

Surveillance of *Vibrio Cholerae* O139 Patients Attending a Rural Diarrhoea Treatment Centre

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Objective: Describe the clinical and epidemiological features of patients with *V. cholerae* O139 presenting at the Matlab Diarrhoea Treatment Centre between February 1993 and January 1994.

Methods: As part of its health and family planning research activities, ICDDR,B maintains a diarrhoea treatment centre in its field site in Matlab, a rural subdistrict in Bangladesh. The Demographic Surveillance System (DSS) records all vital events in a population of 203,000, and the treatment centre has appropriate clinical and laboratory facilities. All patients coming to the hospital are treated, but detailed laboratory studies are conducted only on patients from the DSS area.

Results: The new strain of cholera was first isolated in Matlab in mid-February 1993. Of the 4,373 patients admitted from the DSS area, *V. cholerae* O139 was isolated from 756 (17.3%) cases. Sixty-nine percent of these patients were aged 15 years or more. More than 97% of the *V. cholerae* O139 patients presented with watery diarrhoea, 28% with abdominal pain, and 86% with vomiting and moderate to severe dehydration. Prevalence of *V. cholerae* O139 infection had a large peak during the hot, dry months (March-April) and a smaller peak during the post-monsoon and pre-winter period (September-November). *V. cholerae* O139 patients came from 91 of the 142 villages currently under DSS surveillance. Most villages had less than 10 patients, but 3 villages had more than 40 patients. There was no family clustering of patients; of the 756 cases, 608 came from families with no other case. The hospitalization rate was 3.7/1000/year. The age-specific rate was the highest (8.9/1000/year) among people aged 50 years or more. All *V. cholerae* O139 isolates were sensitive to tetracycline, chloramphenicol, and erythromycin, but resistant to cotrimoxazole. Eight percent of the isolates were resistant to ampicillin. Patients were treated with an average of 3.4 litre of intravenous fluids, 6.5 litre of oral rehydration solution, and tetracycline. Only 2 patients died after hospitalization.

Conclusions: The clinical symptoms produced by *V. cholerae* O139 were indistinguishable from that of classical cholera. Epidemiological differences in age distribution and seasonal patterns were observed. Further research is needed to describe the epidemiology of this new organism in detail to formulate strategies for controlling the disease.



Isolation and Identification of *Vibrio Cholerae* O139 from Faecal Samples of Diarrhoeal Patients

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Objective: Examine the techniques of isolation and identification of *Vibrio cholerae* O139, a newly emerged non-O1 cholera vibrio associated with high morbidity and mortality in the Indian sub-continent.

Methods: More than 100,000 diarrhoea patients are seen annually at the ICDDR,B's Dhaka-based hospital, and the Clinical Research and Service Centre. The conventional culture method, dark-field microscopy and coagglutination test were evaluated to detect *V. cholerae* O139 from faecal samples.

Results: During the period from July 1993 to June 1994, a total of 2,642 (14.17%) vibrios was isolated from 18,647 faecal samples from diarrhoeal patients. A total of 9.16% vibrios was detected by overnight faecal enrichment in bile peptone broth (BPB). The isolates included: *V. cholerae* O139 (44.55%), *V. cholerae* O1 Ogawa El Tor (42.28%), *V. cholerae* O1 Inaba El Tor (3.6%), *V. cholerae* non-O1, non-O139 (6.89%) and other vibrios (2.6%). When 400 watery stool samples were directly cultured on Taurocholate-tellurite gelatin agar (TTGA) and Thio sulphate citrate bile salts sucrose (TCBS) agar and following enrichment in BPB for 4 h, 6 h and overnight, 268 *Vibrionaceae* spp. (67.0%) were isolated which included *V. cholerae* O139 (36.5%), *V. cholerae* O1 (15.5%), *V. cholerae* non-O1, non O139 (1.75%),

other vibrios (1.75%), *Aeromonas* sp. (6.5%), and *Plesiomonas shigelloides* (5.0%). Enrichment of watery stool for 6 h in BPB increased isolation rate of *V. cholerae* O139 in comparison with 4 h and overnight enrichment culture and direct plating. TTGA was superior to TCBS agar with respect to isolation efficiency (100% vs. 93.08%) and results of slide agglutination (100% vs. 54.55%) and oxidase tests (100% vs. 1.66%). When 285 watery stool samples were tested by dark-field microscopy, slide coagglutination test (COAG) and standard culture methods for the detection of *V. cholerae* O139, the sensitivity, specificity and accuracy of coagglutination test were 97%, 100% and 99% respectively. The dark-field microscopy showed similar results. Both tests had positive and negative predictive values of 100% and 98% respectively.

Conclusions: The findings indicate that *V. cholerae* O139 was the major aetiologic agent of cholera in Dhaka during the study period. TTGA appears to be superior to TCBS for the detection of *V. cholerae* O139. Faecal enrichment is essential for optimum isolation. Coagglutination test and the field microscopy are simple, rapid, low-cost and reliable for the detection of *V. cholerae* O139 from faecal samples.



Description of Clinical and Laboratory Features of Severe Cholera Due to *Vibrio Cholerae* O139 (Bengal)

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Objective: Describe the clinical and laboratory features of *Vibrio cholerae* O139 infection.

Methods: A large epidemic of cholera due to a newly-recognized strain of *V. cholerae*, designated as *V. cholerae* O139 was reported from south India and Bangladesh in late 1992 to mid-1993. During the epidemic, there had been a large influx of patients with severe cholera-like diarrhoea into the ICDDR,B hospital in Dhaka, Bangladesh. To describe the clinical course of illness due to this new strain of *V. cholerae*, 22 adults (age 18-60 years) with severe diarrhoea were studied at the ICDDR,B hospital in Dhaka. Patients were managed with intravenous (IV) or oral rehydration fluids during the study period. A course of tetracycline was prescribed at the time of discharge.

Results: The important features of patients were: presenting with frequent watery stools, vomiting, dehydration, and hypovolaemic shock. The mean (\pm SD) volume of stool (ml) during the 1st, 2nd, 3rd, 4th, and 5th day were : 8,768 \pm 5,164; 4,734 \pm 3,514; 3,544 \pm 2,753; 1,387 \pm 1,648; and 628 \pm 1,107 respectively. The total volume of stool during the entire illness was (mean \pm SD): 23,210 \pm 13,944 ml. The total volumes of IV and ORS required for the treatment of patients were: 6,113 \pm 2,649 and 18,934 \pm 10,279 respectively. Stool became soft in 82% of the patients by day 3, and all patients recovered from diarrhoea by day 4 of hospitalization. Serum electrolyte (Na^+ , K^+ , Cl^-) concentrations were normal before hydration. TCO_2 mildly decreased (13 \pm 3.7 mmol/l) indicating isotonic dehydration with mild acidosis. Faecal concentrations of Na^+ , K^+ and CO_2 were 120 \pm 24, 26 \pm 18 mmol/l and 37 \pm 9 respectively. Mean haematocrit on admission was 56 \pm 3.2 % which declined to normal after rehydration. All patients had moderate leucocytosis, and 23% to 50% of the stools contained red blood cells and leucocytes respectively. The mean duration of faecal excretion of *V. cholerae* O139 was 6.7 days. All patients recovered without any residual complications.

Conclusions: These findings indicate that the clinical and laboratory features of *V. cholerae* O139 are similar to those of *V. cholerae* O1, and that treatment can be based on clinical diagnosis.

