

# 14

## A 22-Year-Old Woman from Bangladesh With Profuse Watery Diarrhoea

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### Clinical Presentation

#### History

A 22-year-old woman from Ashulia near Dhaka, Bangladesh is brought to a local hospital with a history of passing 12 to 15 large-volume stools in the past day. The stools resemble diluted milk or rice water with white flakes. Her husband reports that she became unresponsive about an hour previously and he hired a rickshaw to bring her to the hospital. He says that she had not complained of pain and did not have fever.

The patient has recently attended a religious festival, where water was supplied in large metal containers. Her husband reports that there were five or six people who had attended the same event and were also ill with diarrhoea.

#### Clinical Findings

A thin young woman, who is stuporous and responds minimally to a painful stimulus (GCS 9/15). She is afebrile, with sunken eyes, dry mouth and a scaphoid abdomen. A skin pinch returns very slowly. Her pulse rate is 110 bpm, low volume, and her blood pressure is 90/50 mmHg. The remainder of her systemic examination is normal.

#### Laboratory Results

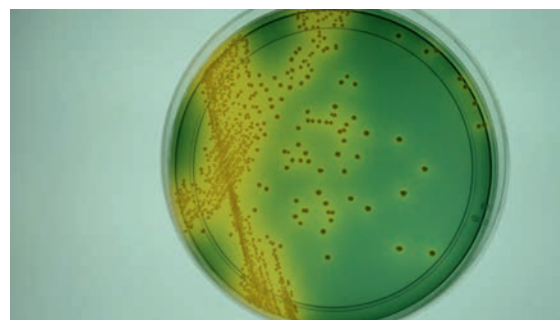
Laboratory results are given in [Table 14.1](#)

#### Stool Examination

Macroscopic: Liquid stool, rice-water appearance with no faecal matter. Hanging drop preparation shows small slender curved bacilli with darting motility. Motility is completely inhibited by using *Vibrio cholerae* antiserum O1. Stool culture grows *V. cholerae* ([Fig. 14.1](#)) and the organism is typed as *V. cholerae* O1, Serotype Ogawa, biotype El Tor.

**TABLE 14.1** Laboratory Results on Admission

Parameter	Patient	Reference Range
Sodium	143.8 mmol/L	(135-145 mmol/L)
Potassium	3.0 mmol/L	(3.5-5.0 mmol/L)
Chloride	103.8 mmol/L	(98-108 mmol/L)
Bicarbonate	11.4 mmol/L	(23-28 mmol/L)
Lactic acid (venous)	4.1 mmol/L	(0.67-1.8 mmol/L)
Creatine	203 µmol/L	(62-115 µmol/L)
Blood Urea Nitrogen	8.6 mmol/L	(2.9-7.1 mmol/L)



• **Fig. 14.1** Stool culture growing *Vibrio cholerae* which produces typical golden-yellow colonies on thiosulphate citrate bile salt sucrose (TCBS) agar.

### Questions

1. How was the infection most likely acquired? Is there an outbreak?
2. How is dehydration assessed and managed?

## Discussion

A 22-year-old Bengali woman who has recently visited a religious festival is brought into hospital in a stuporous condition with a history of rapid onset of severe, acute watery diarrhoea. There is no fever, vomiting or abdominal pain. She is severely dehydrated and her electrolytes are deranged. The microscopic examination of her stool indicates cholera which is confirmed on culture. A number of other people who attended the same festival have also fallen ill with diarrhoea.

### Answer to Question 1

#### *How Was the Infection Most Likely Acquired? Is There an Outbreak?*

Cholera transmission is closely linked to inadequate environmental management. Typical at-risk areas include peri-urban slums where basic infrastructure is not available and rural and urban areas in endemic countries where sanitation is limited, including refugee camps. Additionally, natural disasters, as well as times of political and social unrest associated with a collapse of infrastructure, pose a risk of cholera.

An outbreak is defined as the occurrence of disease episodes in greater numbers than would be expected at a particular time and place.

In this case there seems to be a typical cholera outbreak. The source is most probably contaminated water consumed from the containers during the festival, with the likelihood that unless control measures for disease prevention and appropriate case management are instituted rapidly, there will be spread, significant morbidity and, possibly, mortality.

### Answer to Question 2

#### *How is Dehydration Assessed and Managed?*

The WHO has recommended an assessment based on the general clinical condition of the patient (Table 14.2). Depending on their degree of fluid depletion, patients are assigned to rehydration at home, supervised oral rehydration or intravenous rehydration (Table 14.3).

