CONDITION

Botulism

Learn how botulism affects the nerves, which symptoms require emergency care, how exposure occurs, and how antitoxin and supportive care are used.

WHAT IT IS
Serious illness caused by botulinum neurotoxin

BODY SYSTEM
Nervous system

MAIN SYMPTOMS
Muscle weakness, trouble swallowing, double vision, breathing difficulty

WHAT CAUSES IT
Botulinum neurotoxin from certain bacteria

HOW IT IS DIAGNOSED
Specialized toxin or bacteria testing

MAIN TREATMENT
Antitoxin and supportive care

CAN IT BE CURED?
Sometimes - many recover with treatment

IS IT AN EMERGENCY?
Yes - whenever botulism is suspected

LONG-TERM OUTLOOK
Many recover gradually but some have lasting weakness or fatigue

Overview

Botulism is a serious illness caused by botulinum neurotoxin, a poison made by certain bacteria. The toxin interferes with signals between nerves and muscles. This can cause muscle weakness, trouble swallowing, and paralysis, meaning loss of muscle movement.

Weakness often begins in the muscles of the face, eyes, mouth, and throat. It may then move downward into the neck, arms, chest, and legs. If the muscles used for breathing become weak, a person may need a ventilator, which is a machine that supports breathing.

Botulism is uncommon, but suspected botulism is a medical emergency. Treatment with antitoxin can keep toxin that is still circulating in the blood from causing more nerve damage. It works best when given early, so clinicians generally do not wait for laboratory confirmation when symptoms strongly suggest botulism.

Botulism is not usually spread from one person to another. The main forms are foodborne botulism, wound botulism, infant botulism, and, rarely, botulism related to medical or cosmetic botulinum toxin injections. Adult intestinal botulism can also occur when bacteria grow and produce toxin inside an adult's intestines, but this is rare.

Symptoms

Symptoms depend on how exposure occurred. Foodborne botulism usually develops within hours to several days after contaminated food is eaten, although timing varies. Symptoms from a wound may take longer to appear.

Botulism commonly causes weakness on both sides of the body. Early symptoms may include:

Some people with foodborne botulism first develop nausea, vomiting, abdominal pain, diarrhea, or constipation. Wound botulism generally does not cause these digestive symptoms.

A person with botulism is often awake and aware even when muscle weakness is severe. Sensation usually remains normal, so numbness is not a typical feature. Fever is also not typical, although another infection may cause one.

Call emergency services now if someone has new trouble breathing or swallowing, rapidly increasing weakness, double vision with weakness, slurred speech, or difficulty holding up the head. Do not wait to see whether symptoms improve. Tell emergency clinicians about any home-preserved food, shared meal, wound, injected drug use, or recent botulinum toxin treatment that could be relevant.

Infant botulism has a different pattern. It occurs when swallowed bacterial spores grow in a baby's intestines and make toxin. Possible symptoms include:

An infant with poor feeding, unusual weakness, or breathing problems needs prompt medical assessment. Breathing difficulty, blue or gray coloring, marked limpness, or difficulty waking requires emergency care.

- Blurred or double vision
- Drooping eyelids
- Difficulty focusing the eyes or pupils that react poorly to light
- Slurred speech
- A dry mouth
- Trouble swallowing
- Weakness of the face, neck, arms, or legs

- Shortness of breath or difficulty taking a deep breath
- Constipation, often an early sign
- Poor feeding or a weak suck
- A weak or altered cry
- Drooping eyelids or reduced facial expression
- Less movement than usual
- Poor head control or a "floppy" appearance
- Breathing difficulty

Causes and risk factors

Botulinum toxin is produced by Clostridium botulinum and, less often, certain related bacteria. Their spores are inactive forms that can survive in the environment. Under some low-oxygen conditions, the spores can grow and produce toxin.

Foodborne botulism can occur when food is preserved, canned, or fermented in a way that allows toxin to form. Low-acid foods, such as vegetables, meat, and fish, require proper pressure-canning methods. Improperly prepared oils containing garlic or herbs and some fermented or preserved foods may also create suitable conditions.

Food contaminated with botulinum toxin may look, smell, and taste normal. Never taste food to decide whether it is safe. Use current, tested home-canning instructions. Discard containers that are leaking, bulging, damaged, or that spurt liquid or foam when opened. Handle suspected food carefully because tasting even a small amount can be dangerous.

Infant botulism is linked to swallowing bacterial spores from the environment. Honey is a recognized source, so it should not be given to children younger than 12 months. Most cases are not traced to one specific food or exposure. Breastfeeding or formula feeding does not by itself determine whether an infant will develop botulism.

Wound botulism develops when bacteria enter a wound and produce toxin there. Risk is higher with contaminated, deep, or poorly treated wounds. Injection drug use, particularly injection under the skin or into muscle, has been associated with wound botulism. A wound may not look severely infected even when toxin is being produced.

