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RESEARCH ARTICLE

An outbreak of norovirus gastroenteritis in a county in Turkey

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ABSTRACT

Objective: The aim of our study was to present the epidemiologic features and the measures taken during a norovirus outbreak considered to be originating from contaminated water.

Methods: Medical records of patients referred to the state hospital and health centers with gastroenteritis complaints in April 2010 were evaluated retrospectively. In addition, the data about the possible origin of the outbreak were also evaluated. Fifty patients were randomly selected, and a questionnaire containing epidemiological and clinical questions was applied.

Results: During 13 days (between 6 and 17 April 2010), 1482 patients with acute gastroenteritis symptoms and findings presented to the healthcare facilities. Stool samples were obtained from nine patients and water samples were taken from four parts of the waterworks. Norovirus was detected in six of the stool samples. However, no norovirus was detected in the water samples. All patients were followed up at the outpatient clinics. None of the patients developed complications.

Conclusion: Waterborne norovirus outbreaks can affect hundreds of people simultaneously. Early identification of the outbreak source and agent are important in the control of the outbreak, and for the treatment and follow up of the people affected. If leukocytes and erythrocytes are absent in the stool microscopy in gastroenteritis, norovirus should be considered in the first place as the cause, and appropriate investigation should be carried out. *J Microbiol Infect Dis 2014;4(1): 26-29*

Key words: Norovirus, outbreak, gastroenteritis

Nörovirus kaynaklı bir gastroenterit salgını

ÖZET

Amaç: Bu çalışmada içme suyu kaynaklı bir norovirüs salgınının epidemiyolojik özelliklerini ve salgın kontrol çalışmalarını sunmayı amaçladık.

Yöntemler: Bu çalışmada Nisan 2010'da Isparta Keçiborlu ilçesinde yaşanan salgın esnasında ilçe devlet hastanesi ve bir aile hekimliği merkezine gastroenterit semptom ve bulgularıyla başvuran hastaların kayıtları incelendi. Ayrıca salgının kaynağını araştırmak için yapılan inceleme sonuçları retrospektif olarak değerlendirildi. Salgının ilk iki gününde rastgele seçilen 50 hastanın epidemiyolojik ve klinik özellikleri irdelendi.

Bulgular: Salgının yaşandığı 6-17 Nisan 2010 tarihleri arasında akut gastroenterit semptom ve bulguları ile sağlık merkezlerine 1482 hasta başvurdu. Dokuz hastadan alınan dışkı örneklerinin altısında norovirüs tespit edildi. Şehir şebeke suyundan alınan örneklerde ise norovirüs tespit edilemedi Tüm hastalar ayaktan takip edildi ve semptomatik tedavi uygulandı. Herhangi bir komplikasyon gelişen hasta olmadı. Salgın, yapılan eğitim çalışmaları ve şehir şebeke suyunun temizliğinin sağlanması ile 13 günde kontrol altına alındı.

Sonuç: Su kaynaklı norovirüs salgınları aynı anda yüzlerce kişiyi etkileyebilmektedir. Salgının kontrolü ve salgından etkilenen kişilerin takip ve tedavisi açısından salgının kaynağı ve etkenin erken tespiti önemlidir. Özellikle bulantı, kusma, karın ağrısı ve nadiren ateşin eşlik ettiği gastroenterit salgınlarında dışkı mikroskopisinde lökosit ve eritrosit saptanmıyorsa, salgın etkeni olarak norovirüs öncelikle düşünülmeli ve buna yönelik incelemeler yapılmalıdır.

Anahtar kelimeler: Norovirüs, salgın, gastroentrit

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INTRODUCTION

Noroviruses are single stranded, non-enveloped RNA viruses in the Caliciviridae family and they are the most common cause of water-borne and food-borne gastroenteritis outbreaks among all age groups worldwide.[1,2] In recent years norovirus outbreaks have been reported in increasing frequency, mainly of food-borne nature.[2,3] In our country, particularly water-borne norovirus related gastroenteritis outbreaks have occurred. However, there are only two reports in the literature analyzing the outbreaks in our country.[4,5] There are also small number of studies analyzing the epidemiology of norovirus related gastroenteritis in the pediatric age group.[6-8]

In April 2010 an outbreak of gastroenteritis occurred in the Keçiborlu province of Isparta county. While the number of patients presenting with gastroenteritis symptoms in the weeks before the outbreak was 7-21 per week, on the 5th of April 73 cases have been detected, after which outbreak suspicions have risen and an outbreak investigation team has been formed. On the second day of the outbreak the source was investigated and measures were taken to control the outbreak. Within the framework of these measures public education. As a result of the measures taken the outbreak was under control within 13 days.