Adequate fluid and electrolyte replacement are the cornerstones of cholera management and differ substantially from the approaches to patients with gastroenteritis of other aetiologies. Patients with severe cholera present with a higher

**TABLE 14.2**

**Clinical Assessment of Dehydration in Patients with Suspected Cholera (After Harris J.B., et al.)**

	No Dehydration (<5%)	Some Dehydration (5–10%)	Severe Dehydration (>10%)
General Appearance	Well, alert	Restless, irritable	Lethargic or unconscious
Eyes	Normal	Sunken	Sunken
Thirst	Drinks normally	Thirsty, drinks eagerly	Drinks poorly or is unable to drink
Skin Turgor	Instantaneous recoil	Non-instantaneous recoil	Very slow recoil (>2s)
Pulse	Normal	Rapid, low volume	Weak or absent

**TABLE 14.3**

**Approach to Rehydration in Patients with Cholera Depending on the Degree of Clinical Dehydration (After Harris J.B., et al.)**

	No Dehydration (<5%)	Some Dehydration (5–10%)	Severe Dehydration (>10%)
Requirement for Fluid Replacement	Ongoing losses only	75 mL/kg in the first 24 hours in addition to ongoing losses	>100 mL/kg in the first 24 hours in addition to ongoing losses
Preferred Route of Administration	Oral	Oral or intravenous	Intravenous
Timing	Usually guided by thirst	Replace fluids over 3–4 hours	As rapidly as possible until circulation is restored, then complete the remainder of fluids within 3 hours
Monitoring	Observe until ongoing losses can definitely be adequately replaced by ORS	Observe every 1–2 hours until all signs of dehydration resolve and patient urinates	Once circulation is established monitor every 1–2 hours

ORS = oral rehydration solution.

degree of initial dehydration, have more rapid continuing losses and proportionately greater electrolyte depletion than patients with other forms of gastroenteritis. The most common error is for clinicians to underestimate the speed and volume of fluids required for rehydration.

Up to 80% of sufferers can be treated successfully through prompt administration of oral rehydration salts (WHO/UNICEF ORS standard sachets). In adults, 2 to 4 litres of ORS may be required in the first 4 hours.

Patients with severe cholera typically require an average of 200 mL/kg of isotonic oral or IV fluids in the first 24 hours (Table 14.2). The initial fluid deficit should be replaced within 3 to 4 hours of initial presentation. 10 to 20 mL/kg bodyweight should be calculated for each diarrhoeal stool or episode of vomiting.

Antibiotic therapy in cholera is secondary; but in patients with severe disease, appropriate antibiotics diminish the duration of diarrhoea, reduce the volume of rehydration fluids needed and shorten the duration of *V. cholerae* excretion. In Bangladesh, resistance to furazolidone and tetracycline is increasing.

### The Case Continued...

The patient was admitted immediately and started on intravenous rehydration with Ringer's lactate solution. After receiving 3 L in the first hour her pulse rate and blood pressure picked up to 84 bpm and 100/70 mmHg respectively. Over the next 3 hours she was given an additional 2 L and became alert and responsive. She was then started on oral rehydration and given a single dose of 300 mg doxycycline. She was discharged on the third day, by which time stool consistency had returned to normal.

The local health authorities identified an additional 44 cases of cholera. All were treated, health education carried out and the overhead tanks were chlorinated.

#### SUMMARY BOX

##### Cholera

Cholera, caused by *V. cholerae*, is a major cause of acute dehydrating diarrhoea, particularly in South and South-east Asia, where it is endemic; it also occurs as large-scale outbreaks in Africa and Latin America.

*V. cholerae* is an aerobic Gram-negative bacillus with typical darting motility. Man is the only natural host of *V. cholerae* and

asymptomatic carriage is possible. The main source of transmission is from a contaminated water source. In some parts of the world, copepods are responsible for maintaining *Vibrio* spp. in a viable but non-cultivable state.

The incubation period ranges between 12 hours and 5 days. Patients are usually afebrile and do not have any abdominal pain. The major clinical challenge is dehydration, ranging from mild to severe, and electrolyte imbalance leading on to renal failure in severe cases.

In epidemics, the diagnosis of cholera may be presumptive on clinical and epidemiological grounds following the WHO clinical case definition. Laboratory confirmation may be required when sporadic cases occur or when an extensive outbreak requires confirmation and typing of the etiological agent.

Treatment typically involves isolation of the patient, correction of dehydration and antimicrobial treatment. In most cases oral replacement solutions may be used. Antimicrobial therapy is secondary; it is shown to decrease shedding of the bacteria and also hastens clinical resolution of illness. Tetracycline and doxycycline are the preferred drugs in adults, but ciprofloxacin or macrolides can also be used depending on availability and local resistance pattern.

Public health measures to improve water and sanitation are essential for long-term control. WHO has endorsed the inclusion of oral vaccines in cholera control programmes in endemic areas in conjunction with other preventive and control strategies.

### Further Reading

1. Kang G, Hart CA, Shears P. Bacterial enteropathogens. In: Farrar J, editor. *Manson's Tropical Diseases*. 23rd ed. London: Elsevier; 2013 [chapter 24].
2. Clemens JD, Nair GB, Ahmed T, et al. Cholera. *Lancet* 2017;390 (10101):1539–49.
3. Holmgren J, Svennerholm AM. Vaccines against mucosal infections. *Curr Opin Immunol* 2012;24(3):343–53.
4. Klontz EH, Das SK, Ahmed D, et al. Long term comparison of antibiotic resistance in *Vibrio cholerae* 01 and *Shigella* species between urban and rural Bangladesh. *Clin Infect Dis* 2014;58 (9):e133–6.