

Diagnosing Cholera in The Young: A Review of W.H.O. Criteria

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Abstract

This study was undertaken to study the occurrence of cholera in young children with a view to define the clinical criteria of diagnosis and endemicity of cholera in Delhi and to compare its clinical profile with rotavirus diarrhea. Hundred children below 3 years of age admitted with acute watery diarrhea were recruited. The severity of diarrhea and degree of dehydration were noted. Stool specimens collected from all cases were subjected to bacterial culture for identification of *Vibrio cholerae* and rotavirus detection by ELISA and PAGE techniques. Both *Vibrio cholerae* and rotavirus were detected in 5, *Vibrio cholerae* alone in 13 and rotavirus alone in 18 cases. Sixty-one percent cases of cholera occurred in children below two years. Rice watery stools were seen only in 28% (5/18) cases of cholera. Three (3/13) cases with cholera alone and 6/18 with rotavirus alone had mild diarrhea. Moderate diarrhea occurred in 3/5 cases with both pathogens, 6/13 with cholera alone and 7/18 with rotavirus alone. Severe diarrhea occurred in 3/5 cases with both pathogens, 4/13 with cholera alone, and 5/18 cases with rotavirus alone. Mild dehydration occurred in 3/5 and severe dehydration in 2/5 children with both pathogens. Only 3/13 children with cholera alone and one child with rotavirus alone were severely dehydrated. It is concluded that considering the diagnosis of cholera solely on clinical grounds and overlap between the clinical spectrum of cholera and rotavirus diarrhea would result in missing many cholera cases in a non-endemic area like Delhi.

Key words

Cholera, Rotavirus, Diarrhea

Introduction

Cholera continues to be a major public health problem in the developing countries. Many parts of India and the neighbouring Bangladesh are considered endemic for this disease(1). While clinically the index of suspicion is very high in these areas, the diagnosis is not often considered in non-endemic areas in the absence of typical rice watery stools. It is necessary to diagnose cholera clinically and to institute public health measures to contain this infection, otherwise it may result in the occurrence of an epidemic, as happened in Delhi in 1988(2).

Recent W.H.O. protocols give clinical definition of cholera as "severe dehydration from acute watery

diarrhea in an individual aged more than five years in a non-endemic area and in a person over two years in an area where there is a cholera outbreak(3).

At the Diarrheal Disease Unit of LN Hospital, New Delhi, we receive a large number of cases that can be classified clinically as cholera but do not prove to be so on microbiological analysis and vice-versa. This study was carried out to study the occurrence of cholera in young children and infants with a view to define the clinical criteria of diagnosis and endemicity of cholera in Delhi. For comparative analysis, rotavirus detection was also done in children with acute watery diarrhea.

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Materials and Methods

One hundred children below three years of age admitted with acute watery diarrhea during summer months to the Diarrhea Treatment and Training Unit of the Department of Pediatrics, LN Hospital, New Delhi, were recruited for the study. A detailed clinical history including severity of diarrhea, vomiting, fever and associated complaints was taken. The degree of dehydration was assessed on initial examination and was classified as some dehydration and severe dehydration. Stool specimens were collected from all the cases and subjected to bacterial culture for identification of *Vibrio cholerae*. Rotavirus was detected by ELISA and PAGE (Polyacrylamide Gel Electrophoresis) techniques.

Results

Out of the hundred children studied, both *Vibrio cholerae* and rotavirus were detected in 5 fecal specimens, *Vibrio cholerae* alone in 13 and rotavirus alone in 18 samples. Thus a total of 18 cases were positive for *V. cholerae* and 23 for rotavirus. Sixty-one percent cases of cholera were seen in children below two years of age (6/18 in children less than one year old and 5/18 in those between one and two years of age) and only 25 patients (7 positive for cholera) were in the age-group of 2-3 years. In all, 13% (6/46) and 17% (5/29) children between 0-1 and 1-2 years respectively were positive for cholera. The youngest child affected was 4 months old.

