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# Prevalence of Rotavirus Antigen in Various age Group Children in Acute Diarrhea by Different Method

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## Abstract

**Background:**Rotavirus is one of the leading cause of Pediatrics diarrhea. There is a need for data analysis on the prevalence of rotavirus diarrhea. This study was carried out to determine the prevalence of rotavirus infection in children up to the age group of 5 year who presented with diarrhea. The study also ascertain factors associated with rotavirus infection in them.

**Material and Methods:**In the present study Rotavirus antigen is detected by ELISA and with one step rapid antigen test. Rapid diagnosis of Rotavirus associated diarrhea can prevent inappropriate administration of antibiotics and help in preventing the spread of multi- drug resistance.

**Results:**The Rotavirus infection was highest in age group of 6 months to 24 months (72.72%) and in male (63.64%). The infection was more prevalent during winter and presented with triad of diarrhea, vomiting and fever.

**Conclusion:**Rotavirus was significantly associated with diarrhea in children of 6-24 months of age. It is more in male children as compared to female Rapid card test use in routine investigation which is easy to handle and having low cost and not required trained staff. so It is important to connclude this test in routine investigation for Pediatric patient as it can prevent misuse and inappropriate administration of antibiotics and help in preventing the spread of multi- drug resistance.

**Keywords:**Elisa, Rotavirus, Immuno-chromatography, Watery diarrhea, Mutli-drug resistance.

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## Introduction

Acute diarrheal disease is a major public health problem and a leading cause of high morbidity and significant mortality in both developed and developing countries like India. Rota virus infection is the thirdmostcommon cause of severe diarrhea in young children Worldwide.[1]Almost all kids have had a Rota virus infection by the time they are 5 years old. It is estimated that RotaVirusinfectionannuallycauses 111 million episodes of gastroenteritis requiring home care, andabout5millionclinic visits, millions of hospitalization and approximately600,000deathsinchildren lessthan5yearsofageWorldwide.[2] There are seven Rota virus groups known to infect the humans, among them the most dominant is group A. World Health Organization (WHO) estimated that diarrheaisresponsiblefor18%deaths among children younger than 5 years of age.[3]

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In view of high incidence of morbidity and mortality in developing countries like India there is a need for rapid and sensitive detection method in routine diagnostic laboratory, which perform antigen detection using enzyme immunoassay (EIA), latex agglutination assay3 or immune-chromatography.[4,5] Evidence by direct virus detection using electron microscopy is not practical by routine laboratories. Although Rota virus can be isolated from stool sample by culture, but it is a cumbersome process and needs sophisticated laboratory with skilled personnel. The recent advance in antigen detection is based on immunological techniques using monoclonal antibodies which has gained the attention of the researchers. Therefore the direct detection of antigen in stool sample by rapid one step assay is inexpensive, easy to handle, noninvasive procedure, no specialized instrument is required and have high sensitivity.[6]The present study aims to detect Rota virus antigen using rapid diagnostic kit and ELISA.

**Material and Methods**

The present study was undertaken between January to December in the Department of Microbiology and Pediatrics Department, at Saraswathi Institute of Medical Sciences, Hapur U.P. After obtaining a written & informed consent by the parents of childrenbelowfiveyearswithacute diarrhea. Ethical clearance was taken from the ethical committee of the institution. A total of 150 freshly passed stool, samples were collected in wide mouth sterilized container from hospitalized children and OPD patients of Saraswathi Institute of Medical Science, Hapur, with complain of acute diarrhea by the help of their parents or caretaker and transported to the Microbiology department as soon as possible. Samples were kept at 4°C and tested within 24 hours of collection. Rotavirus antigen is detected by immune-chromatographic test (SD Bioline test kit) and ELISA kit (Premier Rotaclones) accordingtomanufacturer'sinstruction (One step rotavirus antigen test Korea, 2011; Rotavirus antigen ELISA, 2012).