Our aim in this study of water-borne norovirus outbreak, affecting hundreds of people, was to evaluate the clinical and epidemiological features and to share our experience gained during this outbreak.

METHODS

In this study, the medical records of the patients presenting with gastroenteritis symptoms and findings, and the investigation results of the outbreak investigation team were retrospectively evaluated. Patients presenting with 2 or more watery stools and/or 2 or more times of vomiting in a period of 24 hours were considered as gastroenteritis. A detailed medical record, including age, gender the address of the neighborhood they resided was collected from each patient. On the first three days of the outbreak, detailed symptom and physical findings were collected from 50 randomly selected patients.

Direct microscopically and parasite evaluation of the stool samples, and cultures performed on the first three days of the outbreak from 30 patients were evaluated with conventional microbiological methods in the microbiology laboratory of Isparta Gülkent State Hospital.

Stool samples obtained from nine patients on the 3rd and 9th days of the outbreak were sent complying the rules of cold chain to the laboratories of Refik Saydam Hıfzıssıhha Institute (RSHI) in order other bacterial and viral agents to be investigated. Norovirus research of the stool samples were conducted on ABI 7500 (ABI7500, USA) real-time PCR machine, Norovirus genotype 1 and genotype 2 (Fast-track diagnostics, FTD gastrointestinal pathogens, Luxemburg) using Multiplex PCR kit.

Again, on the 3rd day of the outbreak, water samples collected from the city waterworks were sent to the Turkey Public Health Agency laboratories for norovirus testing.

RESULTS

The population of Keçiborlu province according to the address based population registration system was 15.790, of which 7134 resided in the center of the province.[9] The province has a 25-bed state hospital and a Family Health Center. During the outbreak between 5 and 17 April, 1482 patients with gastroenteritis symptoms and findings applied for medical help at the health centers (Figure 1). In total, 865 were female and 617 male. Of the patients, 119 were under the age of 5, 152 were over the age of 65. All patients have been residing in the central area, and all neighborhoods have been affected (Figure 1).

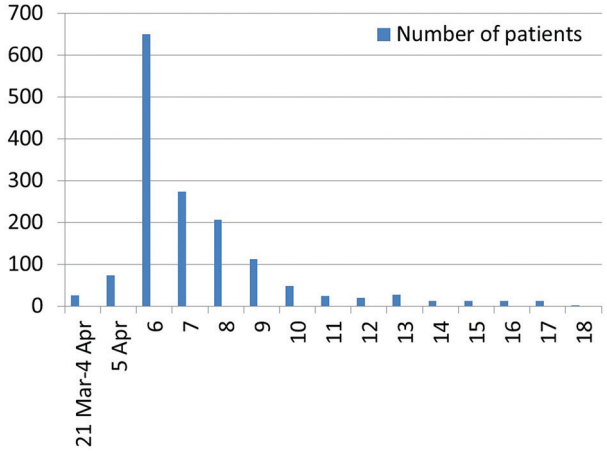

Figure 1. Number of patients seeking medical care due to acute gastroenteritis during the outbreak

While most of the patients had abdominal pain, nausea and vomiting, diarrhea was rarely detected. Some of the patients had fever. Detailed symptoms and physical findings of the randomly detected 50 patients are presented on Table 1. On the direct

microscopy of the stool samples collected from 30 patients on the first 3 days of the outbreak no leukocytes, erythrocytes or parasites were detected and no pathogen bacteriae isolated from the cultures.

Table 1. Various clinical and epidemiological features obtained on the detailed examination from 50 randomly selected patients.

Epidemiological and clinical findings	n (%)
Male	20 (40)
Female	30 (60)
Children under the age of 5	16 (32)
Elderly	7 (14)
Nausea	45 (90)
Vomiting	35 (70)
Stomach ache	45 (90)
Diarrhea	30 (60)
Fever	6 (12)

Norovirus was detected in 6 of 9 patients with stool samples sent to RSHI (5 genotype 2,1 genotype 1). No pathogen bacteria were isolated from the cultures. All patients were given oral or parenteral fluids and followed-up at outpatient settings. All patients were given antibiotics and none of the patients were hospitalized.

