

**RESEARCH
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Ahmet Guzelcicek¹
Seher Aydin¹

¹Harran University, Medicine
Faculty, Department of Pediatrics,
Sanliurfa, Turkey

Corresponding Author:
Ahmet Guzelcicek
Harran University, Medicine Faculty,
Department of Pediatrics, Sanliurfa,
Turkey
mail: aguzelcicek@harran.edu.tr
Phone: +90 5529472003

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konuralptipdergi@duzce.edu.tr
konuralptipdergisi@gmail.com
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Prevalence of Gastroenteritis Caused by Rotavirus in the Children of Southeastern Anatolia

ABSTRACT

Objective: Acute gastroenteritis is an important cause for morbidity and mortality in the children. Rotavirus is an important viral agent in the etiology of childhood gastroenteritis globally. Rotavirus may vary depending on the climate and geographical territory. The aim of the present study was to search for the prevalence of rotavirus in pediatric patients who have referred due to acute gastroenteritis in Sanliurfa province of South-Eastern Anatolia.

Methods: Stool sample records of 5,777 cases who have referred to Harran University Hospital because of gastroenteritis between March 2016 and March 2018 were evaluated according to the age, season and month.

Results: Rotavirus antigens were detected in 532 (9.2%) stool samples. The cases with positive viral antigen were most common in 13 to 24-month age group by 36.8%. The most common period was fall with a rate of 35.3%, and the most common month was October by 15.6%.

Conclusions: Rotavirus gastroenteritis is observed with a prevalence rate of 9.2% in Sanliurfa province of South-eastern Anatolia. Rotavirus, the most common agent for gastroenteritis in pediatric patients below 2 years of age, between 13 and 24 months in particular, should be searched during October in fall season.

Keywords: Acute Gastroenteritis, Child, Rotavirus

Güneydoğu Anadolu Bölgesi'nde Çocuk Gastroenteritlerinde Rotavirus Sıklığı

ÖZET

Amaç: Akut gastroenteritler çocuklarda morbidite ve mortalitenin önemli nedenlerindedir. Rotavirüs gastroenteritleri tüm dünyada çocukluk döneminde görülen gastroenteritlerin etyolojisinde yer alan viral etkenler arasında önemli bir yere sahiptir.

Gereç ve Yöntem: Bu çalışma ile hastanemize akut gastroenterit ile başvuran çocuk hastalarda rotavirüs sıklığının araştırılması amaçlanmıştır.

Bulgular: Dışkı örneklerinin 532'sinde (%9,2) rotavirüs antijenleri belirlenmiştir. Viral antijen pozitif olgular en sık 13-24 aylık yaş grubunda ve zaman olarak Ekim ayı ile sonbahar mevsiminde görülmüştür.

Sonuç: Mortalite ve morbiditeye neden olan gastroenteritler içinde rotavirus insidansı önemli bir yere sahiptir. İlimizde %9,2 oranında görülmektedir. İki yaş altı çocuklarda ve özellikle 13-24 aylık bebeklerde en yaygın gastroenterit etkeni olan rotavirüs özellikle sonbahar ve kış mevsimlerinde rutin olarak araştırılmalıdır.

Anahtar Kelimeler: Akut Gastroenterit, Çocuk, Rotavirus

INTRODUCTION

Acute gastroenteritis (AGE) is the most important cause for morbidity and mortality globally and especially in developing countries following lower respiratory tract infections. Rotaviruses are the leading cause for diarrhea, which is observed in the babies and the children below 5 years of age, and for severe gastroenteritis, which causes hospitalization and infant deaths (1). The infection causes mortality in developing countries where treatment options are limited, and morbidity as well as economic losses in developed countries (1, 2). The cause for AGE may be viral, bacterial, parasitic and fungal. Many seem to be related to water resources, sewage systems and personal hygiene. It is mostly spread through fecal-oral route. Rotavirus is the most common viral cause (3). The increase of infection in colder months may be associated with aerosol spread; the spread through aerosol route was shown in animal experiments (4). Rotavirus is a double-stranded, segmented RNA virus from Reoviridae family. Incubation period is approximately 1 to 4 days (5). Approximately 440,000 children die because of rotavirus gastroenteritis, 2 millions of children are admitted to the hospital and 25 millions of children refer to pediatric polyclinic (6).

Clinical presentation of rotavirus varies from an asymptomatic infection to severe diarrhea causing dehydration and death. Infections appear with vomiting, watery diarrhea, and fever for several days.

