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Evaluation of rotavirus in children's affected with diarrhoea

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Abstract
Rotavirus diarrhoea is an important contributing factor for malnutrition, which in turn predisposes the child to further diarrhoea, thereby initiating a vicious cycle. This in turn results in periodic evaluation of bacteriologic and virological patterns of diarrhoea and therapeutic trials. Hence based on this above findings the current study was planned with the objective to know the proportion of rotavirus diarrhoea in children presenting with acute diarrhoea.
The study was planned in the Upgraded Department of Paediatrics, Patna Medical College & Hospital, Patna From march 2015 to feb 2016. The 50 children's aged 1 month to 4 years suffering from acute watery diarrhoea were included in the present study. Diarrhoea was defined as passage of three or more loose stools in the last 24 hours. Out of 50 children's 25 children were divided in Group A as Rotavirus Positive cases and 25 were divided in the Group B as Rotavirus Negative cases.
The study showed higher incidence of rota viral diarrhoea among children presenting with acute diarrhoea. Hence from the above data and literature data India continues to suffer from a disproportionately high morbidity and mortality from this preventable condition. Prioritizing diarrhoeal disease control interventions in the child health programme is urgently needed. Despite high prevalence, rotavirus diarrhoea can successfully and confidently be managed at home and in the oral rehydration corner of small hospitals.

Keywords: rotavirus diarrhoea**,** acute diarrhoea, stool, dehydration

Introduction
Rotavirus infection is a common cause of diarrhoea in infants and young children, and can cause mild illness, hospitalization, and death. Rotavirus infections results in approximately half a million deaths per year in children aged less than five years, mainly in low- and middle-income countries. Since 2009, the World Health Organization (WHO) has recommended that a rotavirus vaccine be included in all national immunization programmes [6].
Rotavirus infection is spread through contamination of hands, objects, food or water with infected faeces. The virus is taken in by the mouth. Such routes of infection are common in day care centres, family homes and homes for the elderly. It may also be spread by mucous membrane (the thin moist lining of many parts of the body such as the nose, mouth, throat and genitals) contact with infected airborne droplets produced by coughing and sneezing.
Rotavirus infection is the most common cause of severe diarrhoea in infants and children worldwide. Symptoms include: vomiting, fever and watery diarrhoea. The onset is sudden and symptoms last for an average of 3 to 7 days. The illness may cause severe dehydration and require treatment in hospital. Mainly infants and toddlers up to 3 years of age are affected, but older children and adults may also have symptomatic infection. Children can be infected with rotavirus several times during their lives. Children and adults with impaired immunity are at increased risk of more severe infection. In temperate areas of Australia, rotavirus infections are more common in mid to late winter, while in the northern tropical and arid regions there is no seasonal pattern. Epidemics of rotavirus can occur [1].
Rotavirus enteritis is a mild to severe disease characterised by nausea, vomiting, watery diarrhoea and low-grade fever. Once a child is infected by the virus, there is an incubation period of about two days before symptoms appear. The period of illness is acute. Symptoms often start with vomiting followed by four to eight days of profuse diarrhoea. Dehydration is more common in rotavirus infection than in most of those caused by bacterial pathogens, and is the most common cause of death related to rotavirus infection [2].
Rotavirus A infections can occur throughout life: the first usually produces symptoms, but subsequent infections are typically mild or asymptomatic, as the immune system provides some protection. Consequently, symptomatic infection rates are highest in children under two years of age and decrease progressively towards 45 years of age. The most severe symptoms tend to occur in children six months to two years of age, the elderly, and those with immune deficiency. Due to immunity acquired in childhood, most adults are not susceptible to rotavirus; gastroenteritis in adults usually has a cause other than rotavirus, but asymptomatic infections in adults may maintain the transmission of infection in the community. There is some evidence to suggest blood group secretor status and the predominant bacteria in the gut can impact on the susceptibility to infection by rotavirus [3].
To reduce the spread of rotavirus, wash your hands thoroughly

and often — especially after you use the toilet, change your child's diaper or help your child use the toilet. But even strict hand-washing doesn't offer any guarantees.

There are two vaccines offered against rotavirus

RotaTeq: This vaccine is given by mouth in three doses, often at ages 2 months, 4 months and 6 months. The vaccine is not approved for use in older children or adults. Although a few cases of intussusception — a rare but life-threatening form of intestinal blockage — were reported after vaccination with RotaTeq, the Food and Drug Administration (FDA) and the Centers for Disease Control and Prevention (CDC) found that the number of cases in vaccinated children was similar to the number of cases in unvaccinated children and concluded that the vaccine didn't increase a child's risk of intussusception. A similar anti-rotavirus vaccine (RotaShield) was pulled from the market in 1999 because of an association with intussusception. If after vaccination your child has stomach pain, vomiting, diarrhea, blood in his or her stool, or a change in bowel movements, contact your doctor immediately.

