBSCOhost in Pediatric Nephrology

Title: Elevation of serum transaminases with norovirus infection.
Citation: Clinical Pediatrics, June 2010, vol./is. 49/6 (574-8), 0009-9228;1938-2707 (2010 Jun)
Author(s): Tsuge M, Goto S, Kato F, Morishima T
Language: English
Abstract: From November to December in 2006, we experienced 4 pediatric cases with an elevation of the serum transaminase levels accompanied by acute gastroenteritis. All examined stool specimens were norovirus positive according to the Reverse Transcription-Polymerase Chain Reaction (RT-PCR) assay. The clinical courses of these cases were the same as those of common gastroenteritis. Blood examinations showed only a slight elevation of the transaminase levels at the onset of gastroenteritis, while the symptoms were severe. Interestingly, the transaminase levels significantly increased after gastroenteritis disappeared. The average period between the onset of gastroenteritis and the peak of transaminase levels was 13.8 days. In all cases, the patients were treated with the administration of glycyrrhizin, and the transaminase levels returned to normal approximately 4 weeks (average 26.8 days) after the onset of gastroenteritis, thus suggesting that an elevation of the transaminase levels in association with norovirus gastroenteritis may therefore be a self-limited process which may demonstrate a relatively good natural prognosis. Norovirus is one of the important pathogens which cause an elevation in the serum transaminase levels in young children. When an elevation in the transaminase levels in association with gastroenteritis is observed in young children, it is important to continuously follow up such patients even after the gastroenteritis has disappeared and to perform a virus search based on examinations of stool specimens using an RT-PCR assay in order to detect the presence of norovirus infections.
Publication Type: Journal Article
Title: Norovirus RNA in the blood of a child with gastroenteritis and convulsions--A case report.

Citation: Journal of Clinical Virology, June 2010, vol./is. 48/2(147-9), 1386-6532;1873-5967 (2010 Jun)

Author(s): Medici MC, Abelli LA, Dodi I, Dettori G, Chezzi C

Language: English

Abstract: Potential extra-intestinal spread is an important issue in understanding the pathogenesis of NoV disease. A previously healthy 14-month-old boy was admitted to the Pediatric Emergency Department of the University-Hospital of Parma, Italy, for afebrile convulsions in a gastroenteritis episode. Bacterial culture and microscopic examination on cerebrospinal fluid (CSF) yielded negative results as well as PCRs and reverse-transcription PCRs (RT-PCRs) for neurotropic viruses performed either on CSF or plasma. Stools were subjected to electron microscopy and conventional cell culture, yielding negative results. NoV was found in stools and plasma by nested RT-PCR targeting the NoV polymerase gene. The nucleotide sequences obtained from the two specimens showed 100% identity, demonstrating that the strain invading the blood stream was from the intestine, and, in comparison with GenBank sequences, they belonged to NoV genotype GII.4, "2006b" variant. The child had no abnormal electrolyte balance and no fever that could justify seizures, encouraging the hypothesis that NoV could be the cause of the neurologic disorder. These findings further induce to review the current concept of human NoV focused on intestinal infection. Copyright 2010 Elsevier B.V. All rights reserved.

Publication Type: Case Reports, Journal Article, Research Support, Non-U.S. Gov't

Source: MEDLINE

Title: The emerging importance of norovirus as the etiology of pediatric gastroenteritis in Taipei.

Citation: Journal of Microbiology, Immunology & Infection, April 2010, vol./is. 43/2(105-10), 1684-1182;1995-9133 (2010 Apr)

