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Bioterrorism Agent Fact Sheet

Cholera/*Vibrio cholerae*

Disease

Cholera is a disease that is caused by ingestion of the aerobic, comma-shaped gram-negative bacterium *Vibrio cholerae* through contaminated food or water. The disease is severely incapacitating and resource-intensive, but is generally not deadly unless therapy is not provided.

Pandemics were common in the 19th and early 20th century, including one that began in Indonesia in 1961 and spread rapidly until it finally dissipated in South America in 1991. Outbreaks still occur worldwide as a result of environmental reservoirs, including the Louisiana and Texas coast along the Gulf of Mexico, and are associated with brackish water, estuaries and the consumption of raw or under cooked shellfish.

Intentional use by terrorists would presumably involve contamination of food or water supplies.

Diagnosis

Presumptive diagnosis:

- Combination of symptoms (see clinical features section) and darkfield or phase microscopic visualization of spiral shaped organisms in a “shooting star” movement that can be inhibited by antisera.

Confirmatory diagnosis:

- Isolation of *Vibrio cholerae* in stool or vomitus specimen
- Serology: agglutination with specific antisera
- ≥ 4 -fold rise in vibriocidal antibody titers or ≥ 4 -fold decline in vibriocidal titers between early and late convalescent (more than a 2-month interval) serum samples.

Treatment

Mortality rate for untreated patients may reach 50%, but is $< 1\%$ with appropriate antibiotic therapy. Rapid aggressive IV or oral rehydration and treatment of complications are essential to decrease mortality. Initial fluid replacement consists of 30 ml/kg given over one hour for infants or 30 minutes for children > 1 and adults. WHO Oral Rehydration Solution or its equivalent is preferred unless the patient is in shock, obtunded, or has intestinal ileus.

In addition, appropriate antimicrobial therapy is imperative; rapid initiation may lessen diarrheal episode resulting in decreased IV rehydration needs and period of communicability. Tetracyclines are the drug of choice and while they are generally not recommended for children < 8 years of age, in cases of severe cholera the benefits are believed to offset the risk of staining teeth.

Until sensitivities are known, treat as follows for 3 days:

- **Adults**
Tetracycline 500 mg PO qid
- **Children**
Tetracycline 12.5 mg/kg PO qid or
Doxycycline 6 mg/kg PO (max 300 mg) as a single dose

Cholera

Clinical Features of Cholera

Incubation period: few hours to 5 days (1-3 days normally). Symptoms vary between asymptomatic carriage to the hallmark symptom of voluminous diarrhea. Abdominal cramping, pain and fever are unusual, even in the most sick of patients. Diarrheal stools are likely to be colorless, odorless, mucousy (“rice-water”) and painless.

All symptoms of cholera are a result of fluid and electrolyte loss. Dehydration, hypokalemia, and metabolic acidosis develop rapidly due to fluid loss in untreated patients. In rare cases, patients may progress to hypovolemic shock and result in renal failure if not treated immediately. Coma or seizures resulting from hypoglycemia and fluid loss are likely to occur in children.

Infection Control

Only standard precautions are needed unless the patient wears diapers or is incontinent (Contact Precautions: gowns and gloves). Although transmission occurs through the fecal-oral route and could potentially be spread from the contaminated stool or vomitus of infected cases, person to person transmission is unlikely when proper hygiene is followed.

Proper hand washing after using the rest room and before preparing or eating food is imperative to decrease transmission. If contaminated water is the source, all beverages and foods associated with the water source are considered contaminated and should be avoided, including ice, sauces or grains that required water for preparation and foods rinsed with the contaminated water.

Isolates should be sent to a state health department laboratory for serogrouping.

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Other effective 3-day therapies if strain is tetracycline-resistant: TMP-SMX, furazolidone, and erythromycin or single dose ciprofloxacin.

Post-Exposure Prophylaxis

Immunization of contacts is not recommended. In the US, chemoprophylaxis is not recommended unless sanitary and hygiene conditions are poor. When prophylaxis is warranted, potential contacts should be provided chemoprophylaxis for 3 days as follows:

- **Adults**
Tetracycline 500 mg PO qid or
Doxycycline 300 mg PO once a day
- **Children**
Tetracycline 50 mg/kg/day PO in 4 divided doses or
Doxycycline 6 mg/kg PO once a day

Other effective 3-day therapies if strain is tetracycline-resistant: furazolidone, erythromycin and TMR/SMX or single dose ciprofloxacin.

Vaccination

A killed whole cell vaccine is available, but is generally not recommended because it only protects approximately half of those vaccinated, the immunity provided is only short-term (3-6 months) and vaccination cannot prevent asymptomatic infection. Furthermore, the vaccine requires two doses to be effective and it takes weeks before vaccinated persons develop immunity, rendering the vaccine completely useless during an epidemic. Due to the vaccine's limitations, most public health authorities do not recommend vaccination under normal circumstances.

Decontamination

Standard hospital-approved disinfectants are adequate for cleaning patient rooms. Water should be boiled or treated with chlorine or iodine, and foods should be adequately cooked in order to kill the organism.

Reporting

Report suspected cases or suspected intentional release of Cholera to your state health department. The state health department is responsible for notifying the FBI, CDC and local law enforcement. The CDC will notify WHO.

Disclaimer

Information contained in this fact sheet was current as of August 2001, and was designed for educational purposes only. Medication information should always be researched and verified before initiation of patient treatment.

Additional information and references available at www.bioterrorism.slu.edu