Rotarix: This vaccine is a liquid given in two doses to infants at ages 2 months and 4 months. Clinical trials of the vaccine detected no increased risk of intussusception [4].

The rotavirus causing diarrhoea is an important contributing factor for malnutrition, which in turn predisposes the child to further diarrhoea, thereby initiating a vicious cycle. This in turn results in periodic evaluation of bacteriologic patterns of diarrhoea and therapeutic trials. Hence based on this above findings the current study was planned with the objective to know the proportion of rotavirus diarrhoea in children presenting with acute diarrhoea.

Methodology

The study was planned in Upgraded Department of Pediatrics, Patna Medical College & Hospital, Patna From march 2015 to feb 2016. The 50 children's aged 1 month to 4 years suffering from acute watery diarrhoea were included in the present study. Diarrhoea was defined as passage of three or more loose stools in the last 24 hours. Out of 50 childrens 25 childrens were divided in Group A as Rotavirus Positive cases and 25 were divided in the Group B as Rotavirus Negative cases.

The approval of the institutional ethics committee was taken before starting the study. All the patients and their parents were informed consents. The aim and the objective of the present study were conveyed to them.

The Inclusion criteria include the abrupt onset of four or more loose stools per day for less than 14 day's duration. Those cases who received antibiotics before collection of stool samples were excluded.

All children were managed according to their dehydration status, as per WHO guidelines [6]. Children were monitored for number of loose stools, consistency of stool and time since last loose stool every six hours in a day. Stool samples of enrolled children were collected in sterile screw-top container. The samples were analysed in Microbiology department in vaccine carrier; rotavirus detection was done by ELISA using Rota IDEIA Kit (DAKO, Germany).

Results & Discussion

The study was planned in Department of Paediatrics in the North Indian Hospital. The 50 children's aged 0 -4 years diagnosed with the suffering from acute watery diarrhoea were included in the present study.

The data from the 50 childrens suffered from diarrhoea of age below 4 years were collected and presented as below. Children were monitored for number of loose stools, consistency of stool and time since last loose stool every six hours in a day.

Table 1: Age, Sex & No. of Cases

Group	Group A	Group B
Age in years	**Rotavirus Positive cases**	**Rotavirus Negative cases**
0.1- 1 years	12	15
1 – 2 years	6	4
2 – 3 years	4	3
3 – 4 years	3	3
Total	25	25
Sex	No of cases	No of cases
Males	15	18
Females	10	7
Total	25	25

Table 2: Rotavirus Cases and Variables

Group	Group A	Group B
Variable	**Rotavirus Positive cases**	**Rotavirus Negative cases**
Fever	20 cases	16 cases
Dehydrated	5 cases	9 cases
Loose Stools per day	6-7 times	5-6 times
Duration of hospital stay (days)	From 3 to 4 days	From 2 to 3 days
Duration of diarrhoea at time of enrolment (days)	1 to 2 days	1 to 2 days
Total duration of diarrhoea (days)	5 - 7 days	4 - 6 days

Worldwide, diarrhoea related mortality has decreased, mainly because of better therapeutic interventions along with provision of safe drinking water, improvement of sanitation and popularization of primary health care activities [5-6]. Many studies across the world have shown the important role of rotavirus as a cause of diarrhoea in children both in developed and developing countries [7-8].

Rotavirus infections were detected in almost all months of the year and chances of coinfections are more in children [9]. Rotavirus is main cause of acute gastroenteritis in children [10]. Worldwide, diarrhea related mortality has decreased mainly because of better therapeutic interventions along with provision of safe drinking water, improvement of sanitation and popularization of primary health care activities. Many studies done in different area have shown the inpatient role of rotavirus as a cause of diarrhea in children in both developed and developing countries.

Kang, *et al.* [11] detected rotavirus in 39% cases in Indian multi-centric surveillance whereas Bahl, *et al.* [12] reported

23.5% positivity rate in children below 5 years, hospitalized for acute diarrhoea. A review of epidemiological studies reported rotavirus in 20% of children hospitalized for acute diarrhoea [13]. The difference observed between our study and previous studies may be attributed to variation in enrolment criteria among the studies, and inclusion of outpatient children in our study. Like previous studies [14], we also found more dehydration and longer duration of diarrhoea in rotavirus-positive children.

Conclusion

The study showed higher incidence of rota viral diarrhoea among children presenting with acute diarrhoea. Hence from the above data and literature data India continues to suffer from a disproportionately high morbidity and mortality from this preventable condition. Prioritizing diarrhoeal disease control interventions in the child health programme is urgently needed.

Despite high prevalence, rotavirus diarrhoea can successfully and confidently be managed at home and in the oral rehydration corner of small hospitals.

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