Author(s): Lin CY, Chiu NC, Lee HC, Chuang CK, Lin SP, Yeung CY

Language: English

Abstract: BACKGROUND/PURPOSE: Rotavirus is a major causative agent of pediatric gastroenteritis throughout the world. However, other viruses such as norovirus also play an important role, but have seldom been studied in Taipei, Taiwan. The aim of this study was to survey the prevalence and clinical manifestations of different types of viral gastroenteritis in Taipei, focusing especially on the disease burden of norovirus.METHODS: Between November 2004 and April 2005, stool samples were collected from hospitalized pediatric patients with a diagnosis of acute gastroenteritis. Clinical manifestations, laboratory data, and hospitalization course of the patients were all analyzed. Stool cultures for bacteria and rotavirus antigens were performed. All samples were tested for norovirus, enteric adenovirus, and astrovirus using enzyme-linked immunosorbent assays.RESULTS: A total of 75 stool specimens were collected during the 6-month period. Fifteen (20.0%) were positive for norovirus (3 genogroup I and 12 genogroup II). Three (4.0%) were positive for enteric adenovirus, and one (1.3%) for astrovirus. Nine (12.0%) patients had positive rotavirus antigen tests. Bacterial pathogens were found in 12 patients (16.0%), including seven cases of Salmonella, and five of Campylobacter. The patients with norovirus gastroenteritis were aged between 1.5-7.5 years old (median 20 months old). Fever was found in six patients (40.0%), and bloody, mucoid stools in three (20.0%). The mean hospitalization time was 3.3 days. None of them had...
complications. CONCLUSION: During the study period, norovirus was the most common pathogen causing hospitalized pediatric gastroenteritis in our hospital. Genogroup II was the predominant type (80.0%). Clinicians in Taipei should, therefore, be aware of the emergence of norovirus infections. Copyright 2010 Taiwan Society of Microbiology. Published by Elsevier B.V. All rights reserved.

Publication Type: Journal Article

Source: MEDLINE

Title: Norovirus-associated renal acute renal failure with nephrotic syndrome.
Citation: Pediatrics International, February 2010, vol./is. 52/1(e23-5), 1442-200X (2010 Feb)
Author(s): Kanai T, Yotsumoto S, Momoi MY
Language: English
Publication Type: Case Reports, Journal Article
Source: MEDLINE
Full Text: Available from EBSCOhost in Pediatrics International

Title: Norovirus diarrhoeal disease in infants and children.
Citation: Medical Journal of Australia, January 2010, vol./is. 192/2(108-9), 0025-729X;0025-729X (2010 Jan 18)
Author(s): Kesson AM, Benwell N, Elliott EJ
Language: English
Publication Type: Letter
Source: MEDLINE

Title: Norovirus-associated renal acute renal failure with nephrotic syndrome.
Citation: Pediatrics International, 01 February 2010, vol./is. 52/1(0-), 13288067
Author(s): Kanai T, Yotsumoto S, Momoi MY
Language: English
Publication Type: Journal Article
Source: CINAHL
Full Text: Available from EBSCOhost in Pediatrics International

Pediatr Infect Dis J. 2009 Jul;28(7):604-7. doi: 10.1097/INF.0b013e318197c3ca. Prevalence and clinical characteristics of norovirus gastroenteritis among hospitalized children in Spain. Junquera CG, de Baranda CS, Mialdea OG, Serrano EB, Sánchez-Fauquier A. BACKGROUND: The importance of norovirus as a cause of gastroenteritis outbreaks is well documented, but the role of norovirus in sporadic acute severe gastroenteritis is not so well established. The aim of this study was to determine the prevalence and clinical characteristics of norovirus gastroenteritis among hospitalized children. METHODS: A prospective study was conducted in children less than 5 years old, admitted with acute gastroenteritis between January 2005 and January 2008 to the Pediatrics Department of the University Hospital, Albacete, Spain. Demographic and clinical data were collected. A stool sample from each child was screened for enteropathogenic bacteria and tested by reverse transcription polymerase chain reaction for rotavirus, astrovirus, norovirus, and sapovirus and by immunochromatographic method for enteric adenoviruses. RESULTS: Norovirus was the second most frequent pathogen after rotavirus, being detected in 61 (17.3%) of the 352 children enrolled, in 29 of them (8.2%) as single agent. Mixed infections involving other viruses or bacteria were present in 52.4% of norovirus positive samples, a nosocomial source of infection was demonstrated in 17.2%. Norovirus infection was more prevalent in winter and affected mainly children less than 2 years of age. Vomiting was present in 68% and fever in 48.3% of cases, 3 children had nonfebrile seizures.
Compared with rotavirus enteritis, norovirus infection was slightly less severe (in terms of severity score and need of intravenous rehydration) and fever was less frequent.

