



ROTAVIRUS INFECTION IN UNDER FIVE CHILDREN WITH ACUTE GASTROENTERITIS

Pediatrics

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ABSTRACT

Background: Rotavirus is the most important cause of diarrhoea among children below five year of age. It is most frequent causes of morbidity and mortality in children worldwide, especially in India.

Methods: This cross sectional study was conducted to know the causative agent of diarrhoea among under five children treated at Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar. Stool specimens were collected from children under 5 years of age visiting the pediatric OPD at Sri Krishna Medical College and Hospital, Muzaffarpur. Rapid stool antigen immunochromatographic testing was used to diagnose rotavirus diarrhoea.

Results: During the 3 months of the study period, 50 children visited the institute seeking treatment of diarrhoea. 10 (20%) of the children were found to be positive for Rota virus infection. It was also observed that, due to advent of rotavirus vaccine, incidence of diarrhoea has come down.

Conclusions: Routine evaluation of children with acute diarrhoeal episode by stool test for rotavirus is recommended to avoid excess use of antibiotic.

KEYWORDS

Childhood Diarrhoea, Enteropathogens, Predominance, Antigen Immunochromatographic Testing

INTRODUCTION

Diarrhoea is the third leading cause of childhood mortality in India, and is responsible for 13% of all deaths/year in children under 5 years of age (1). Acute gastroenteritis is an inflammatory condition of the stomach and the small intestine; this can be caused due to many organisms like bacteria, viruses and parasite. Among the various organisms causing diarrhoea, viruses are the most common causative agent. Rotavirus is the most common cause of diarrhoeal disease among infants and young children(2). About 50% of diarrhoeal deaths in children are estimated to occur in lower income countries of Asia and sub-Saharan africa(3). Rotavirus had often been associated with severe dehydration which is actually responsible for death associated with the infection (4). In addition, children with dehydration had been found to be about two times more likely to have rotavirus diarrhoea(5). There is no specific treatment for rotavirus associated gastroenteritis but the complications can be prevented by fluid and electrolyte replenishment. This research would emphasize that the major causative organism causing gastroenteritis is rotavirus. With the advent of newer medical techniques and advent of rotavirus vaccine, the incidents of rotavirus infection have reduced. The rotavirus vaccine helps protect babies against diarrhoea and vomiting caused by rotavirus.

METHODS

This cross sectional study was conducted in Children below five years of age between September 2019 to November 2019. Children hospitalized for acute diarrhoea in the Department of Pediatrics Sri Krishna Medical College and Hospital, Muzaffarpur. The study is conducted by using the rapid immunochromatographic test. In this study children below 5 years of age came to the pediatric OPD with symptoms of acute gastroenteritis- like nausea and vomiting, diarrhoea and abdominal cramps (as per WHO) were included. The experimental design used in this research is detection of VP6 antigen present in the middle capsid layer. The technique of rapid ICT card test is used, being a rapid detection test for rotavirus; the results were obtained in 15 minutes.

The age and name of the patient is noted and stool sample of the patient was collected, by using rapid ICT card test, the stool sample is tested for the presence of antigen, also, history of rotavirus vaccination was asked and noted down. This test is a rapid diagnostic method which detects only a group of rotavirus that infects man. The sensitivity of this test is 100% and specificity is 92.4%(8). Samples were subjected to SD rotavirus BIO LINE, based on the result obtained, i.e. two bands on the card which reads for test and control indicates that the test is

positive, if only one band is present on the card which reads for control, indicates that the test is negative. For each day the total number of the positives and the negatives are noted. At the end the entire data is compiled and analyzed.

RESULTS

Out of 50 samples of acute gastroenteritis obtained from children below five years of age 10 were positive for rotavirus infection and 40 were negative for rotavirus infection as shown in Table 1. The percentage of positivity is 20% shown in Figure 1. Rapid ICT card test is a reliable test for the detection of rotavirus in the diarrhoeal sample and shows 100% sensitivity and 92.4% specificity.

Table-1 Prevalence Of Rotavirus Infection

Total number of samples taken	Positive for rotavirus infection	Negative for rotavirus infection
50	10	40

DISCUSSION

Immunochromatographic assay is an antigen antibody agglutination technique that allows the identification of group specific proteins, including the major inner capsid protein, present in group A of rotavirus. The test is based on the detection of VP 6 antigen present on the middle layer of the capsid, ICT test is a rapid test and the specificity of the test is 97%. The antigen VP6 which is responsible for the pathogenesis and causes diarrhoea in children is detected by ICT. The nitrocellulose based membrane pre-coated with rabbit monoclonal antibodies and the specially-selected monoclonal anti rotavirus antibodies are used as detector materials and used as detectors. These enable the test to identify Group A rotavirus antigen directly from the sample in human fecal specimens and then this mixture will react specifically with the rabbit anti rotavirus antibody on the membrane.

The test is a rapid qualitative test for the detection of group A rotavirus in human fecal specimen. The ICT test was performed using the standard protocol and the all the rules of WHO were followed. Out of the 50 samples we obtained from children suffering from acute gastroenteritis, 10 were positive. Our study on the prevalence of rotavirus in children below five years which gave 20% positivity is showing good correlation with other studies conducted by Chakravarti et al (17.8%)(6), Nag et al (15.6%)(7), Anand et al (16.2%)(8). Though humans of all age groups are susceptible to rotavirus infection, the infection shows its severity in children below 5 years of age. The individual suffering from rotavirus infection excretes large amount of virus (rotavirus) which can be spread even through contaminated

hands and fomites also. The ICT kit used in this study is an immunoassay to detect Group A rotaviruses in the fecal specimen.

CONCLUSION

This study is performed using an ICT rapid card test in which group A of the rotavirus is detected, the drawback of this study is other groups of rotavirus like B and C which also cause human infections are not detected. Following the rapid ICT card test which is a diagnostic test, ELISA for the detection of rotavirus should also be done as ELISA is a confirmatory test.

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