**RESULTS&DISCUSSION**

Out of 150children 90(60%)were male and 60(40%)were female. Male children (63.64%) were affected more than female (36.36%). Age wise distribution of children showed maximum number in the age group 6 month to 24 month [Table1].Around 54% of positive cases occurred among 7-18 month of age group children, which is concordance with recent and previous studies done in India that ranged from 22 to 74%. Saravanan. P et al,[7] reported 29.95% rotavirus positive children among age group7-12 month. Major proportion of rotavirus positive cases fell under the age group between 7-18 month with a rate of 62.5%.Another study done by Banerjee I et al,[8] reported that the median age of detection of rotavirus in children admitted in hospital as 10 month. Robin SM et al,[9] also reported that majority of cases of rotavirus diarrhea occurred in children younger than 2 year. The present study in in concordance with the above studies. There was no statistically significant difference in the frequency of rotavirus infection among patients from urban and rural area. A high number of (72.6%) of rotavirus positive cases by ELISA presented with a triad of diarrhea, vomiting and fever followed by vomiting preceding diarrhea (21%) and only diarrhea (6.4%). Dehydration was significant in children 72% showed severe dehydration. The infection was more prevalent during the winter month. In present study, out of 150 patients there were 32 rotavirus positive cases. The present study showed an incidence of 22% of rotavirus diarrhea by ELISA in children less than five years of age [Table2 &3]. Similar results were seen by study done by Broor et al.[10]

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**Table 1: Age & Sex Distribution of Diarrhea Cases**

| Age | Male | % | Female | % | Total | % |
|---|---|---|---|---|---|---|
| 6 - 12 months | 25 | 16.67% | 20 | 13.33% | 45 | 30.00% |
| 1 - 2 years | 32 | 21.33% | 15 | 10.00% | 47 | 31.33% |
| 2 - 3 years | 17 | 11.33% | 13 | 8.67% | 30 | 20.00% |
| 3 - 4 years | 9 | 6.00% | 6 | 4.00% | 15 | 10.00% |
| 4- 5 years | 7 | 4.67% | 6 | 4.00% | 13 | 8.67% |
| Total | 90 | 60.00% | 60 | 40.00% | 150 | 100.00% |

Majority of infected children in the present study were between 6 to 24 months of age (72.72%). It appeared that children below 6 months of age wereinitially protectedby maternalantibodiestorotavirusinfection andby acquiredactiveimmunity after24 months of age7. This result is similar to other studies done in Eastern Nepal and other countries.[11] In present study 90.47%cases had watery diarrheaandmajority(76.19%)are presented with severe dehydration due to elaboration of a potent enterotoxin which causes profuse watery diarrhea, destroys the intestinalepithelialsurfaceleadingto bluntedvilli, extensivedamage,and shedding of massive quantities of virus in stools.[12]

**Table 2: Age & Sex Distribution of Rotavirus Positive Cases by ELISA**

| Age | Male | % | Female | % | Total | % |
|---|---|---|---|---|---|---|
| 6 - 12 months | 8 | 24.24% | 3 | 9.09% | 11 | 33.33% |
| 1 - 2 years | 8 | 24.24% | 5 | 15.15% | 13 | 39.39% |
| 2 - 3 years | 3 | 9.09% | 3 | 9.09% | 6 | 18.18% |
| 3 - 4 years | 2 | 6.06% | 1 | 3.03% | 3 | 9.09% |
| 4- 5 years | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| Total | 21 | 63.64% | 12 | 36.36% | 33 | 100.00% |

**Table 3: Diarrhea in various Age Groups**

| Age | Total No. of Cases | ELISANo. (+/-) | Rapid TestNo. (+/-) |
|---|---|---|---|
| 6 - 12 months | 45 | 11/34 | 10/35 |
| 1 - 2 years | 47 | 13/34 | 13/34 |
| 2 - 3 years | 30 | 6/24 | 6/24 |
| 3 - 4 years | 15 | 3/12 | 3/12 |
| 4- 5 years | 13 | 0/13 | 0/13 |
| Total | 150 | 33/117<br>22.00% | 32/118<br>21.33% |

**Table 4: Statistical Significance of Rotavirus with respect to Age Group**

| Observed Value | | 6 months to 2 years | More than 2 years | Total |
|---|---|---|---|---|
| Rotavirus Cases | Positive | 24 | 9 | |
| | Negative | 68 | 49 | |
| Total | | 92 | 58 | |

## CONCLUSION

Rotavirus was significantly associated with diarrhea in children of 6-24 months of age.It is more in male children as compared to female,associated with severe dehydration, vomiting, and fever, and its clinical spectrum of signs and symptoms whichmimics to other types of diarrhea. It is not routinely diagnosed inmostof thehospitals due to non-availability of tests. Present study shows that rapid card test is inferior as compared to ELISA but ELISA is not

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used routenly in India, only few hospitals use ELISA for diagnosis of Rota virus infection, because of limited availability and cost. Rapid card test use in routine investigation which is easy tohandle and having low cost and not required trained staff. so It is important to include these test in routine investigation for Pediatric patient as it can prevent misuse and inappropriate administration of antibiotics and help in preventing the spread of multi- drug resistance.

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