Short Communication

Vibrio Cholerae O1 Ogawa Serotype Outbreak in a Village of Ambala District in Haryana, India

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Introduction

Cholera occurs in sporadic, endemic, epidemic, and pandemic forms. Large deltaic areas of the Ganges and Brahmaputra rivers are considered to be the homeland of cholera. After the 19th century, in several pandemics, it has involved most parts of the world. In India, epidemics of cholera are quite frequent. Epidemiological studies have estimated that it is responsible of about 5-10% of all acute diarrhea cases.(1)

Cholera may lead to death due to hypovolemic shock within 24 hours due to profuse watery diarrhea and vomiting. In most parts of the world, Vibrio cholerae El Tor biotype is the main cause of the outbreaks, which causes mild and asymptomatic diarrhea as compared to the classical typeToxigenic strains of Vibrio cholerae belonging to the O1 and O139 serogroups cause a devastating type of diarrhea. The occurrence of epidemics is known to coincide with increased prevalence of the causative Vibrio cholerae strain in the aquatic environment. We report an extensive outbreak of cholera in the Noorpur village of Haryana which was caused by Vibrio cholerae Ogawa serotype transmitted from the water of a shallow handpump located near a drain.

Materials and Methods

Noorpur village is around 5 kilometers from Ambala city and 55 Km from Post Graduate Institute of Medical Institute and Research (PGIMER), Chandigarh. It had 920 people residing in 136 households. On 22 August 2007, cases of diarrhea started arriving at the PHC around 7:30 AM, and by end of the day 280 cases were registered. Medical Officer in-charge reported the outbreak to district health authorities on the same day. A rapid response team was sent to the PHC for investigation and control by the district health authorities. Help was sought in terms of manpower, intravenous sets and fluids etc. from a neighboring PHC. Beds were arranged for the patients with the help of the villagers. Cases were managed intensively with continuous supervision. District health authorities declared it as an outbreak of acute diarrhoeal disease, and a team of 2 medical officers along with two ambulances were deputed to the PHC round the clock. Daily visit by health authorities also ensured effective monitoring and supervision of the situation. Another team facilitated by a microbiologist was sent from PGIMER, Chandigarh for investigation of the outbreak.

Stool samples were collected by the microbiologist from 16 affected patients on 22 August 2007. Water samples from 4 hand pumps, 2 tube wells, and 1 tap were also collected.

Results

Fifty-three percent (488/920) of village population was affected by diarrhea within a period of 7 days. Maximum (60%) cases occurred on the first day of the outbreak. Average age of the cases was 28 years. Attack rate was high (64.2%) among 46−60 years age group. Significantly high attack rate was found among males (57.5%) as compared to females (48.0%) (P = 0.005).

Forty-five cases were referred to district hospital at Ambala and two cases were referred to PGIMER,

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Chandigarh. One of the two referred cases to PGIMER Chandigarh was found to have Vibrio cholerae Ogawa serotype in the stools. Out of the 16 stool samples collected from the village, 10 (62%) cultures were positive for Vibrio cholerae O1 and one for Aeromonas species. The water sample from handpump installed near the slum area was found to be positive for Vibrio cholerae O1.

Discussion

Sporadic cases of acute diarrhea occur frequently in most parts of India throughout the year. However, at times explosive outbreaks of diarrhea occur due to cholera. The cholera outbreak in Noorpur village involved more than half of the village population with attack rate of 53%. Due to better surveillance and timely action no one died during the outbreak. Another such outbreak occurred with an attack rate of 11.6% and case fatality ratio (CFR) of 0.8% in October 2002 in Assam state.[2] In Dhalai and North Tripura district of Tripura state, acute diarrheal disease outbreak occurred during May 2004 with attack rate of 18.8% and CFR of 0.7%.[3] Another outbreak of cholera in Maldah district, West Bengal, during July-August 1998 had an attack rate of only 3.4%.[4] Most of the outbreaks involved adults to a large extent. Adults were reported to be 59.3% and 72.0% in the outbreak of West Bengal[4] and Goa,[5] respectively. In the present study, the attack rate was found to be significantly higher among males.

Until 1992, epidemics of cholera were caused by Vibrio cholerae classical or El Tor biotypes of serogroup O1. The classical biotype is believed to have caused first six pandemics, which occurred in the Indian subcontinent and subsequently in other areas of the world between 1817 and 1923.[6] Vibrio cholerae O1 biotype El Tor was first reported in 1905,[7] and was found to be the causative agent for most of cholera outbreaks. It was isolated as a sole pathogen in the hospitalized acute diarrhea patients; 40.0% in Tripura, 52.9% in West Bengal, and 63.0% in Assam oubreaks[2-4] and from water samples examined.[4] In the present outbreak, Vibrio cholerae O1 Ogawa serotype was found to be the causative agent, which was isolated from 62% of the stool samples collected from the patients. Vibrio cholerae O1 El Tor biotype, Ogawa serotype has been causing most of the cholera outbreaks in India till recently. It was also involved in Delhi outbreak in the year 2005.[8] Bacteriological analysis of 431 rectal swabs, collected from acute diarrhea cases at a surveillance site and in different diarrhea outbreak areas of Orissa from May to October 2005 had V. cholerae. Out of 265 culture-positive samples, Vibrio cholerae O1 was isolated in 56 samples (20.8%).[9] Cholera outbreaks have been reported due to contaminated water source for human consumption.[10-12] In the present study, the water source (handpump) for human consumption had shown the Vibrio cholerae Ogawa serotype growth, which could have triggered this outbreak.

In 2006, 52 countries officially reported to the World Health Organization (WHO) a total of 236,896 cholera cases including 6,311 deaths with a CFR of 2.7%.[1] These numbers do not reflect true burden of cholera due to limitations in the surveillance and notification systems in many countries. In order to estimate the actual burden of disease, a study revealed an incidence of 1.6/1000 population. The incidence was 8.6/1000 in <2 years old children and 6.2/1000 in 2−5 year old and only 1.2/1000 among children older than 5 year of age.[13] Cholera continues to be a growing concern in most developing countries. Since the emergence of serogroup O139, the incidence pattern of serogroup O1 have been constantly changing in the Indian subcontinent.[14,15]

This article represents practical experience direct from the community settings. Health services response towards an outbreak was outstanding and sets an example. This study also demonstrates how community participation with health care delivery system helped in the containment of an outbreak.

Conclusion

The diarrhea outbreak in Noorpur village occurred due to transmission of V. cholerae from a shallow handpump installed near the drain. Water quality surveillance system needs to be strengthened in order to prevent the occurrence of water borne diseases.

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Date: 1st March 2011 **Hemant Manjrekar** **Prof. Deoki Nandan**