CONCLUSIONS: Norovirus was a frequent cause of acute severe sporadic gastroenteritis in children representing the second etiologic agent after rotavirus.

Title: The diagnosis of norovirus infections in hospitalized children and adolescents with acute gastroenteritis: a study from Pilsen, Czech Republic.
Citation: Epidemiologie, Mikrobiologie, Imunologie, November 2009, vol./is. 58/4(167-72), 1210-7913;1210-7913 (2009 Nov)
Author(s): Pazdiora P, Taborska J, Svecova M, Sykora J
Language: English
Abstract: BACKGROUND: Norovirus-associated sporadic gastroenteritis is an important cause of illness in Western Europe. However, at present, little information on the role of norovirus in sporadic gastroenteritis in Central Europe is available. Our study aimed at providing an assessment of their significance in hospitalized children and adolescents with acute gastroenteritis using ELISA test at the time of their introduction.METHODS: A prospective hospital based study of the etiology of acute gastroenteritis was undertaken in a total of 618 patients (mean age 39.8 months, range 0-228), who were hospitalized at the Charles University Hospital in Pilsen. All subjects were monitored in six fragmented periods during the years 2003 and 2004, 2006 and 2007. Clinical and laboratory data were processed, norovirus antigens in stools were detected using the EIA kits IDEIA Norovirus, DakoCytomation.RESULTS: A norovirus infection was confirmed in 62 cases, i.e., 10.0% of all patients with acute gastroenteritis. Vomiting was the most common symptom, recorded in 95.2 % of all the patients with norovirus infection. No severe extragastrointestinal complications were detected. The average interval between initial symptoms and the beginning of hospitalization was considerably shorter in patients with norovirus infection (1.3 days) compared with patients with rotavirus infections (2.4 days). The frequency of Salmonella spp., rotavirus, Campylobacter spp. and enteric adenovirus was 15.4%, 11.2%, 3.9%, 3.6%, respectively.CONCLUSIONS: Our findings confirm the clinical importance of noroviruses as a causative agent of acute gastroenteritis in children and teenagers in the region of a Central European country. Identification of norovirus infection should be included in the routine screenings of sporadic cases of acute gastroenteritis.

Publication Type: Journal Article, Research Support, Non-U.S. Gov't
Source: MEDLINE

Title: Clostridium difficile ribotype 027-associated disease in children with norovirus infection.
Citation: Pediatric Infectious Disease Journal, September 2009, vol./is. 28/9(847-8), 0891-3668;1532-0987 (2009 Sep)
Language: English
Abstract: Two previously healthy children developed Clostridium difficile ribotype 027-associated disease concomitantly with norovirus infection. Viral gastroenteritis may contribute to epithelial homeostasis of the intestine and exacerbate the effects of toxins produced by C. difficile ribotype 027.
Publication Type: Case Reports, Journal Article, Research Support, Non-U.S. Gov't
Source: MEDLINE

