

Botulism

Summary

Botulism is a neuroparalytic disorder characterized by an acute, afebrile, symmetric descending flaccid paralysis. Although rare, botulism is a serious illness caused by a nerve toxin produced by the bacterium *Clostridium botulinum*.

There are **three** kinds of botulism:

1-**Foodborne botulism** is caused by eating foods that contain the botulism toxin.

2-**Wound botulism** is caused by toxin produced from a wound infected with *Clostridium botulinum*.

3-**Infant botulism** is caused by consuming the spores of the botulinum bacteria, which then grow in the intestines and release toxin.

All forms of botulism can be fatal and are considered medical emergencies.

The classic symptoms of botulism include double vision, blurred vision, drooping eyelids, slurred speech, difficulty swallowing, dry mouth, and muscle weakness. Infants with botulism appear lethargic, feed poorly, are constipated, and have a weak cry and poor muscle tone.

Agent

- Toxicosis is due to botulinum toxin produced by *Clostridium botulinum*, a gram-positive bacillus which is a spore-forming obligate anaerobe. The toxin irreversibly blocks presynaptic release of acetylcholine at the neuromuscular junction causing flaccid paralysis and cranial nerve dysfunction. There are many different toxin serotypes with different species and geographic distributions: type A causes the majority of foodborne cases in the western U.S.; type B causes the majority of cases in the eastern U.S.; type E causes most cases of foodborne botulism in Canada and Alaska which are associated with native foods; and type F causes rare foodborne cases in the U.S.

Transmission

- Reservoir: Botulinum spores are ubiquitous in soil, and may be recovered from agricultural products, including honey.
- Mode of Transmission:

Foodborne botulism is acquired by ingestion of food containing preformed toxin (such as after inadequate sterilization or preservation of canned foods). Ingestion

of food containing spores that germinate and produce toxin in the large intestine causes intestinal botulism.

Wound botulism results when *C. botulinum* grows anaerobically in traumatized tissue and produces toxin (such as from contamination of wounds with soil or gravel). Wound botulism has also been reported among illicit drug users (especially those using black tar heroin) from subcutaneous injection contaminated with spores or from cocaine inhaled into a sinus followed by germination, vegetative growth, and toxin production.

Infant botulism results after ingested spores germinate, multiply and produce botulinum toxin in the intestinal tract of infants.

- Period of communicability: Not transmitted person-to-person.

Clinical Disease

Incubation Period:

- **Foodborne botulism**: usually 12 to 72 hours after eating contaminated food, but can occur as early as 2 hours or as late as 8 days.
- **Wound botulism**: 4 to 14 days between time of injury and onset of symptoms.
- **Infant botulism**: estimated at 3 to 30 days from exposure to spore-containing food.

Illness: **Cranial nerve palsies always occur in botulism.**

Foodborne botulism is characterized by acute bilateral cranial nerve dysfunction and descending weakness or paralysis. Early signs and symptoms can include: ptosis (drooping eyelids), double vision, blurred vision, dry mouth, dysarthria and dysphonia (difficulty talking, muffled speech), and dysphagia (difficulty swallowing, eventually aspiration). Symmetrical voluntary muscle weakness progresses from difficulty with head control to weakness of upper extremities then lower extremities. Cognitive function is normal despite fatigue and apparent lethargy. Fever is absent unless secondary infections develop.

Wound botulism develops into a similar clinical picture after the organism contaminates a wound, although these patients may have little evidence of acute wound infection.

Infant botulism Typically presents with constipation, lethargy, difficulty feeding and swallowing, ptosis, loss of head control, and muscle weakness. Death is primarily due to respiratory failure. Prolonged paralysis and intubation frequently lead to secondary infections.

Laboratory Diagnosis – Laboratory tests are not helpful in the initial diagnosis of botulism. White blood cell counts and erythrocyte sedimentation rates are normal. Cerebrospinal fluid is normal, except for occasional mild elevations in protein concentration.

