A recent outbreak of cholera due to *Vibrio cholerae* O1 Ogawa in & around Chandigarh, North India

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An outbreak of cholera caused by *Vibrio cholerae* O1 Ogawa occurred in and around Chandigarh during July 22-31, 2002. Of the 303 patients admitted to two hospitals, 82 were confirmed by culture. Two rehabilitation colonies located at the periphery of Chandigarh were mainly affected. The isolates were biotyped as Eltor and were susceptible to many antibiotics. Thirty one (35.2%) of 88 water samples showed evidence of faecal contamination. The survey of the area revealed sewage contamination of the drinking water supply. The outbreak was controlled by providing safe drinking water to the people and correcting the defects in the sewage and water pipelines.

Key words Chandigarh - outbreak - *Vibrio cholerae* O1 Ogawa

Epidemics of cholera have been reported from various parts of India. Resurgence of *Vibrio cholerae* OI39 in certain areas has also been reported. Cholera has been quiescent in the past few years in Chandigarh. Very few cases have occurred (4 confirmed cases) in the last two years (unpublished data). A limited outbreak due to *V. cholerae* O139 (36 cases, unpublished data) occurred in July 1994. After that *V. cholerae* O139 has not been isolated and a few cases that occurred have been due to *V. cholerae* O1 Ogawa. We report here an outbreak of cholera due to *V. cholerae* O1 biotype Eltor serotype Ogawa in July 2002.

Stool samples collected from patients suspected to have cholera admitted to two hospitals (Government hospital, Sector 16 and Postgraduate Institute of Medical Education and Research, Chandigarh) during July 22-31, 2002 were examined by standard bacteriological techniques. Isolates of *V. cholerae* were biotyped by chick RBC agglutination test, sheep RBC haemolysis, Voges-Proskauer (VP) test and susceptibility to polymyxin B (50 units). Serotyping was performed using Denka Seiken antisera (Japan). *In vitro* antimicrobial susceptibility testing was done by the Stokes disk diffusion method on Mueller-Hinton agar using the following antibiotics (µg/disc) (Hi-Media Laboratories, Mumbai, India) : amoxycillin (100), cotrimoxazole (25), chloramphenicol (30), tetracycline (30), ciprofloxacin (5), nalidixic acid (30), cephalexin (30), cefotaxime (30), and gentamicin (10). *Escherichia coli* NCTC 10418 (originally obtained from Colindale, London and being maintained in our laboratory) was used as the control strain. A total of 88 water samples were
collected, 10 from tube wells, 45 from taps, 20 from hand pumps and 13 from water stored in tanks, buckets and cans. Water samples were tested by multiple-tube method for faecal coliforms and *Esch. coli*<sup>17</sup>. Two methods were employed to detect *V. cholerae* in water samples. In the first method one litre of water was filtered through membrane filter of 0.45 µ pore size (Milipore Corporation Bedford, MA) and the filter was placed on thiosulphate citrate bile salt sucrose agar (TCBS agar-Difco Laboratories, USA). Golden yellow colonies growing on TCBS agar were picked up for further identification. In the second method, 900 ml of water was added to 100 ml of 10 times concentrated alkaline peptone water (APW). After incubating for 6 h, 1 ml was transferred to 10 ml of single strength APW. A subculture was made from this APW after 6 h and another after overnight incubation on TCBS.

A total of 303 patients suspected to have cholera were admitted to two hospitals. Maximum numbers of patients were from two rehabilitation colonies. Stool samples could be collected from 148 patients and 82 stool samples were positive for *Vibrio cholerae* O1 (Fig.). Forty-eight patients (58.5%) were children and 16 were below 5 yr of age. Males and females were equally affected (42 males, 40 females). All patients presented with acute watery diarrhoea. Seventy eight per cent had vomiting, 56 per cent developed mild to moderate dehydration, and 10 per cent developed severe dehydration. Pain abdomen occurred in 18 per cent patients. The patients were treated with oral rehydration solution (ORS), intravenous fluids and antibiotics. Adults were given doxycycline and children were treated with furoxone/ciprofloxacin. One patient died, all others recovered. The case fatality was <0.01 per cent. All isolates were biotyped as Eltor and were susceptible to amoxycillin, ciprofloxacin, cephalaxin, gentamicin, tetracycline and cefotaxime. The resistance to furazolidone, cotrimoxazole and chloramphenicol was 37, 25.8 and 8.9 per cent respectively. The antibiotic resistance pattern is different from that reported from other areas in India<sup>18,19</sup> as none of the present isolates was resistant to amoxycillin. Ciprofloxacin resistance has been reported from India<sup>20</sup>, but none of the present isolates was resistant to this drug. The isolates should be tested by molecular methods like pulsed

![Stool samples tested and confirmed cholera cases](Fig. Occurrence of cholera cases during the outbreak (July 22-31, 2002).
field gel electrophoresis or ribotyping to see whether they belong to the new emerging clone of *V. cholerae* O1 Eltor that has replaced O139 strains in many parts of India and Bangladesh and have an epidemic potential.

Though stool samples were collected from hospitalized patients only, survey of the affected areas revealed a large number of people having symptoms suggestive of cholera in the two rehabilitation colonies located at the periphery of Chandigarh. This was probably due to mixing of drinking water with sewage in these areas due to broken pipelines. Of the 88 water samples tested, 31 (35.2%) were positive for confirmed coliform count and 13 (14.7%) were positive for confirmed *Esch. coli* count. Water samples collected from tube wells were free of contamination, while samples collected from hand pumps (12/20), taps (11/45) and stored water (8/13) showed evidence of faecal pollution. *V. cholerae* could not be grown from any of the water samples. Twelve samples had very high coliform counts (2 samples had 161 and 10 had >180/100 ml of water). Coliform counts in 19 samples ranged from 1 to 35/100 ml of water. Confirmed *Esch. coli* counts ranged from 1 to 35 in 11 samples and 161 and >180 in one sample each. The results of water testing confirmed that sewage contamination of drinking water supply had occurred somewhere along the distribution system. The outbreak was controlled by providing safe drinking water to the residents from mobile water tanks, correcting the defects in the sewage and water pipelines, treating the patients and providing health education to the residents about personal and domestic hygiene practices. Regular surveillance of the rehabilitation colonies for occurrence of cholera cases and bacteriological testing of drinking water supplies may prevent occurrence of such outbreaks.

**References**


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