Clostridium botulinum

Clostridium botulinum is a gram-positive bacilli of the genus Clostridium, which are anaerobic, spore-forming bacteria. This bacteria produces several toxins including a heat labile neurotoxin that inhibits acetylcholine release at the neuromuscular junction, causing a flaccid muscular paralysis. Adult botulism is associated with the ingestion of food in which C. botulinum spores have been allowed to germinate in anaerobic conditions, often seen in home-canned food substances and fermented uncooked dishes. Botulism results when adults ingest preformed toxins from the bacteria. In infant botulism, children are colonized with bacteria early in life, often associated with the consumption of spores in honey. The bacterium then releases the toxin into the intestine, which is absorbed into the bloodstream.Both forms lead to paralysis that typically begins with the muscles in the face and characteristically affects the muscles supplied by the cranial nerves first, causing eyelid drooping, diplopia (double vision), loss of facial expression, dry mouth, difficulty chewing and swallowing, followed by symmetric descending, flaccid paralysis. The weakness then spreads to the arms and legs. In infants, symptoms include constipation and generalized weakness, with weak crying, poor feeding, lethargy, and loss of head control (floppy baby syndrome). In severe botulism, it can cause paralysis of the respiratory muscles and cause respiratory failure. In addition to affecting voluntary muscles, the toxin can cause disruptions in the autonomic nervous system causing dry mouth, postural hypotension and decreased peristalsis leading to constipation. Because the adult form is contracted by ingesting a preformed heat labile toxin, it can be prevented by adequately heating food to proper temperatures.



PLAY PICMONIC

Characteristics

Bacillus
Rod
This bacteria is rod-shaped.

Gram-positive
Graham-cracker Positive-angel
This bacteria stains gram-positive, which means that it retains large amounts of the Gram stain due to its high peptidoglycan content in the cell wall.

Anaerobe
Ant-robe
This bacteria prefers to grow in an anaerobic environment.

Spore-forming
Spores
This bacteria is capable of forming spores when in an unfavorable state. It can quickly germinate and produce bacteria in its vegetative state when in preferable conditions.

Heat Labile Toxin
Heat-lamp melting Toxin
The neurotoxin responsible for the symptoms of botulism is a heat labile toxin and can be prevented by adequately heating food to proper temperatures.

Inhibits Acetylcholine (Ach) Release at Neuromuscular Junction (NMJ)
Inhibiting-chains on A-seagull-cola at NMJ
The toxin causes a flaccid paralysis by inhibiting acetylcholine at the neuromuscular junction, preventing activation of the muscles.

Canned Food in Adults
Canned Foods
Adult botulism is associated with the ingestion of food in which C. botulinum spores have been allowed to germinate in anaerobic conditions, often seen in home-canned food substances and fermented uncooked dishes. The spore have a preformed toxin which is the cause of disease.

Spores in Honey
Spores in honey jar
In infant botulism, children are colonized with bacterium early in life, often associated with the consumption of spores which have formed toxin in honey. The released toxin in the intestine is then absorbed into the bloodstream.

Sign up for FREE at picmonic.com

Signs and Symptoms

Descending Flaccid Paralysis

Down-arrow Wheelchair

The neurotoxin leads to paralysis that typically begins with the muscles in the face due to involvement of the cranial nerves. Symptoms include double vision, drooping of the eyelids, loss of facial expression, and difficulty swallowing and talking. The weakness then spreads to the arms and legs causing a descending flaccid paralysis.

Diplopia

Double-eyes

Diplopia is a common symptom of botulism as the cranial nerves that control ocular movement are affected.

Ptosis

Toast-eyes

Ptosis is drooping of the eyelids and is commonly seen in botulism due to involvement of the cranial nerves that control the eyelids.

Floppy Baby

Floppy Baby

In infants, the flaccid paralysis is often called floppy baby syndrome.

Constipation

Corked Con-toilet

In addition to affecting voluntary muscles, the toxin can cause disruptions in the autonomic nervous system, causing dry mouth, postural hypotension and decreased peristalsis, leading to constipation.

Sign up for FREE at picmonic.com