- Persons with suspected botulism should have serum and stool collected for analysis. *
- A mouse neutralization bioassay confirms botulism by isolating the botulism toxin. Toxin may be identified in serum, stool, vomitus, gastric aspirate, and suspected foods.
- *C. botulinum* may be grown on selective media from samples of stool, wound exudates or foods. Note that the specimens for toxin analysis should be refrigerated, but samples for cultured *C. botulinum* should not be refrigerated.
- Because intestinal carriage is rare, identifying the organism or its toxin in vomitus, gastric fluid, or stool is strongly suggestive of the diagnosis.
- Isolation of the organism from food without toxin is insufficient grounds for the diagnosis.

*Because the toxin may enter the blood stream through the eye or via small breaks in the skin, precaution is warranted during specimen collection.

Treatment - Treatment of botulism should begin based on clinical suspicion before definitive laboratory test results are available.

Intravenous botulinum antitoxin should be administered as soon as possible, but after collection of serum and other specimens for testing, to all patients with suspected botulism.

- **Foodborne and Wound Botulism:** Equine trivalent (types A, B, E) and bivalent (types A and B) antitoxin can be made available 24/7/365 by contacting the Epidemiology and Response Division 505-827-0006 and the CDC Emergency Operation Center 770-488-7100. Because the antitoxin is of equine origin, testing for hypersensitivity and desensitization may be necessary. For **wound botulism**, in addition to antitoxin, the wound should be debrided and appropriate antibiotics administered.
- **Infant Botulism:** Infants should be given an investigational human botulinum immunoglobulin available from the California Department of Health Services. To obtain BabyBIG® for a patient with suspected infant botulism, the patient's physician must first contact the Infant Botulism Treatment and Prevention Program (IBTPP) on-call physician at (510) 231-7600 to review the indications for such treatment. Inquiring physicians may obtain a checklist that outlines the necessary steps the Infant Botulism Treatment and Prevention Program must take to release BabyBIG® to a hospital at www.infantbotulism.org.

- Equine botulinum antitoxin **should not** be used for infant botulism due to the risk of sensitization and anaphylaxis.
- Antimicrobial therapy **is not indicated** in infant botulism, as lysis of luminal bacteria could release more toxin.
- Patients with suspected or confirmed botulism should have immediate access to intensive care for meticulous supportive care, including intubation and ventilation.

Surveillance

- **Case Definition:** For more info: www.bt.cdc.gov/Agent/Botulism/CaseDef.asp
 - *Laboratory criteria* - Detection of botulinum toxin in serum, stool, or patient's food or isolation of *Clostridium botulinum* from stool or a wound specimen
 - *Confirmed* – a clinically compatible case that is laboratory confirmed or that occurs among persons who ate the same food as persons who have laboratory-confirmed botulism.
 - *Probable* - a clinically compatible case with an epidemiologic link (e.g., ingestion of a home-canned food within the previous 48 hours).
- **Reporting:** **Report all suspected or confirmed cases of botulism immediately to the Epidemiology and Response Division (ERD) at 505-827-0006.** Information needed includes: patient's name, age, sex, race, ethnicity, home address, home phone number, occupation and health care provider. ERD will collect clinical and laboratory information, assist in the shipment of antitoxin for treatment, and arrange for specimen testing at CDC.
- **Case Investigation:**
 - **Foodborne botulism** – use the Foodborne Surveillance Investigation Form to complete your investigation. Information should also be entered into NM-EDSS per established procedures.
 - **Wound botulism** – use the General Infectious Disease Investigation Form to complete your investigation. Information should be entered into NM-EDSS per established procedures.
 - **Infant botulism** – Complete the CDC Infant Botulism Form 52.73 and send to Epidemiology and Response Division, P.O. Box 26110, Santa Fe, New Mexico, 87501-6110 or fax to 505-827-0013. Information should be entered into NM-EDSS per established procedures.

