

A Case Study: Cholera

Muhammad Zeeshan Zafar^{1*} and Hafsa Gulzar²

¹Faculty of Pharmacy, University of Sargodha, Pakistan

² Department of Pharmacy, University of Lahore, Pakistan

*Corresponding author: Zafar MZ, Faculty of Pharmacy, University of Sargodha, Pakistan, Tel: 03466189496; E-mail: shanmughall1@gmail.com

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Abstract

The bacterium named *Vibrio cholerae* is known to be the microorganism causing the deadly disease called as cholera. The first successful isolation of the *V. cholerae* bacterium occurs as an important instance in the history of medicine on the whole. New, more virulent and drug-resistant strains of *V. cholerae* continue to emerge, and the frequency of large protracted outbreaks with high case fatality ratios has increased, reflecting the lack of early detection, prevention and access to timely health care. The primary symptoms of cholera are profuse diarrhea (Looseness of bowel movement) and vomiting of clear fluid. Cholera is only one of many types of diarrhoeal disease, but its global importance is underlined by its inclusion in the WHO Communicable Disease Surveillance and Response (CSR) list.

A patient who is infected with bacteria *V. cholerae* (Cholera is caused by the bacterium *V. cholera*, this bacterium is Gram stain-negative), by eating contaminated food and water and by drink water after watermelon. In most cases cholera can be successfully treated with oral rehydration therapy which is highly effective.

Keywords: Diarrhea; Blue death; Cramps; Dehydration; Infection; Ciprofloxacin; Malaise

Introduction

An infection of the small intestine caused by the bacterium "*Vibrio cholera*", resulting in profuse watery diarrhea.

The bacterium named *Vibrio cholerae* is known to be the microorganism that cause a deadly disease known as cholera [1]. The first successful isolation of the *V. cholerae* bacterium occurs as an important instance in the history of medicine on the whole. It is rather very tough to a certain who actually discovered cholera. The reasons are not far to seek. Most people attribute the discovery of cholera to Robert Koch, the famous German scientist.

Cholera is only one of many types of diarrheal disease, but its global importance is underlined by its inclusion in the WHO Communicable Disease Surveillance and Response (CSR) list [2].

The subsequent loss of fluid volume causes a drop in blood pressure and circulatory shock. If the patient remains untreated, they become progressively weaker, sometimes to the point of death, within 12-24 h of the onset of symptoms. If the patient survives, then the infection usually lasts 1-5 days.

The disease is common in places with poor sanitation, crowding, war and famine. Common locations include parts of Africa, south Asia, and Latin America. If you are traveling to one of those areas, knowing the following cholera facts can help protect you and your family [3].

The primary symptoms of cholera are profuse diarrhea (Looseness of bowel movement) and vomiting of clear fluid. These symptoms usually start suddenly, half a day to five days after ingestion of the bacteria. The diarrhea is frequently described as "rice water" in nature

and may have a fishy odor. An untreated person with cholera may produce 10 to 20 liters (3 to 5 US gal) of diarrhea a day. Severe cholera kills about half of affected individuals. Estimates of the ratio of asymptomatic to symptomatic infections have ranged from 3 to 100. Cholera has been nicknamed the "blue death" because a person's skin may turn bluish-gray from extreme loss of fluids [4].

Case Presentation

A patient is 27 years old. He was infected with a bacteria *V. cholerae* (Cholera is caused by the bacterium *V. cholerae*. (This bacterium is Gram stain-negative), by eating contaminated food and water or by drinking water after watermelon, uncooked food and fruits. After a 24-48 h, some symptoms begin with the sudden onset of painless watery diarrhea that quickly become voluminous and is often followed by vomiting. Its main symptoms are vomiting and diarrhea, because of this disease severe dehydration can occur. He vomits. if he eats or drinks anything. After a day, his color become pale yellow and he became weak due to dehydration (severe loss in water) by loose motions and vomiting. In the first day of infection he drank some rehydration solutions but it was not very effective. He also felt severe pain in stomach.