The infection may be diagnosed by fresh stool samples during acute period. The most common methods used for diagnosis include ELISA, latex agglutination and immunochromatographic methods. Sensitivity of these tests varies between 70% and 100% (7).

The present study was planned to detect the incidence of gastroenteritis caused by rotavirus in pediatric patients between 0 and 17 years of age who have referred to Research and Practice Hospital of Medical Faculty within Harran University, and to detect seasonal and age distribution.

MATERIAL AND METHODS

The study was conducted retrospectively on the children between 0 and 17 years of age who have referred because of acute gastroenteritis between March 2016 and March 2018 after approval of local ethical committee. All patients who were examined in the polyclinic, the patients who were admitted from emergency service because of gastroenteritis, and those who provided stool sample in the clinic were enrolled into the study. Data of the patients who had rotavirus antigen test were reviewed retrospectively.

The adequate tests accepted for the study included immunochromatographic method to analyse rotavirus.

Statistical Evaluation: Descriptive statistical method was used for data evaluation. Furthermore, chi-square test was used to compare binary group data.

RESULTS

Among 5,777 patients who were examined for acute gastroenteritis, 2,485 (43%) were female and 3,292 (57%) were male; rotavirus antigen was negative in 5,245 (90.2%) patients, and positive in 532 (9.2%) patients. The positive cases included 296 (55.6%) males and 130 (44.4%) females. Rotavirus was detected more in male gender (Table 1).

Table 1. Distribution of cases according to gender

Sex	Positive	Negative	Total
Female	236	2249	2485
Male	296	2996	3292

Majority of the cases were detected in October (n: 97, 15.6%), March (n: 29, 14%), December (n: 51, 13.9%), January (n: 47, 13.6%) months, mostly in fall (35.3%), followed by winter (27.6%), spring (18.6%) and summer (18.4%). July (n: 30, 3.9%), June (n:22, 4.9%) and September (n: 37, 5.4%) were the months with least rotavirus positivity (Table 2).

Table 2. Distribution of cases according to months

Months	Positive	Negative	Total	Ratio %
January	47	297	344	13.6
February	49	320	369	13.2
March	29	178	207	14
April	36	236	272	13.2
May	34	349	383	8.8
June	35	675	710	4.9
July	30	722	752	3.9
August	33	522	555	5.9
September	37	649	686	5.4
October	97	521	618	15.6
November	54	462	516	10.4
December	51	314	365	13.9
Total	532	5245	5777	9.2

One hundred and ninety-six patients whom rotavirus was detected were infants between 13 and 24 months of age. One hundred and fifty-three patients (28.7%) were within first 12 months of age, followed by 102 (19.1%) cases between 25 and 36 months of age, and 55 (10.3%) cases between 37 and 48 months of age. The cases significantly reduced in further ages, and no case was detected after 10 years of age (Figure 2).

Numbers of positive cases

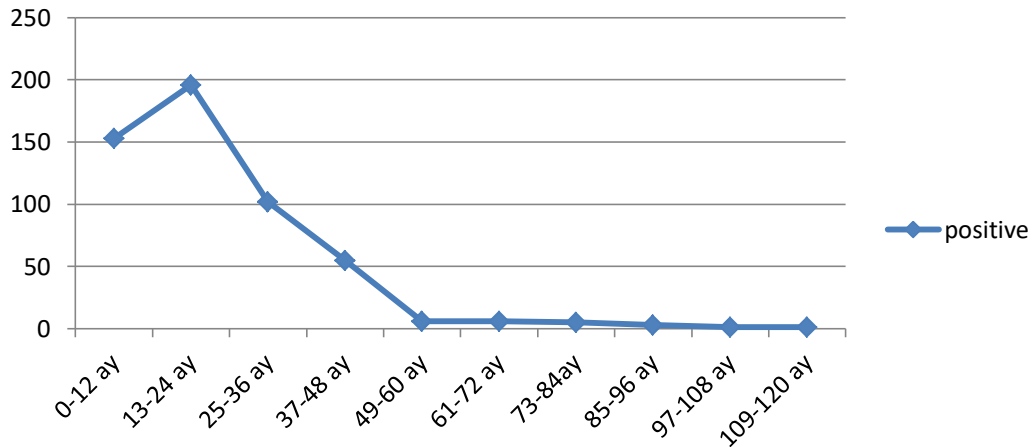


Figure 1. Distribution of gastroenteritis cases according to age

DISCUSSION

Rotavirus is the most important cause for childhood gastroenteritis. The disease causes diarrhoea-induced hospitalization, severe morbidity, mortality and significant medical costs in our country and all over the world. Although similar incidence rates are detected in developed and developing countries, mortality due to rotavirus infection is higher in developing countries (8, 9).

