ORIGINAL ARTICLE

A Significant Role of Rotavirus in Acute Gastroenteritis in Infants and Young Children.

by

MUZIEF MUNIR, S. SALENDU-WAROUW and I.S. KARUNDENG *

(From the Department of Child Health and Department of Microbiology Medical School, Sam Ratulangi University/Gunung Wenang Hospital Manado, North Sulawesi, Indonesia)*

Abstract

A study of the role of rotavirus in acute gastroenteritis in infants and children was conducted in an attempt to find out the magnitude of its problems.

It was found that the majority of cases with acute diarrhea was caused by rotavirus, only 8% were bacterial gastroenteritis while the remaining one third of unknown origin.

The clinical course of rotavirus gastroenteritis seemed to be a dysentery-like diarrhea with an acute onset of watery diarrhea, associated with fever and vomiting.

These findings indicate that a further extensive study is needed and that the regimen of treatment of dysentery-like diarrhea should be reevaluated.

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Introduction

Diarrheal disease in developing countries, including Indonesia is still a major child health problem, since it is not only one of the most prevalent diseases and the main cause of death in children under five years of age, but it also deteriorates the nutritional status of those children. Indonesia with a population of 150 million, is estimated to have 50 milion episodes of diarrhea anually among children under 5 years of age.

Many factors are to be considered in accounting for the high incidence of diarrheal disease, such as poor environmental sanitation and lack of clean-safe-water supply. In spite of the fact that this disease is an enormous child-health problem, only less than 50% of bacterial pathogens could be identified in the stools of them with acute diarrhea (Walker-Smith, 1978), and the remaining was of unknown origin, blamed on viral gastroenteritis. After Bishop et al. (1973) and Flewet et al. (1974) identified virus particles in the stools of infants and children with gastroenteritis, the role of rotavirus as the cause of acute diarrhea in children becomes important.

Realizing the important role of rotavirus in acute gastroenteritis in children, many question arise concerning the need of antibiotics in the treatment of acute gastroenteritis, particularly in our environment. This study was conducted in an attempt to find out the magnitude of rotavirus gastroenteritis in children, with a special reference to the needs of antibiotics in the treatment of acute diarrhea.

Materials and Methods

Infants and young children with acute diarrhea, admitted to the Pediatric Ward, Gunung Wenang Hospital, Manado, Indonesia during the outbreak in September and October 1980, were chosen randomly for this study. Sex, age, body weight, physical examinations were recorded.

Stools of studied-cases were collected for bacterial and viral investigations. The collected stools for rotavirus examinations were sent to the centre For Bio-Medical Research, National Institute of Health research & Development, Department of Health, Jakarta, Indonesia. Bacterial investigations were done by the Department of Microbiology, Medical School, Sam Ratulangi University, Manado.

Result

During the period of September and October 1980, there were 96 infants and children with acute gastroenteritis admitted to the Pediatric Ward of Gunung Wenang Hospital Manado, Indonesia. Forty four out of those cases were included in this study. It was found that from the stools of 26 out of 44 cases or in 59%, rotavirus was isolated.

Pathogenic bacteria were found in only 2 out of 44 cases or in 5%. While in the remaining 16 cases, there were no pathogenic bacteria in their stools.

The clinical findings of 26 cases in which rotavirus was found in the stool were as follows :

1. Diarrhea :	
— acute onset	100 % or in 26 cases
— watery diarrhea	100 % or in 26 cases
— followed by mucous stool :	61.5% or in 10 out of 26 cases
> 10 times/day	69.2% or in 18 out of 26 cases
less than 10x/day	30.8% or in 8 out of 26 cases
2. Fever of more than 38°C	100 % or in 26 cases
3. Vomiting	86 % or in 22 out of 26 cases
4. Convulsion	11.5% or in 3 out of 26 cases
5. Associated diseases :	
Bronchopneumonia	8 % or in 2 out of 26 cases
Upper respiratory tract infection	23 % or in 6 out of cases

Discussion

Although this study was not conducted throughout the year, it revealed an important role of rotavirus in acute diarrhea in infants and children, particularly during the outbreak of acute gastroenteritis. The majority of cases in this study or 59%, suffered from rotavirus gastroenteritis. Only 8% were bacterial gastroenteritis, and the remaining one third which was still of unknown origin, needed further investigations. Other viral such as adenovirus, astrovirus, calicivirus, coronavirus and enterovirus might account for the unknown origin of diarrhea.

The clinical course of rotavirus gastroenteritis seemed to be a dysentery-like diarrhea with an acute onset of watery diarrhea, associated with fever and vomiting, and might be followed by a mucous discharge. It recovered without any fatal cases within 3 - 10 days (mean 5.2 days). Convulsion, considered as febrile convulsion was found in 11.5% of the cases, without any evidence of cerebrospinal fluid abnormalities.