Iatrogenic botulism refers to illness caused by botulinum toxin used as a medical or cosmetic treatment. This is rare when an authorized product is given correctly by a qualified clinician. Risk may increase with excessive amounts, improperly prepared products, or counterfeit or

unlicensed products.

Botulism cannot be prevented through routine vaccination. Risk reduction focuses on safe food preservation, appropriate wound care, avoiding injection drug use, not giving honey to infants, and receiving botulinum toxin only from a licensed professional using an authorized product.

Diagnosis

Botulism is diagnosed first by its pattern of symptoms and the possible exposure history. Clinicians perform a neurological examination to check eye movements, eyelids, speech, swallowing, muscle strength, reflexes, and breathing.

Several other conditions can resemble botulism, including stroke, Guillain-Barré syndrome, myasthenia gravis, tick paralysis, and certain poisonings. Tests may be used to evaluate these possibilities. These can include brain imaging, spinal fluid testing, nerve and muscle electrical tests, and routine blood tests.

Specialized laboratories can test serum, stool, stomach contents, food, or material from a wound for botulinum toxin or toxin-producing bacteria. Public health agencies usually help arrange this testing. Results may take time and can sometimes be negative even when the clinical pattern suggests botulism.

Because delay can allow more toxin to bind to nerves, treatment decisions are generally based on clinical suspicion rather than waiting for laboratory results. Clinicians who suspect botulism contact public health authorities promptly. Public health teams can help assess the case, arrange antitoxin, coordinate testing, and investigate whether other people may have been exposed.

Treatment and management

Most people with suspected botulism are admitted to a hospital. Care may take place in an intensive care unit because breathing strength can worsen quickly. Clinicians may measure lung function repeatedly even when a person is not yet short of breath.

Antitoxin is the main treatment for foodborne, wound, and most non-infant forms of botulism. In the United States, heptavalent botulism antitoxin is used for adults and children other than infants. It contains antibodies that neutralize several toxin types.

Antitoxin can stop toxin still circulating in the bloodstream from attaching to nerves. It cannot remove toxin that has already attached, so existing paralysis may not improve immediately.

Early treatment can limit further weakness and may reduce the severity and length of illness.

Infants are treated with botulism immune globulin, commonly called BabyBIG in the United States. This product contains human antibodies against the toxin types that cause most infant cases. It is obtained through the California Department of Public Health's Infant Botulism Treatment and Prevention Program.

Supportive care is equally important. It may include:

Wound botulism may also require surgical cleaning of the wound and antibiotics like amoxicillin or doxycycline to treat the bacteria. These steps are managed carefully and usually follow antitoxin administration. Antibiotics do not neutralize toxin and are not routinely used for foodborne or infant botulism. Certain medicines can worsen nerve-to-muscle signaling, so the healthcare team should review all prescription medicines, over-the-counter products, and supplements.

Recovery occurs as nerve endings repair and form new connections with muscles. This may take weeks to months. People who required prolonged breathing support may need an extended period of rehabilitation.

- A breathing tube and mechanical ventilation if breathing muscles are weak
- Nutrition through a feeding tube if swallowing is unsafe
- Measures to prevent food, drink, or saliva from entering the lungs
- Physical, occupational, and speech therapy
- Prevention of pressure injuries, blood clots, and hospital-acquired infections

Complications

The most immediate complication is respiratory failure, in which weakened breathing muscles cannot move enough air. Weak swallowing and coughing can also allow saliva, food, or stomach contents to enter the lungs. This may cause aspiration pneumonia.

Other possible complications include:

Many people recover, but improvement can be gradual. The speed of recovery varies and does not always follow a steady pattern. Some people continue to notice shortness of breath with activity, weakness, or fatigue after the most severe symptoms have resolved.

- Long-lasting fatigue and muscle weakness
- Difficulty swallowing or speaking

- Reduced mobility and loss of physical conditioning
- Blood clots related to limited movement
- Pressure injuries
- Lung, urinary, or bloodstream infections during prolonged hospital care
- Emotional distress after a severe illness or intensive care stay

Follow up

After discharge, routine follow-up focuses on breathing, swallowing, nutrition, strength, mobility, and the ability to manage daily activities. A rehabilitation plan may involve physical therapy, occupational therapy, speech-language therapy, or pulmonary care.

Keep follow-up appointments even if recovery appears to be going well. Clinicians may adjust activity plans, reassess swallowing safety, monitor weight, and review whether equipment or home support is still needed. Return to work, school, driving, and strenuous exercise should be discussed in the context of remaining weakness and fatigue.

Seek prompt medical advice for new coughing during meals, repeated choking, worsening fatigue, increasing wound redness or drainage, poor weight gain, or a decline in strength.

Call emergency services for new or worsening trouble breathing, inability to swallow saliva, rapidly progressing weakness, blue or gray lips or skin, fainting, or difficulty waking. These are not routine follow-up concerns.

If foodborne botulism was suspected, follow public health instructions about leftover food and containers. Do not throw away or open a suspected item unless officials tell you how to handle it. Others who ate the same food should be informed and should seek urgent assessment if compatible symptoms develop.

Sources

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