Title: Norovirus infection as a cause of diarrhea-associated benign infantile seizures.
Citation: Clinical Infectious Diseases, April 2009, vol./is. 48/7(849-55), 1058-
BACKGROUND: Norovirus and rotavirus cause outbreaks of diarrheal disease worldwide. This prospective observational study was undertaken to investigate the clinical characteristics and complications, with a focus on convulsive disorders, of gastroenteritis caused by norovirus and rotavirus in hospitalized pediatric patients in northern Taiwan. METHODS: Children hospitalized with acute gastroenteritis in Chang Gung Children’s Hospital from August 2004 through January 2007 were enrolled in the study. Rotavirus and norovirus were detected by reverse-transcriptase polymerase chain reaction with fecal specimens and were genotyped by sequence analysis. The symptoms and complications, in particular convulsions, of acute gastroenteritis caused by rotavirus and norovirus were reviewed and compared. The occurrence of convulsions associated with norovirus infection was specifically analyzed and discussed. The neurological outcomes for all norovirus-infected patients with or without convulsions were followed up for 1 year. Results. Among the 353 patients with acute viral gastroenteritis without coinfection, rotavirus and norovirus isolates were detected in 101 patients (28.6%) and 64 patients (18.1%), respectively. We compared the symptoms between the 2 groups and found that rotavirus caused a higher frequency and longer duration of vomiting and a higher body temperature than did norovirus. Norovirus infection, on the other hand, caused significantly longer hospital stays (mean duration of stay [interquartile range], 6 [5-8] days vs. 5 [4-7] days; P <.001) and a significantly higher incidence of convulsions than did rotavirus infection (29.7% vs. 5%; P <.001). Three of the 19 patients with convulsions showed an abnormal record on electroencephalogram, but none had any neurological sequelae at the subsequent 1-year follow-up. The majority of norovirus strains (41 of the 56 genotypeable strains) belonged to genogroup GGII/4. Conclusions. Norovirus is a major cause of acute gastroenteritis in children. This study identified norovirus as an emerging agent causing convulsive disorder in children, particularly in young infants. Long-term neurological sequelae are uncommon.

Title: Comparison of clinical features of childhood norovirus and rotavirus gastroenteritis in Taiwan.

Citation: Journal of the Chinese Medical Association: JCMA, November 2008, vol./is. 71/11(566-70), 1726-4901;1726-4901 (2008 Nov)

Author(s): Wu TC, Liu HH, Chen YJ, Tang RB, Hwang BT, Yuan HC

Language: English

Abstract: Viral gastroenteritis is a common acute infectious disease in infants and young children. This study compared the incidence and clinical features of childhood norovirus (NV) and rotavirus (RV) gastroenteritis in Taiwan.METHODS: Stool specimens were collected from children with acute gastroenteritis aged 6 months to 14 years who were treated at the Children's Medical Center of Taipei Veterans General Hospital between January 2004 and March 2005. The incidence, clinical manifestations, and laboratory findings of childhood NV gastroenteritis were analyzed and compared with those of patients with RV gastroenteritis. Patients with underlying diseases associated with diarrhea or those diagnosed with bacterial gastroenteritis were excluded. Stool specimens were tested for NV and RV using enzyme immunoassay (EIA). NV genogroups were determined by reverse-transcriptase polymerase chain reaction.RESULTS: Among the 201 patients included in this study, NV was detected in 44 (21.9%) by 1
or more tests (22 by EIA). Five of these isolates were genogroup I (11.3%), and 39 were genogroup II (88.7%). Fifty-two (25.9%) specimens had a positive EIA result for RV. Compared with NV, patients with RV gastroenteritis had a significantly higher percentage of diarrhea (94 vs. 69%, p < 0.001), fever (82 vs. 26.2%, p < 0.001), and longer hospital stay (3.81 vs. 2.93 days, p = 0.048). Laboratory studies showed significantly higher liver enzymes and C-reactive protein levels in patients with RV infection. In contrast, white blood cell counts were significantly higher in patients with NV infection.

CONCLUSION: Norovirus is one of the leading agents of acute gastroenteritis in children in Taiwan, and genogroup II is the predominant type.