The outbreak was under control within 13 days after appropriate precautions were taken (education activities, public announcements of boiling of the water before consumption, personal hygiene and prevention)

DISCUSSION

This study is reporting an outbreak of norovirus related water-borne gastroenteritis affecting hundreds of people. Between April 5-17 the number of patients seeking medical help from the healthcare centers was 1428, however the number of affected people was estimated to be higher. In recent years especially an increase in norovirus food-borne gastroenteritis outbreaks are noted.[2,3] Water-borne norovirus outbreaks are rarely reported.[10] Uyar et al. in 2008 issued the laboratory parameters of the first norovirus outbreak in Aksaray, Turkey.[11] Since then, norovirus outbreaks have been noted in various locations.[4,5] It is reported that in the USA annually 23 million people get infected with norovirus.[12] The main route of infection in these outbreaks it is reported to be through food and rarely through water.[9] From the 348 Norovirus outbreaks reported to the CDC between 1996-2000, 39% were food-borne, 12% from person to person contact and 3% water-borne. The origin in 18% of these outbreaks remained undetected.[13] Most of the water-borne norovirus outbreaks originate from well water, contaminated from sewage, also small number of outbreaks originating from city water supply, bottled water and pools have been reported.[14]

Norovirus outbreaks are usually seen in autumn-winter period, especially between January-March.[12] It is considered that excessive rainfall in this season is a reason of water contamination. This outbreak emerged in a rainy spring season, and it was considered that the rain along with water network repairs facilitated the outbreak. The source of norovirus outbreaks is usually food and rarely water, subsequently direct contact from person to person and rarely contamination through air are important in the spread of the infection.[2] Even if norovirus was not detected in the city water supply, cases detected in many parts of the center and especially high number of cases in the first two days of the outbreak has led us to believe that the outbreak was water-borne. On the following days, interpersonal contacts may have played a role in contamination. Therefore, beside the control of the outbreak source, necessary infection control measures should be taken to prevent the contamination through interpersonal contacts.

Major clinical finding in norovirus gastroenteritis are abdominal pain, nausea, vomiting and diarrhea. Fever is rarely seen. These symptoms and findings occur 24-48 hour after contamination with the virus.[15-17] In this outbreak; nausea, vomiting and abdominal pain were more common than diarrhea. In the literature, cases with fever have been reported.[15]

Norovirus gastroenteritis may affect all age groups. However, complications due to dehydration are more commonly seen in children younger than five years of age, in those older than 65 years and in the chronically ill. Although there is no specific treatment, patients who develop dehydration should be treated with oral or intravenous fluid replacement.[2,18] In this outbreak, all patients were treated on outpatient settings, if necessary intravenous fluids were given. No complications or deaths were seen.

When managing gastroenteritis outbreaks, one of the most important issues is detection of the agent and the source. This would be of utmost importance for patient treatment and control of the source and prevention from spreading. Clinical and laboratory findings and epidemiological data may be of help. In this outbreak, samples have been collected from

patients and from the city waterworks as probable source of the outbreak. On the sample evaluation, together with clinical, epidemiological and laboratory parameters (influx of patients from all neighborhoods, patients' clinical findings and microbiological features of the stool samples) it has been considered that the source is the city water supply and the agent a virus. The necessary measures have been taken in the light of this information and in the days ahead the agent was confirmed to be norovirus.

Norovirus not only may be causative agent of gastroenteritis outbreaks alone, but also sometimes other bacterial, viral or parasitic factors, may cause outbreaks simultaneously.[5,19] Therefore, other bacterial, viral and parasitic agents must be examined together with the norovirus. In this study, examples of patients evaluated for bacterial, viral and parasitic agents, but a positive result was not obtain.

Water-borne norovirus outbreaks may affect hundreds of people simultaneously. Early detection of the outbreak source and agent are important in terms of follow up and treatment of the individuals affected. Particularly in gastroenteritis outbreaks accompanied by nausea, vomiting, abdominal pain and rarely fever, where no leukocytes or erythrocytes are detected on stool microscopy, norovirus should be considered as an agent on the first place and investigations should be performed.

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