Control Measures

1. **Case management**
 - 1.1. Isolation: None required.
 - 1.2. Prophylaxis: Not applicable.
2. **Contact management**
 - 2.1. Isolation: None required.
 - 2.2. Prophylaxis: Persons who have eaten the same food implicated in a case of botulism should receive catharsis to remove toxin from the intestine or stomach. They should remain under surveillance for at least one week after

exposure. The decision to provide presumptive treatment with antitoxin to an asymptomatic exposed individual needs to be weighed carefully against the risks for adverse reactions and sensitization to horse serum.

3. Prevention

3.1. Canning of food requires careful attention to adequate control of pH (for food not subject to pressure sterilization), temperature, and time in order to destroy spores.

3.2. Honey should not be given to children younger than 12 months of age.

3.3. Immunization: Not applicable.

4. Outbreak

4.1. Report of a single suspected case of botulism requires an immediate response to confirm the index case, facilitate prompt treatment, investigate the source of toxin and seek additional cases or persons at risk. Infant and wound botulism cases are sporadic. Foodborne and other intestinal botulism cases may occur in protracted outbreaks from commercially distributed food products or from extended use of contaminated foods by restaurants.

Management of Botulism in Child Care Centers – Refer to recommendations above.

References

American Academy of Pediatrics. Pickering LK, ed. 2006 Red Book: Report of the Committee on Infectious Diseases. 27th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2006.

Arnon, S.S. et al. Botulinum Toxin as a Biological Weapon Medical and Public Health Management JAMA, February 28, 2001—Vol 285, No. 8.

CDC. NCID. www.cdc.gov/ncidod/dbmd/diseaseinfo/botulism_g.htm

Heymann, DL, ed. Control of Communicable Diseases Manual. 18th edition. Washington, DC: American Public Health Association; 2004.

BOTULISM

What is botulism?

Botulism is caused by a toxin made by a bacterium known as *Clostridium botulinum*. It causes a muscle-paralyzing disease. There are 3 kinds of botulism:

- Foodborne botulism happens when a person swallows toxin and becomes ill within a few hours to days;
- Infant (also called intestinal) botulism occurs when botulism spores settle in the intestine and then produce toxin. This usually affects infants, but may also take place in adults who have certain unusual intestinal conditions;
- Wound botulism takes place when a wound has been “dirtied” or contaminated by soil or gravel and the wound is then sealed off from outside air.

What are the symptoms of botulism?

- Symptoms of foodborne botulism include blurred or double vision, dry mouth, and muscle paralysis that may affect breathing. These symptoms appear 12 to 36 hours after eating the food that contains the toxin.
- Symptoms of infant botulism may include constipation, weakness, difficulty breathing, poor feeding and poor reflexes. It is unknown how long it takes for infant botulism to appear after exposure.
- Symptoms for wound and inhalation botulism are very similar to foodborne botulism. Wound botulism symptoms appear after about 7 days. Studies in monkeys have shown that symptoms of inhalation botulism would probably occur 12 to 80 hours after exposure.

How is botulism spread?

A person must eat contaminated food that has not been properly cooked or reheated. With infant botulism, an infant eats food containing bacterial spores and then the bacteria produce the toxin in the gastrointestinal tract. Wound botulism is rare and happens when botulism spores are introduced into a wound by contaminated soil or gravel.

How long are people contagious?

Botulism is not spread from person to person. In other words, people with botulism are not contagious.

Who gets botulism?

Anyone can get botulism.

What treatment is available for people with botulism?

Hospital care is necessary. Persons with botulism may need help with breathing. Antitoxin is available for certain cases of botulism.

Do infected people need to be kept home from school, work or daycare?

People who have botulism will most probably be in the hospital. They can return to school or work once they feel well enough.

How can I protect myself and my family from getting botulism?

- Honey and corn syrup should *not* be fed to infants less than 12 months of age.
- All canned and preserved foods should be properly processed and prepared.