Publication Type: Comparative Study, Journal Article
Source: MEDLINE

Title: Hospitalization due to norovirus and genotypes of rotavirus in pediatric patients, state of Espirito Santo.
Citation: Memorias do Instituto Oswaldo Cruz, March 2008, vol./is. 103/2(201-6), 0074-0276;0074-0276 (2008 Mar)
Author(s): Ribeiro LR, Giuberti RS, Barreira DM, Saick KW, Leite JP, Miagostovich MP, Spano LC
Language: English
Abstract: Viruses are the leading cause for hospitalization due to gastroenteritis worldwide. Group A rotaviruses (RV) are the most prevalent and are assorted in glycoproteins (G) and protease sensitive (P) dual genotypes based on polymorphic genes that encode the external VP7 and VP4 capsid proteins, respectively. Noroviruses (NoV) have increasingly answered by sporadic gastroenteritis. This study aimed to determine the prevalence of NoV and RV in 68 hospitalized children, between July 2004 and November 2006, at a pediatric hospital in Vitoria city, state of Espirito Santo, Southeastern Brazil. Nucleic acid was extracted from fecal suspension following the guanidine-silica procedure. Reverse transcriptase-polymerase chain reaction (RT-PCR) and polyacrylamide gel electrophoresis were employed for NoV and RV detection, respectively. RV genotyping was accomplished using RT-PCR followed by heminested multiplex PCR with specific primers for the most prevalent types of G and P. Fecal samples were positive for NoV and RV in 39.7% (27/68) and 20.5% (14/68), respectively and together were responsible for 60% (41/68) of the cases. RV genotypes were: 50% G9P[8], 28.7% G2P[4], 7.1% G1P[8], G2P[8] and G?P[8]. Vomit was a prominent manifestation observed in 92% and 85% of the NoV and RV cases, respectively. The median hospitalization was 5 and 5.5 days for the patients infected with NoV and RV, respectively. The data showed that NoV prevailed over RV and it also corroborated the emergence of RV G9 genotype followed by G2P[4], reinforcing the need for RV genotype surveillance.

Publication Type: Journal Article, Research Support, Non-U.S. Gov't
Source: MEDLINE

Title: Peculiarities of norovirus and rotavirus infections in hospitalised young children.
Citation: Journal of Pediatric Gastroenterology & Nutrition, March 2008, vol./is. 46/3(289-92), 0277-2116;1536-4801 (2008 Mar)
Author(s): Narkeviciute I, Tamusauskaite I
Language: English
Abstract: OBJECTIVES: To investigate the features of norovirus infection in hospitalised children under the age of 3 and to compare the results with those of rotavirus infection. PATIENTS AND METHODS: Case notes were randomly selected and retrospectively analysed for 70 norovirus- and 70 rotavirus-infected children. All of the children were treated in Vilnius University Children's Hospital in 2005. The norovirus antigen was assayed using enzyme-linked immunosorbent assay, the rotavirus using immunochromatography diagnostic assay. RESULTS: In
young children, norovirus infection manifested as vomiting (94% of all cases), diarrhoea (81%), and fever (66%). It presented as gastroenteritis with fever (47%) or without fever (30%). However, 19% of cases were without diarrhoea. During rotavirus infection, fever was present in 97% of cases and 81% of them were >38 degrees C. However, in norovirus infection, the percentages were 66% and 48%, respectively (P < 0.0001). Intensive diarrhoea (> or =7 times/day) more frequently appeared in children with rotavirus infection than with norovirus (P < 0.0001). Repeated vomiting (> or =4 times/day) has been more common for children with norovirus infection. As opposed to norovirus infection, which has 2 main syndromes (gastroenteritis with fever and without fever), rotavirus infection is dominated by just 1 clinical syndrome-gastroenteritis with fever (P < 0.0001).

CONCLUSIONS: Norovirus infection in young children can present as gastroenteritis with or without fever. Norovirus and rotavirus infections had statistically significant differences in the presence and the degree of fever, and the intensity of diarrhoea and vomiting, as well as frequency of different syndromes.