The infection is spread through fecal-oral route, it is common below 2 years of age and progresses severer. The disease causes fever, vomiting, watery diarrhoea without blood and mucus, and severe dehydration following an incubation period for 1 to 4 days (10). Although medical history and clinical presentation guide the clinician for diagnosis of viral gastroenteritis, laboratory tests are needed for final diagnosis. The methods that may be used to analyze rotavirus in the stool samples during acute period include electron microscopy, enzyme immunoassay, immunochromatography or antigen detection through latex agglutination or assertion of the virus in the stool by culture (10, 11, 12). Electron microscopy is a rapid method which is useful to detected rotavirus in the stool; however, it is not practical (13). Majority of the studies that analyse positivity of rotavirus were conducted through immunochromatographic and ELISA methods. These are preferred antigen detection tests in the laboratories due to resulting in shorter time, high specificity, and compliant results (14). The samples were analyzed through immunochromatographic method in the present study.

According to the data of World Health Organization (WHO) which was updated in 2011, incidence of rotavirus infection was reported as 20% to 40% in European countries, 5% to 25% in America, 30% to 50% in Asian countries, 10% to 65% in African countries (15). The studies conducted in their countries report that rotavirus

rate varies between 11% and 71% among viral gastroenteritis (16, 17) whereas the studies conducted in our country report the rotavirus incidence between 9.9% and 39.8% (18, 19, 20). Prevalence of rotavirus antigen was detected 9.2% in the present study. This study which was performed through immunochromatographic method suggested that the prevalence of rotavirus infection is below Turkey average.

Although rotavirus infection may be seen in any age, symptomatic infections mostly appear in the children below 2 years of age (21). Breastfeeding for the first 6 months reduce the incidence of diarrhoea (22). Recurrent infections are milder and asymptomatic due to partial immunity created by rotavirus after 24 months of age. Rotavirus is most commonly detected between 0 and 24 months of age in our country. In the studies which have focused on the cases between 0 and 5 years of age, the rate of the cases younger than 12 months of age was 26.3% to 65.4%; the rate of the cases within first 2 years was 46% to 88.9% (18, 23). A previous study conducted in Izmir reported that 80.7% of 366 rotavirus cases were within first 2 years, 46% were between 6 and 23 months of age, and 48% were within first 12 months of age (18). Gul et al. reported in their study conducted in Kahramanmaraş that 26.3% of their cases were within first 12 months of age, and 71% were within first 2 years (11). From the view of wider age groups, the rate of the cases within first 2 years of age varied between 54.9% and 72% (24, 25). Incidence of rotavirus within first 2 years was detected 56% in Istanbul, 70.3% in Kayseri, and 69% in Bursa (26, 27, 28). Rotavirus gastroenteritis was most common in the children between 13 and 24 months of age by a rate of 36.8% in the present study. This was followed by the infants within first 12 months of age by a rate of 28.7%. The cases within first 2 years of life were more than half of

the cases (65.5%). Our findings were consistent with the literature. The prevalence gradually decreased in further ages, and there was not any case after 10 years of age. Rotavirus was most commonly detected between 0 and 24 months of age, followed by 24 to 69 months of age.

Rotavirus-induced diarrhoea is affected by the region, season and climate. Rotavirus is detected every season of the year in tropical countries; it is more common in dry seasons in some countries (29). Although seasonal variations are observed depending on the climate conditions of the study region in our country, it is more common in the winter and spring in many studies (30, 31, 32). It usually appears during fall, winter and spring seasons in mild climate conditions (33). In the present study, the infection was most common in October (15.6%) followed by March (14%), December (13.9%) and January (13.6%); the most common seasons were fall (35.3%) and winter (27.6%). The infection was least common in July and in summer. In a previous study in this

region, the most common infectious agent rotavirus was found (34).

Limitation of the present study was the possibility of false positive results by immunochromatographic tests in the newborns and gastroenteritis in the patients with an underlying disease. Exclusion of misleading by reference methods may enable to obtain more accurate data. However, use of expensive methods for scanning is not a cost-efficient approach.

Consequently, incidence and importance of rotavirus in gastroenteritis cases should be kept in mind within the first two years of age. Detection of a positive rotavirus antigen would reduce the use of unnecessary antibiotics; would allow to predict the clinical presentation of the patient, and to determine a therapeutic approach. It is important to recognize the fact that rotavirus gastroenteritis is most common in October and during fall in our country. We believe that rotavirus infection would be reduced through vaccination programs in the early period.

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