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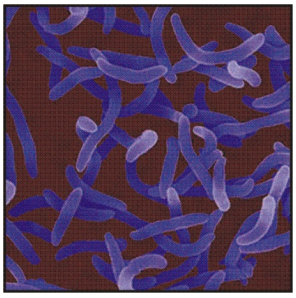

WATERBORN OUTBREAK OF VIBRIO CHOLERAE O1 OGAWA;
IN WADH AREA OF BALOCHISTAN

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ABSTRACT ... gspirkani@yahoo.com **Objective:** To isolate the etiological agent of severe diarrheal outbreak, identification, antibiogram of isolated agent and preventive measures to control the spread of infection. **Design:** Samples of stool and drinking water supply of affected area collected in Cary- Blair transport medium**,** inoculated on various media. The isolated strains were identified as responsible for diarrheal outbreak tested against antibiotics. The strain and antibiogram was further confirmed by Agha Khan University Hospital Laboratory in Karachi. **Setting:** Bolan Medical College Hospital, Quetta. **Main outcome measures:** Isolation of Vibrio cholerae O1, Ogawa, El Tor, antibiogram against isolated strain, and control of spread of infection. **Results:** The etiological agent responsible for severe diarrheal disease outbreak was Vibrio cholerae O1, Ogawa El Tor. in which 148 persons affected including all ages and both sexes. Four deaths (2.7%) reported out of these affected patients. The isolated strain was same in all patients and water source. Susceptibility to antimicrobial drugs was determined showing sensitivity to Ampicillin, Choloramphenicol, Ofloxacin, Tetracycline, Nalidixic Acid , Gentamycin and resistance to Polymaxin B, and Co-trimaxazole. The drinking source of water was a shallow well which was sealed and alternative arrangements of drinking water were made from another source. **Conclusion:** Vibrio cholerae O1, Ogawa El Tor, strains were isolated as etiological agent for severe diarrheal disease outbreak, which was spread through drinking water. The source of drinking water was contaminated due to rain in this area. The isolated strain was most common pathogen in this area for severe diarrheal disease outbreaks, and mostly it spreads through contamination of water source. The strategy applied for prevention of disease was successful and no further case was reported.

Key Words: Vibrio cholerae O1, Ogawa El Tor, Diarrheal outbreak, Antibiogram, Infection control.

INTRODUCTION

Vibrio cholerae is a known etiological agent for large outbreaks of severe diarrheal disease. Many pandemics have been reported in history. The first long-distance spread of cholera to Europe and America began in 1817 and by the early 20th century, six waves of cholera had spread across the world in devastating epidemic fashion. In 1961, the "El Tor" biotype (distinguished from classic biotypes by the production of hemolysins) reemerged to produce a major epidemic in the Philippines and to initiate a seventh global pandemic . Since then this biotype has spread across Asia, the Middle East, Africa, and more recently, parts of Europe(Fig-1).

Between 1900 and 1927 about one million and during 1928- 54 half a million people died due to cholera.[1] West Africa reported 150,000 cases and more than 20,000 deaths in year 1970[2], while from January to May 1991, over 120,000 cases and more than 1,200 deaths were reported from Peru[3,4].

In December 1992, a large epidemic of cholera began in Bangladesh, and large numbers of people were involved. The organism has been characterized as V. cholerae O139 "Bengal". It is derived genetically from the El Tor pandemic strain but it has changed its antigenic structure such that there is no existing immunity for all ages, even in endemic areas, are susceptible. The epidemic has continued to spread and V. cholerae O139 has affected at least 11 countries in southern Asia[5,6,7]. In Pakistan outbreaks due to Vibrio cholerae 0139 have been reported from Karachi 1993[8] and from Sibi city of Balochistan in 1994[9]. Vibrio cholera 01 strain outbreak reported from Rawalpindi during 1993-1994[10].