He experienced accompanying abdominal cramps, probably from distention of loops of small bowel as a result of the large volume of intestinal secretions. Fever is typically absent.

Diagnosis

He went to a hospital where proper check-ups were performed. Doctor advised him for few tests (CBC+ESR, Rapid stool test to identify cholera bacteria). A doctor confirms cholera by identifying bacteria in a stool sample. Doctor checked the report properly and gave him first line therapy.

In stool test *V. cholerae* bacteria identified as shown in Figure 1.

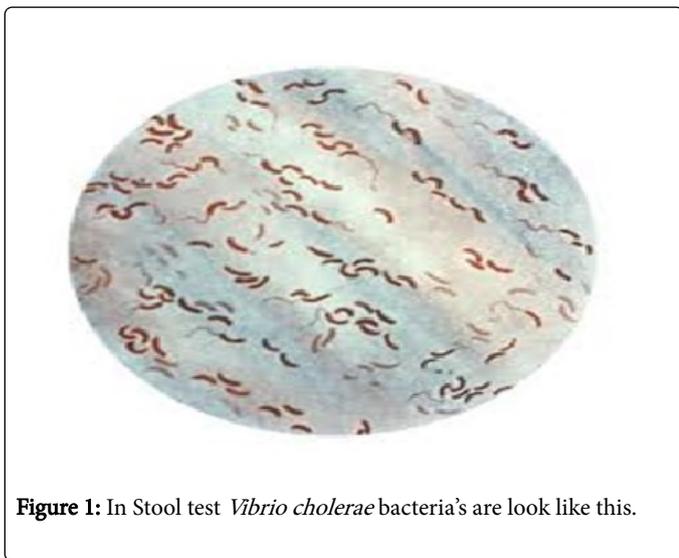


Figure 1: In Stool test *Vibrio cholerae* bacteria's are look like this.

Complete Blood Cells Count test (CBC)

In this test report some blood deficiency identified and weak patient's defense system (table 1).

Test	Value	Units	Expected value
Hb%	12.3	g/dL	13 to 18
WBC	6067	mm ₃ new born	5500 to 18000/cm
Platelet count	616000	mm ₃	150000 to 400000
Different Leucocyte count (DLC)			
Neutrophils	22	%	45 to 75 %
Lymphocytes	70	%	20 to 45 %
Eosinophils	4	%	02 to 06 %
Monocytes	4	%	02 to 10 %
RBC	4.3	10 ¹² /L	3.5 to 5.5
MCV	79.2	F1	75 to 100
HCT	36.2	%	35 to 55
MCH	26.5	Pg	25 to 35
ESR	24		Upto 12

Table 1: Different component values of blood were compared with their normal values.

Treatment

Doctor weighed him. His lose his weight and was of 58 kgs only at that time. He became bluish and weak due to loss of water. After checking all aspects, doctor prescribed him dimenhydrinate tablets for vomiting twice-a-day before the meal, neogram tablets (gramicidin, neomycin sulfate), cipro (ciprofloxacin 500 mg) once-a-day antibiotic to prevent diarrhea, and flygal (Metronidazole) 400 mg twice-a-day and a rehydration solution (ORS).

After a one day therapy, cholera was little bit cured by oral therapy but due to large amount of loss of water from body, patient's condition was not so well, he became weak and pale yellow in color. Thus, doctor admitted him in clinic because there was lot of water loss from body due to vomiting and looseness of bowl. Doctor injected him an infusion metronidazole and ringer solution 1000 CC with adding dimenhydrinate injection and ROCEPHIN (ceftriaxone injection) 500 mg. He also advised him to take the same as described above medicines again. After a 6-8 days treatment, patient recovered completely but weakness retained for a few days, after eating food and fruits with high calorific values he became healthy. He recovered completely after seven days medication.

