

Examination of rotavirus and enteric adenovirus in children with acute gastroenteritis

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ABSTRACT

Rotavirus and enteric adenovirus serotypes 40 and 41 are important etiologic agents of acute gastroenteritis in children. Little is known about the epidemiology of adenovirus and rotavirus infections in Turkey. This study was designed to determine the incidence of rotavirus and enteric adenovirus in stool specimens of children with acute gastroenteritis.

Three hundred and twenty children (135 female and 185 male) with acute gastroenteritis admitted to the Pediatrics Department of Maltepe University, School of Medicine between March 2004 to March 2005, were included in this study. To detect these viruses in stool specimens, immunochromatographic tests (Rida Quick, r-biopharm) were used.

Rotavirus was detected in 46 (14%) of the patients whereas adenovirus was detected in 44 (14%) out of 320 cases. In 24 (8%) of the cases both adenovirus and rotavirus were positive. Most of the cases were admitted to the hospital on May and December. The incidence of adenovirus was the same during the whole year except spring in which it was low and of rotavirus was high in winter compared to the other months.

Although, rotavirus is known to be the frequent agent in viral gastroenteritis in children, in our study, the rates of adenovirus were similar with rotavirus. With these findings we conclude that, detection of both viruses may be convenient in the differential diagnosis in children with acute gastroenteritis.

Key words: Gastroenteritis, children, Rotavirus, Adenovirus

INTRODUCTION

Rotaviruses and enteric adenovirus types 40 and 41 are the most prevalent viruses in the aetiology of childhood gastroenteritis in developed countries (1). Rotavirus is known to be the most common agent for diarrhea in all over the world. Rotaviruses have a peak incidence in winter, whereas evidence for a seasonal variation in the We report a one year prospective analysis of rotavirus and enteric adenovirus (type 40,41) in stool specimens of children under twelve years incidence of adenoviruses infections is lacking (2). Viral gastroenteritis takes the important place in acute infectious gastroenteritis and because, the symptoms are nonspecific, microbiological evidences are important for the differential

diagnosis. Most reports from our country have only rotavirus results (3-6). Epidemiological studies directly comparing these two viruses are inadequate in our country. We report a one year prospective analysis of rotavirus and enteric adenovirus (type 40,41) in stool specimens of children under twelve years of age with acute gastroenteritis.

MATERIALS AND METHODS

In one year (between March 2004 to March 2005), 320 infants and children (135 female and 185 male) up to 12 years of age, admitted to the Clinics of Pediatrics Maltepe Faculty of medicine with acute gastroenteritis, were studied for the presence of rotavirus and enteric adenovi-

ruses 40/41 in stool specimens collected at the time of admission. Diarrheal illness was defined as the passage of unformed (loose or watery) stools with at least twice the usual daily frequency, accompanied by fever, nausea, or vomiting. To detect these viruses in stool specimens, the same method, immunochromatographic tests (Ri-da Quick, r-biopharm) were performed in a ten minute after admission to laboratory. For microscopic examinations, wet- concentration procedures by formalin- ethyl acetate sedimentation and were used. For each positive specimen, the date of reporting or receipt in the laboratory, the sex and age of the patient and results of viral and microscopic examination were recorded on SSPS 11.5 statistical programme. For statistical analysis, Mann-Whitney U test was used.

RESULTS

The patient ages ranged from 1 month to 144 months, with a mean of 44.93 months; 57 % of the patients were male.

In the 114 of the 320 (36%) stool specimens viral antigens were recovered. Rotavirus was detected in 46 (14%) of the patients whereas adenovirus was detected in 44 (14 %) out of 320 cases. In twenty-six (8 %) of the cases were yielded adenovirus and rotavirus simultaneously.

Most of the cases were admitted to the hospital on May and December (26%). Less specimens were accepted to the laboratory on August and October (7%). Detection rate of viral agents according to months is shown Figure 1.

Figure 1.The incidence of adenovirus was the same during the whole year except spring in which it was low and of rotavirus was high in winter compared to the other months.

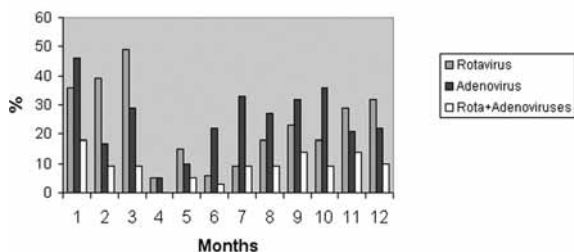


Table 1. The age means in months and the type of viruses.