The outbreak of severe diarrheal disease occurred in Drakala Village of Wadh area in Khuzdar district of Balochistan province. The results of stool and drinking

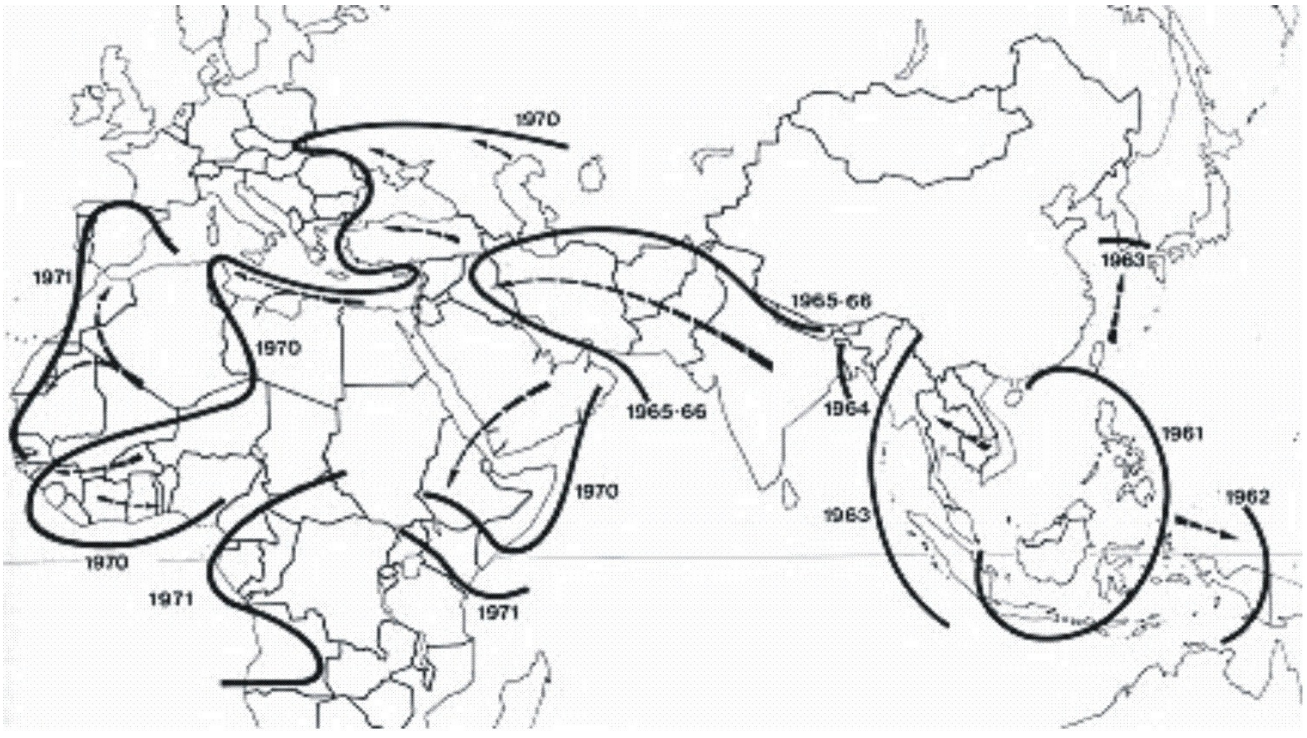

Fig-1. The global spread of cholera during the seventh pandemic, 1961-1971

water samples revealed that the outbreak was due to the infection of Vibrio cholerae Ogawa, El Tor strain, and the source was the near by well which was used as source of drinking water.

PATIENTS & METHODS

The study was conducted in Bolan Medical College Hospital Quetta. The outbreak of severe diarrheal disease occurred in village of drakala in Wadh area of Khuzdar District, the central region of Balochistan Province, in month of July 2005. Most of the population of the village suffered from the disease and four patients expired. Five samples of stool from the patients who has not received antibiotic and two samples of water from the wells from where the residents of village were using the water were collected. The samples were inoculated in Cary- Blair transport media.

On reaching to Quetta, samples were inoculated on TCBS agar, Mac Conkey agar, Blood agar and XLD agar. The plates were incubated at 37^0 C for 24 hours. Next day, the isolates were examined by gram straining, motility, colonial characterization and biochemical profile by standard techniques. The serological identification and typing was carried out by V, cholerae anti sera (Denka Seiken, Japan).The strain and antibiogram was further confirmed by Agha Khan University Hospital Karachi Laboratory.