- Do not open bulging containers or eat or taste goods with strange odors.
- Return unopened commercial cans with bulging lids to the place of purchase.
- Home canned vegetables should be boiled, with stirring, for at least 3 minutes before eating.
- Wound botulism can be prevented by promptly seeking medical care for infected wounds and by not using injectable street drugs.



Epidemiology and Response Division
505-827-0006

Last updated April 2008

BOTULISMO

¿Qué es el botulismo?

El botulismo está causado por una toxina (como un veneno) creada por una bacteria llamada *Clostridium botulinum*. Es una enfermedad que paraliza los músculos. Hay 3 tipos de botulismo:

- El botulismo transmitido por alimentos ocurre cuando una persona ingiere la toxina y se enferma después de unas horas o incluso días.
- El botulismo infantil (o intestinal) ocurre cuando las esporas del botulismo se establecen en el intestino y producen la toxina (veneno). Suele afectar a los bebés, pero también puede darse en adultos que tienen ciertas condiciones no usuales del intestino.
- El botulismo por heridas ocurre si una herida que está contaminada con tierra o arenilla, se cubre y no le da el aire.

¿Cuáles son los síntomas del botulismo?

- Los síntomas del botulismo transmitido por alimentos incluyen visión doble o borrosa, sequedad de la boca y parálisis muscular que puede afectar a la respiración. Estos síntomas aparecen de 12 a 36 horas después de comer los alimentos que contienen la toxina (veneno).
- Los síntomas del botulismo infantil pueden incluir estreñimiento, debilidad, reflejos lentos y dificultad para respirar y alimentarse. No se sabe cuanto tiempo tarda en aparecer después de estar expuesto.
- Los síntomas del botulismo por heridas y por inhalación son muy similares al transmitido por alimentos. Los síntomas del botulismo por heridas aparecen después de 7 días. Los síntomas del botulismo por inhalación ocurrirían entre 12 y 80 horas después de estar expuesto, según estudios realizados en monos.

¿Cómo se transmite el botulismo?

Se transmite al comer alimentos contaminados que no se cocinaron o recalentaron de forma apropiada. En el caso del botulismo infantil, un bebé puede comer comida que contenga las esporas de la bacteria y ésta produce la toxina (veneno) en su tracto intestinal. El botulismo por heridas es raro y ocurre cuando las esporas del botulismo entran en la herida.

¿Por cuánto tiempo puede alguien con botulismo contagiar a otros?

El botulismo no se transmite de persona a persona. Es decir, las personas con botulismo no son contagiosas.

¿Quién puede contraer el botulismo?

Cualquier persona puede contraer el botulismo.

¿Cómo se trata el botulismo?

Es necesario recibir atención médica en un hospital. Las personas con botulismo pueden necesitar ayuda para respirar. La antitoxina (sustancia contra el veneno) está disponible para determinados casos de botulismo.

¿Es necesario quedarse en casa y no ir a la escuela, a la guardería o al trabajo?

Lo más seguro es que las personas con botulismo estén en un hospital. Pueden regresar a la escuela o al trabajo cuando se sientan bien para hacerlo.

¿Cómo puedo protegerme yo y también proteger a mi familia contra el botulismo?

- No se debe dar miel ni jarabe de maíz (se usa en siropes y dulces) a los bebés menores de un año de edad.
- Todas las comidas enlatadas y en conserva deben estar preparadas y procesadas de forma apropiada.
- No abra latas abultadas, tampoco coma o pruebe comida que tenga un olor extraño.
- Regrese a la tienda donde las compró todas las latas sin abrir que tengan tapas abultadas.
- Las verduras que sean de conserva casera deben hervirse, mientras se van removiendo, por lo menos durante tres minutos antes de comerlas.
- El botulismo por heridas puede prevenirse con atención médica inmediata cuando se produce infección en una herida y también si no se usan drogas inyectables.



Epidemiology and Response Division
505-827-0006

Last updated April 2008