The clinical management of our cases consisted of oral rehydration and antibiotics (Amoxillin). Antibiotics were given based on the thought that all of those cases were caused by bacterial infections, all of those cases had high fever with dysentery-like diarrhea, and one third of them were associated with upper respiratory tract infections and pneumonia. However, as revealed from

TABLE 1 : *Age, duration of diarrhea, and types of feeding of cases with rotavirus gastroenteritis*

No.	Sex	A g e (years)	diarrhea (days) Duration of	Types of feeding	Associated diseases
1.	F	11/12	3	bottle	—
2.	M	5/12	6	bottle	—
3.	F	7/12	7	bottle	PCM
4.	M	10/12	10	breast milk	—
5.	F	3 6/12	4	bottle	—
6.	M	3/12	10	bottle	URI + Convulsion
7.	M	1	5	breast milk	—
8.	M	10/12	3	bottle	URI
9.	F	5/12	7	breast milk	—
10.	M	4/12	4	breast milk	—
11.	F.	1 2/12	2	breast milk	—
12.	F	6/12	3	breast milk	Bronchopneumonia
13.	M	4/12	6	bottle	Convulsion
14.	F	1 9/12	4	breast milk	URI + Convulsion
15.	F	2 8/12	3	family diet	PCM
16.	F	1 3/12	6	breast milk	—
17.	M	8/12	5	bottle	Bronchopneumonia
18.	M	1 9/12	6	bottle	—
19.	F	2	5	bottle	URI
20.	F	10/12	5	bottle	—
21.	M	1	6	bottle	—
22.	M	2	5	bottle	URI
23.	M	5/12	4	bottle	—
24.	M	3	5	family diet	—
25.	F	10/12	6	bottle	URI
26.	M	1 6/12	5	breast milk	—

this study which showed the important role of rotavirus in acute gastroenteritis in infants and young children, a further extensive study including the use of antibiotics and its epidemiological aspects should be given first priorities.

A profound understanding of the epidemiological aspects of this disease is necessary indeed, to find out a proper way to prevent its transmission in an attempt to reduce the morbidity rate of gastroenteritis, particularly rotavirus gastroenteritis. The pathogenesis of this disease is still a big question mark as to whether it is transmitted by merely a feco-oral route or by other ways. Based on the observations made during this study, we believe that the transmission of this disease was not merely through the feco-oral route. since coincidently with the outbreak of acute diarrhea, there was an outbreak of flue-like disease. A concurrent upper respiratory tract infection was also found in 23% of the cases, and bronchopneumonia in 8%. However, it was unfortunate, that the etiology of those cases, whether or not caused by rotavirus was not determined. The same finding was reported by Rodriquez et al. (1977) who found that 29% of their cases with rotavirus gastroenteritis were associated with upper respiratory tract infections.

The beneficial role of breast feeding has been widely discussed regarding the prevention of infection during infancy, particularly in the prevention of gastroenteritis. (Goldman and Smith, 1973 Hanson et al, 1977).

But in this report the beneficial role of breast feeding in the prevention of rotavirus gastroenteritis was obscured and needs an extensive further study; 34.6% of the cases were still being breast-fed after they had contracted diarrhea.

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REFERENCES

1. BISHOP, R.F.; DAVIDSON, G.P.; HOLMES, I.H. and RCK, B.J. : Virus particles in epithelial cell duodenal mucosa from children with acute non-bacterial gastroenteritis. Lancet, ii, 1281 - 1283 (1973).
2. FLEWETT, T.H.; BRYDEN, A.S.; DAVIS, H.; WOODE, G.N.; BRIDGER, J.C. and DERRICK, J.M. : Relation between viruses from acute gastroenteritis of children and newborn calves. Lancet, ii, 61 (1974).
3. GOLDMAN, A.S. and SMITH, C.W. : Host resistance factors in human milk. J. pediatr. 82 : 1082 (1973).
4. HANSON, L.A.; CARLSON, B.; AHLSTED, S. and FALLSTROM, S.P. : New knowledge of human milk imunology. Int. Congr. Pediatr., New Delhi 1977.

5. RODRIGUEZ, W.J.; KIM, H.W.; ARROBIO, J.O.; BRANDT, C.D.; CHANOCK, R.M.; KAPIKIAN, A.Z.; WYATT, R.G. and PARROT, R.H.: Clinical features of acute gastroenteritis associated with human reovirus-like agent in infants and young children. J. Pediatr., 91; 188 - 193 (1977).

6. WALKER-SMITH, J.: Rotavirus Gastroenteritis (Review article) Arch. Dis. Childh., 53 : 355 - 362 (1978).