The antimicrobial susceptibility was determined by disk diffusion test following Kirby Bauer method using Muellar Hinton agar. The standard antimicrobial disks(Oxoid, BBL) ampicillin 10µg (AMP),chloramphenicol 30µg (CAP), co-trimaxazole 23.75 µg (SMX), nalidixic acid 50µg (NA), ofloxacin 5 µg (OFX), tetracycline 30µg (TE), polymaxin B 300µg (PB) and gentamycin 10 µg (GM) were used. The drinking source of water was sealed, and alternative arrangement for drinking water was made by district authorities on recommendation of health officials.

RESULTS

Eight hundred twenty three cases of diarrheal disease and 12 deaths (1.45%) were reported in different districts of Balochistan province from June to November 2004. The most serious outbreak was in village of Badree in Tehsil Wadh, district Khuzdar. Where in three days, 148 cases of severe gastroenteritis and 4 deaths (2.7%) occurred. These four patients were two females aged 60 and one male aged 45 and one male child aged 18 months. All cases were from same village using a common source of water.

The source of contamination was suspected from well of drinking water and it was sealed, and alternative arrangements ware arranged by local authorities. Patients were treated by IV. fluid and antibiotics (inj Gentamicin).The cause of outbreak was investigated, and five stool samples, from those who have not received antibiotic and water samples from the well were collected. Samples were brought to Bolan Medical College Hospital for analysis.

Table: I. Diarrheal disease in different parts of Balochistan

Area	Month	Cases	Death
Quetta	June 2004	45	Nil
Khuzdar*	July 2004	148	4
Bolan	September 2004	201	2
Sibi	September, October 2004	356	6
D.M Jamali	October, November 2004	73	Nil
	Total	823	12(1.45%)

**Vibrio cholerae Ogawa isolated*

The stool and water samples revealed isolation of Vibrio cholerae Ogawa El Tor. We also confirmed our isolate from Agha Khan University hospital laboratory Karachi. They were sensitive to Ampicillin, Choloramphenicol, Ofloxacin, Tetracycline, Nalidixic Acid , Gentamycin. and

resistant to Polymaxin B, and Co-trimaxazole. The organism was sensitive to Gentamycin. All patients received intravenous fluid and oral salts with antibiotic and no any patient died after receiving treatment. After alternate arrangement of drinking water no more cases were reported from this area.

DISCUSSION

Every year outbreaks of severe gastroenteritis occur in different parts of Balochistan province specially in summer season in southern region where climate is very hot. Vibrio cholera 0139 outbreak was reported from Sibi city of Balochistan in year 1994[9]. The Vibrio cholerae Ogawa has been isolated from other parts of Pakistan like Rawalpindi/ Islamabad[10]. We were able to collect the samples from Khuzdar outbreak and isolated Vibrio cholerae, Ogawa El Tor. Human beings are natural reservoir for Vibrio cholerae, and they pass the organism in stool contaminating the water or food sources. In this outbreak there was rain in the area two days before the outbreak occurred. There is no toilet system in the area and people pass stool in the fields and most probably some carrier has passed the organism in the field and rain water contaminated the drinking water well of village.

Severe diarrheal outbreaks reported from other districts of Balochistan but proper specimen of stool was not reached to laboratory for analysis in time. Other organisms than Vibrio may play a role of etiological agent for diarrheal outbreaks which need an effective surveillance system and methodology for isolation of etiological agent. Therefore there is a need of training and surveillance system in Balochistan.

CONCLUSION

Vibrio cholerae O1, Ogawa El Tor, strain was isolated as etiological agent for severe diarrheal disease outbreak, which spread through drinking water. The mortality rate in this outbreak was 1.45%. The source of drinking water was contaminated due to rain in this area. The isolated strain was most common pathogen in this area for severe diarrheal disease outbreaks, and mostly it was spread through contamination of water source. The strategy applied for prevention of disease was successful and no further case was reported.

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