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Original Article

Prevalence of rotavirus infection in children below two years presenting with diarrhea

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ABSTRACT

Background: Rotavirus is a common cause of diarrhea in children. There is a need for data on prevalence of rotavirus diarrhea especially in our setting. This study was carried out to determine the prevalence of rotavirus infection in children upto two years presenting with diarrhea and to ascertain factors associated with rotavirus infection in them.

Methods: A cross sectional observational study was carried out to determine the prevalence of rotavirus infection amongst children less than 2 years presenting with diarrhea. The clinical profile of the children was analyzed along with detection of rotavirus antigen in stool.

Results: A total of 250 children with diarrhea were included in the study. The Male: Female ratio was 0.97:1. We found 24% children presenting with diarrhea to be positive for rotavirus antigen. 78.3% of children with rotaviral diarrhea were in the age group of 6–15 months. There was a significant association between type of feeding and rotavirus diarrhea with reduced prevalence while on exclusive breast-feeding. Though only 10.4% of children with rotavirus diarrhea had severe dehydration, 61.5% of children with severe dehydration were positive for rotavirus.

Conclusion: Rotavirus diarrhea caused substantial morbidity in our study population. The rotavirus positivity in these children was 24% and there was a significant association of rotavirus infection with type of feeding and severity of dehydration.

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Introduction

Diarrheal disorders account for an estimated 1.5 million deaths globally every year making it the second leading cause of childhood mortality.¹ Amongst these, viral diarrheas form the most important cluster. Rotavirus is the most common

identifiable viral cause of diarrhea in all children.^{2,3} Rotavirus infection ranges from asymptomatic infection to severe life threatening diarrhea. It has been estimated that 29% of all diarrheal deaths in children <5 years of age is due to rotavirus and about 23% of rotavirus deaths are in the Indian subcontinent.⁴ Rotavirus infection affects 95% of children under the age of 5 years regardless of the socio-economic or

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environmental conditions and leads more frequently to dehydration than other etiologies.⁵⁻⁷

Advances in hygiene and sanitation have reduced the predominance of the other gut pathogens, while leaving rotavirus incidence almost unaffected.⁸ Rotavirus vaccines are being projected as a solution to this problem. Availability of efficacious rotavirus vaccines has warranted extensive epidemiological studies on rotavirus diarrhea. It was with this background that this study was carried out to add to the existing knowledge on the magnitude of the problem in a tertiary care hospital setting.

Materials and methods

A cross sectional observational study was carried out in children presenting to either the outpatient department or admitted with diarrhea at a tertiary hospital between January 2011 and June 2012.

The inclusion criteria consisted of all children less than two years with acute diarrhea. Acute diarrhea was considered as passage of loose watery stools or an increased frequency of stools.

The exclusion criteria consisted of children with dysentery, diarrhea more than 14 days, or diarrhea developing after hospitalization due to any other cause. Clinical data was collected on a pre-designed pro forma. History regarding type of feeding was taken and classified as those taking exclusive breast feeds (BF), those on top feeds only (FF) and those on both breast feeds and top feeds (MF). Classification of dehydration and management was done based on WHO guidelines for diarrhea management. The children in the study were treated with oral rehydration therapy or intravenous fluids depending on severity of dehydration. Stool samples were collected from children on presentation to the hospital before starting therapy. Stool samples were collected in sterile containers and stored at -20°C in the freezer for testing at a later date when adequate samples were collected. The stool samples were analyzed for rotavirus antigen by ELISA technique using Rotavirus Antigen Detection Microwell ELISA Kit by IVD Research Inc. Quality Diagnostic Products (Cat Code Rota-96). This ELISA based test was used for the qualitative determination of rotavirus antigen in stool.

The data was analyzed with appropriate statistical tests with the help of SPSS 17.0 software.

Results

In the study period from January 2011 to June 2012, a total of 250 samples were taken and clinical data regarding type of feeding, symptomatology, severity of dehydration and type of treatment given was recorded and analyzed.

Out of 250 children, 123 (49.2%) were male and 127 (50.8%) were female. Age wise distribution of patients showed maximum number of patients in the age group of 6 months to 15 months (74.8% for entire group and 78.3% for rotavirus group) (Fig. 1). 44 (17.6%) children were exclusively breastfed (BF), 90 (36%) were given top feeds only (FF) and 116 (46.4%) were being breastfed along with top feeds (MF). The feeding

data showed that there were a large percentage of children who should have received supplementation beyond 6 months and those who should have continued breast-feeding beyond 6 months rather than giving only top feeds. However, further details on the same were not collected as this was not in the purview of the study.

Out of 250 children with diarrhea, 109 (43.6%) had vomiting along with diarrhea. 81 (32.4%) had cough or coryza and 83 (33.2%) had fever during diarrhea. The incidence of lethargy was 41.2%, irritability-39.2%, sunken eyes-21.2% and altered skin pinch-28%. 204 (81.6%) had passed urine in the last 6 h, 26 (10.4%) suffered from severe dehydration requiring intravenous fluids, 77 (30.8%) were diagnosed to have some dehydration. Majority of children 147 (58.8%) did not show any signs of dehydration. On presentation, 182 (72.8%) received oral rehydration therapy. 68 (27.2%) children required intravenous fluids on admission. Few children with some dehydration required IV fluids owing to persistent vomiting or inability to accept orally.

Rotavirus was detected in 60 (24%) samples. The proportion of rotavirus positive cases in in-patients was 45.2% as compared to those in out-patients which was 15.2%.

On comparison of rotavirus with non-rotavirus diarrhea, it was found that there was no statistically significant association between age (in months) and rotavirus ($p = 0.9$) or with gender and rotavirus ($p = 0.14$). There was a significant association between type of feeding, bottle feeding and severity of dehydration as shown in Table 1. Vomiting, coryza and fever were significantly more associated with rotavirus diarrhea. However, there was no statistically significant association between rotavirus and month of presentation ($p = 0.332$).

Discussion

Diarrheal disease is one of the commonest causes of death in children in developing countries and rotavirus has been consistently identified as the commonest pathogen associated with severe diarrhea. In our study of 250 children presenting with diarrhea, 24% were found to be positive for rotavirus antigen in their stool samples. A large number of studies

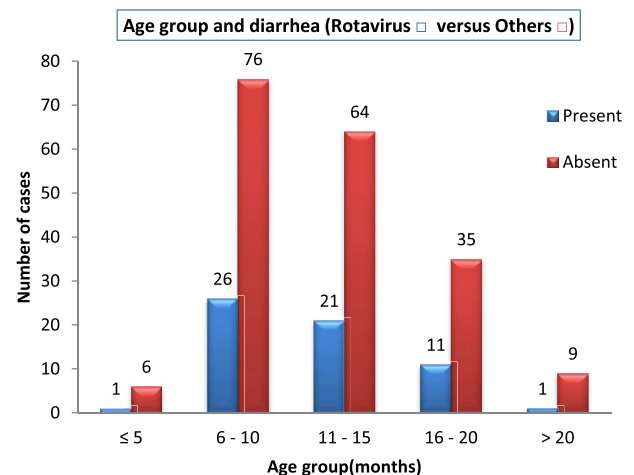


Fig. 1 – Age distribution of children with diarrhea.

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