During treatment some clinical problems were reported due to medications;

- Headache
- Temperature elevations
- Stomach irritation due to antibiotic treatment.

Preventions

If you are travelling to an area where cholera is common, your chances of catching a disease can be low if you;

- Wash your hands
- Drink bottled or boiled water
- Avoid raw food and shellfish
- Avoid dairy foods
- Eat raw fruits and vegetables that you can peel yourself.

Cholera vaccines do not work well.

Discussion

Deadly disease called cholera is caused by eating contaminated food and water etc. The primary cause of this syndrome is an enterotoxin (cholera toxin). In stool specimens *V. cholerae* can be easily identified by its characteristic yellow colonies. Physicians think that vibrio only grow in association with salt water [5-7].

In most cases cholera can be successfully treated with oral rehydration therapy, which is highly effective. An effective and relatively cheap method to prevent the transmission of cholera is to drink purified water and uncontaminated food.

Cholera is an acute secretory diarrheal illness caused by toxin-producing strains of the Gram-negative bacterium *Vibrio cholera* [8]. Severe cholera is characterized by profound fluid and electrolyte losses in the stool and the rapid development of hypovolemic shock, often within 24 h from the initial onset of vomiting and diarrhea [9,10].

Conclusion

This case report demonstrated the infection caused by a bacteria *V. cholerae*. Its symptoms are vomiting and diarrhea because of which water loss from body and dehydration can occur. Due to excessive loss of water from body, patient may feel weak and death can also occur, if not cured.

Antibiotics used for its treatment, anti-emetics and anti-diarrheal are also used. Rapid test (Stool test) used for its diagnosis. By using antibiotics some clinical problems can also occur. Some preventive measures are also used to prevent this disease.

Its main prevention can be:

- Take rehydrated solution
- Avoid eating contaminated food
- Drink boiled/purified water.

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Recommendations

- Oral or intravenous hydration is the mainstay of cholera treatment.
- In conjunction with hydration, treatment with antibiotics is recommended for severely ill patients. It is particularly recommended for patients who are severely or moderately dehydrated and continue to pass a large volume of stool during rehydration treatment. Antibiotic treatment is also recommended for all patients who are hospitalized.

References

1. Groisman EA (ed.) (2001) Principles of Bacterial Pathogenesis. Academic Press (1st edn.), p: 826.
2. World Health Organization (2002) Promoting rational use of medicines: core components.
3. Lipp EK, Huq A, Colwell RR (2002) Effects of global climate on infectious disease: The cholera model. *Clin Microbiol Rev* 15: 757-770.
4. <https://www.nlm.nih.gov/>
5. Cholera treatment (2007) *Molson Medical Informatics*.
6. Krishna BV, Patil AB, Chandrasekhar MR (2006) Fluoroquinolone-resistant *Vibrio cholerae* isolated during a cholera outbreak in India. *Trans R Soc Trop Med Hyg* 100: 224-226.
7. Leibovici-Weissman Y, Neuberger A, Bitterman R, Sinclair D, Salam MA, et al. (2014). Antimicrobial drugs for treating cholera. *Cochrane Database Syst Rev* 6: 1-182.
8. Clark CG, Kravetz AN, Alekseenko VV, Krendelev YuD, Johnson WM (1998) Microbiological and epidemiological investigation of cholera epidemic in Ukraine during 1994 and 1995. *Epidemiol Infect.* 121: 1-13.
9. Dixon B (1994) *Power Unseen: How microbes rule the world*. Freeman WH, Oxford University Press.
10. Faruque SM, Ahmed KM, Siddique AK, Zaman K, Alim AR, et al. (1997) Molecular analysis of toxigenic *Vibrio cholerae* O139 Bengal strains isolated in Bangladesh between 1993 and 1996: evidence for emergence of a new clone of the Bengal vibrios. *J Clin Microbiol* 35: 2299-2306.