VIRUS	Min	Max	Mean	S.D
Rotavirus	3	119	33.85	28.73
Adenovirus	4	130	37.79	33.19
Bothviruses (+)	9	144	39.25	35.67
Bothviruses(-)	1	144	49.54	40.96

There was no statistically significant difference between age groups and the type of viruses.

Table 2. Age groups and pathogens

AGE	ROTAVIRUS n=46	ADENOVIRUS n=44	ROTA+ADENO n=24
0-6 month	1	2	0
7-24 month	23	18	14
25-48 month	11	14	16
49 and over	11	9	4

The greatest number of rotavirus (50 %) occurred among patients 7 to 24 months old and for adenoviruses, the detection rates were % 41 among the same age groups. Both adenovirus and rotavirus common young children under 48 month. But, rotavirus results in 7 to 24 month group were higher than the other groups (p<0.005).

DISCUSSION

Infectious diarrhea is one of the most important causes of mortality during childhood period in Turkey (4,5). The causes of infectious diarrhea vary according to age, season and the geographic localization (7). We report a one year prospective analysis of rotavirus and enteric adenoviruses in 320 children with gastroenteritis.

Viruses are important causes of infectious diarrhea. The most common cause of viral gastroenteritis is rotaviruses whereas enteric adenoviruses are known to be the second most common cause (5,8). In the studies from different countries, it was reported that rotaviruses constituted 11-71

% of viral gastroenteritis cases (9-11) while this rate was found as 6-22.2 % for adenovirus and as 1.3-6 % for both adenovirus and rotavirus positive cases (9,10,12-14). In the studies conducted in our country, the rate of rotavirus cases was found as 9.8-39.8 % while it was 7.8-10 % for adenovirus cases (4-6,15-18).

In our study, viral antigens were recovered in 34 % of 320 stool specimen from gastroenteritis cases. Of these viral antigens, 14 % (n: 46) were adenovirus, 14 % (n: 44) were rotavirus and 8 % (n: 26) were both rota and adenovirus antigens. This rate increased to 21 % for rotavirus when rotavirus positive cases and both adenovirus and rotavirus positive cases are considered together while this rate increased to 21 % for all adenovirus cases.

In the study of Öztürk et al. (17) where he studied 136 gastroenteritis cases, antigen positivity was found as 20.8% and 8.8 % for rotavirus and adenovirus, respectively. Only one case (2.8 %) had both rotavirus and adenovirus positivity.

Rotavirus is the most common etiologic agent in viral gastroenteritis when literature is reviewed. Only one study from Guatemala reported that adenovirus serotypes 40-41 were seen 3 times more common than rotaviruses as an etiologic agent in children with gastroenteritis which was attributed to climate (13). In our study, the rates of recovering adenovirus and rotavirus from stool specimens were the same.

Although rotavirus and adenovirus infections are seen more commonly under 2 years of age, adenovirus can be seen as an etiologic agent among all age groups (5-7,9,13,16).

In the study of Baysallar et al (18), they found the rate of adenovirus antigen positivity significantly higher than that of rotavirus positivity in patients younger than 2 years.

Kyung-Hee et al (14) found no difference in age distribution of patients with rotavirus and adenovirus positivity.

In our study, of the 114 cases with an age range of 2 months to 12 years, nearly half of total were under 2 years of age.

In temperate climates, viral gastroenteritis cases are seen more commonly in winter while they are seen throughout the year in tropical climates. In winter months, bacterial gastroenteritis cases are less commonly seen while the rate of viral gastroenteritis cases seem to be increased (5,6). While the rotavirus gastroenteritis is seen more commonly in winter and early spring, adenovirus is seen throughout the year (9,11,13,15).

Uhnou I. et al. (9) reported that adenovirus gastroenteritis made 2 different peaks during the summer and winter months, respectively.

In our study, rotavirus gastroenteritis cases were seen more commonly in March and winter months, while adenovirus cases and cases with both virus positivity were seen throughout the year which is consistent with other studies.

In conclusion, viral pathogens play an important role as a causative agent in childhood gastroenteritis. Viral antigen analysis in stool specimens is important for diagnosis since clinical findings are nonspecific. This method provides a rapid diagnosis with a high sensitivity and specificity (70-100 %). While investigating viral pathogens, it is advisable to look for adenovirus antigens in addition to rotavirus (especially in cases which are not very compatible with rotavirus gastroenteritis when age and season are taken into consideration) which we think is a better diagnostic approach for identification of causes of viral gastroenteritis.

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