Rice watery stools were seen only in 28% (5/18) cases of cholera and not in any case of non-cholera acute watery diarrhea. Out of 5 cases positive for both *V. cholerae* and rotavirus, moderately severe diarrhea (10-20 stools per day) was seen in 3 cases (60%) while severe diarrhea (more than 20 stools per day) was seen in 2 cases (40%). Among 13 cases with a diagnosis of cholera alone, 3 children (23%) had mild diarrhea (up to 10 stools per day), 6 (46%) had moderate and 4 (31%) had severe diarrhea. Out of 18 cases positive for rotavirus alone, 6 (33%); 7 (39%) and 5 (28%) children respectively had mild, moderate and severe diarrhea.

Mild dehydration was seen in 60% (3/5) children with both pathogens, and 40% (2/5) had severe dehydration. Only 23% (3/13) children positive for *V. cholerae* alone

had severe dehydration, the rest (10/13) had mild dehydration. Among cases positive for rotavirus alone, 94% (17/18) had mild dehydration and only one child (6%) was severely dehydrated.

Discussion

The above results reveal that cholera is fairly prevalent in Delhi in children below 3 years. Nearly two-thirds of the cases of cholera were aged below 2 years. As Delhi is not considered endemic for cholera, according to the W.H.O. definition, a clinical diagnosis of cholera would not even have been considered in these cases. In a study by Aggarwal P *et al*(4) from Delhi, stool culture done in all cases of acute watery diarrhea below 12 years of age revealed cholera in 31.7% cases. Here 23.4% cases were less than two years old, though the study was carried out throughout the year rather than in the peak season. Similarly, Amin V *et al*(5) found one-third of culture-positive cases of cholera to be below two years of age. Therefore we can conclude that cholera occurs frequently in children below two years in Delhi.

The peak season for cholera in Delhi extends from May through September, during which period Singh *et al*(6) found 87% of their positive cultures. This study was also carried out during the same months, thus explaining the high positivity for cholera.

The youngest child in this study was 4 months old, similar to the study by Amin V *et al*(5) where the lowest age was 3 months; indicating that very young infants are not immune to cholera. In that study, only 0.78% (64/8714) cases of acute watery diarrhea were clinically suspected to have cholera on the basis of acute onset, rice watery stool, high purge rate and severe dehydration. This is much lower as compared to our study suggesting that clinical suspicion alone can miss a lot of cases of cholera in children. In this study, severe dehydration was found only in 28% cases. In a retrospective study by Mittal *et al*(7) on cases of culture-proven cholera during 1981-84, 21.5% cases had severe dehydration and only 20% had rice watery stools. Therefore severe dehydration is also not a necessary or common feature of cholera.

Rotavirus infection in children below 3 years accounted for 23% of the cases in our study, similar to



that in the study by Singhi *et al*(8), who reported 21.2% of all cases of acute watery diarrhea to be caused by rotavirus. The reported range of the incidence of this infection in tropical countries like India is 21-71%(9). Only 6% of the cases of rotavirus diarrhea had severe dehydration, which is somewhat less than that reported by Mahmood DA *et al*(10) (13%) and Mata L *et al*(11) (10%). Thus a significant degree of overlap has been found between the clinical spectrum of rotavirus and cholera infections.

Conclusion

In light of the above findings, had the diagnosis of cholera been considered solely on clinical grounds, most cholera cases would have been missed considering Delhi a non-endemic area. Further, had the clinical criteria given by W.H.O. been applied, 72% of the cases would have been missed on grounds of absence of severe dehydration. The overlap between the clinical features of cholera and rotavirus cases could lead to misdiagnosis of cholera cases as rotavirus clinically. Thus this study indicates that Delhi may be an endemic area for cholera, and larger studies need to be carried out in order to review the W.H.O. criteria for clinical diagnosis of cholera.

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