**Publication Type**: Journal Article  
**Source**: MEDLINE  
**Title**: Prolonged norovirus shedding in infants <or=6 months of age with gastroenteritis.  
**Citation**: Pediatric Infectious Disease Journal, January 2007, vol./is. 26/1(46-9), 0891-3668;0891-3668 (2007 Jan)  
**Author(s)**: Murata T, Katsushima N, Mizuta K, Murakami Y, Hongo S, Matsuzaki Y  
**Language**: English  
**Abstract**: BACKGROUND: Noroviruses (NV) are one of the leading causes of gastroenteritis in young children; however, the duration of NV shedding in young children is not well known. METHODS: Fecal specimens were collected from children with acute gastroenteritis at a pediatric clinic during the period from November to December 2002 and tested for NV by reverse transcription-polymerase chain reaction. RESULTS: Of 71 children infected with NV, 60 (84.5%) were less than 3 years old. Among children aged <2 years and those aged 2 to 5 years, the duration of illness was longer (7 days versus 3.5 days, P = 0.0069), the maximum number of stools in a 24-hour period was greater (7 versus 3, P = 0.0078) and a 20-point severity score was higher (11 versus 8, P = 0.0031) in patients aged <2 years than in patients aged 2 to 5 years. Among the 23 children whose follow-up specimens were obtained, the median duration of NV shedding was 16 days (range, 5-47 days). Virus shedding for more than 2 weeks after onset was observed in 75% (6 of 8), 71.4% (5 of 7) and 25% (2 of 8) of children aged <1 year, 1 year and 2 to 3 years, respectively. Three infants aged <or=6 months continued to excrete NV for an extremely long period (more than 42, 44 and 47 days from onset) after recovery. CONCLUSION: Long-term virus shedding after the disappearance of clinical symptoms was observed. Caution should be exercised when handling the excrement of infants and young children infected with NV.

**Publication Type**: Journal Article, Research Support, Non-U.S. Gov't  
**Source**: MEDLINE  
**Title**: Norovirus-associated encephalopathy.  
**Citation**: Pediatric Infectious Disease Journal, July 2006, vol./is. 25/7(651-2), 0891-3668;0891-3668 (2006 Jul)  
**Author(s)**: Ito S, Takeshita S, Nezu A, Aihara Y, Usuku S, Noguchi Y, Yokota S  
**Language**: English  
**Abstract**: Norovirus is a common cause of gastroenteritis. We describe the case of a 23-month-old girl with encephalopathy possibly associated with norovirus infection. The viral genome was detected in stool, serum and cerebrospinal fluid (CSF) by reverse transcription polymerase chain reaction. This is the first report
of encephalopathy potentially caused by norovirus as indicated by the presence of the virus genome in CSF.

**Publication Type:** Case Reports, Journal Article  
**Source:** MEDLINE

**Title:** Clinical severity of Norwalk virus and Sapporo virus gastroenteritis in children in Hokkaido, Japan.  
**Citation:** Pediatric Infectious Disease Journal, September 2001, vol./is. 20/9(849-53), 0891-3668:0891-3668 (2001 Sep)  
**Author(s):** Sakai Y, Nakata S, Honma S, Tatsumi M, Numata-Kinoshita K, Chiba S  
**Language:** English

**Abstract:** OBJECTIVE: To clarify the clinical significance and etiologic impact of Norwalk virus (NV) and Sapporo virus (SV) in viral gastroenteritis in Japanese children. STUDY DESIGN: Two outbreaks each of NV gastroenteritis and SV gastroenteritis occurring in an infant home in Sapporo, Japan, as well as 95 hospitalized children with acute gastroenteritis were retrospectively evaluated using a 0- to 20-point clinical severity scoring system. RESULTS: The mean severity scores for NV and SV gastroenteritis outbreaks were 7.9 and 5.2, respectively, as compared with 8.4 for rotavirus A gastroenteritis that occurred in the same infant home. Among 95 hospitalized children with acute gastroenteritis, rotavirus A was detected in 47% followed by NV in 18%. SV was not found. CONCLUSION: Our data indicate that NV can cause severe gastroenteritis and is an important etiologic agent in hospitalized cases, whereas SV causes mild gastroenteritis in Japanese children.

**Publication Type:** Comparative Study, Journal Article, Research Support, Non-U.S. Gov't  
**Source:** MEDLINE

---

**Google Scholar**

*From 1st 50 results…*

**[HTML] Risk groups for clinical complications of norovirus infections: an outbreak investigation**

F Mattner, D Sohr, A Heim, P Gastmeier… - Clinical microbiology …, 2006 - Wiley Online Library

... group of norovirus-negative patients might have been included in the study, or that norovirus-positive patients without symptoms were missed. ... Thus, data are lacking for other patient groups, particularly haematological, pneumological, surgical and paediatric patients. ...  
*Cited by 109* Related articles All 9 versions Cite