

# Botulism

[Announcer] This program is presented by the Centers for Disease Control and Prevention.

[Reginald Tucker] Hi, I'm Reginald Tucker and today I'm talking with Dr. Agam Rao, a medical officer at CDC. Our conversation is based on papers about botulism, which appear in CDC's journal, *Emerging Infectious Diseases*. Welcome, Dr. Rao.

[Agam Rao] Thanks. It's great to be here, Reginald.

[Reginald Tucker] Dr. Rao, what causes botulism?

[Agam Rao] Botulism is a naturally occurring illness. It's actually caused by a powerful toxin. The toxin is produced by the bacterium *Clostridium botulinum*. When the toxin gets into somebody's bloodstream it blocks the release of a neurotransmitter between nerves and muscles and this is actually what causes botulism. This affects your cranial nerves and may result in people having symptoms like problems opening their eyes, moving their eyes, and swallowing. If it's left untreated, people can go on to have paralysis of their limbs, respiratory failure, and even death.

[Reginald Tucker] Botulism sounds frightening. How dangerous is it?

[Agam Rao] Botulism is dangerous. It's a serious illness and people can actually die from it. In fact, before the advent of modern intensive care units and botulism antitoxin, people did die from botulism pretty commonly. And, even though intensive care units and antitoxin are around now, people still have scary symptoms, like paralysis. When people are paralyzed they can't speak and not being able to communicate makes the situation even worse. Improvement in their symptoms can sometimes take a long time, too. Because of its severity, deadliness, and the potential for many cases associated with eating a common food, every suspected case of botulism is considered a public health emergency.

[Reginald Tucker] How is botulism treated once someone gets it?

[Agam Rao] Botulism is treated with management in an intensive care unit, mechanical ventilation when needed, and botulinum antitoxin. Physicians who suspect botulism in a patient should immediately contact their health department so that an investigation can be started and also so that they can get antitoxin from CDC. Botulinum antitoxin is most helpful if administered early during the patient's illness, so it's really important that physicians get that antitoxin as soon as possible when they find out about a patient's illness. Antitoxin doesn't reverse the symptoms that the patient already has. It just prevents the worsening of paralysis.

[Reginald Tucker] Don't people usually get botulism from food? Are there other ways to get it?

[Agam Rao] It may come as a surprise that there are actually five ways that people can get botulism. Getting botulism from food is just one of these ways. People who get botulism from food get it from eating foods that contain the actual *botulinum* toxin. The food contains the toxin because of the way it was prepared or stored. For example, when people do their own home canning, and they don't strictly adhere to the pressure, temperature, and other canning instructions, toxin can be produced in those canned foods.

A second way people can develop botulism is when *botulinum* toxin is produced in a wound that has *C. botulinum* in it. In the US these days, wound botulism most often occurs in injection drug users who introduce the *C. botulinum* into wounds when they skin-pop black tar heroin. But people can also get wound botulism when *C. botulinum* from soil contaminates other kinds of wounds, like open fractures and wounds from motor vehicle accidents.

A third way to get botulism is when *C. botulinum* gets into infant's intestines. This is called infant botulism. Usually the source of infant botulism isn't known, but we do know that *C. botulinum* can be found in honey, and since it's also often in environmental sources like dust, it's easy to see how *C. botulinum* could be ingested.

A fourth way, is what we call adult intestinal colonization botulism, and like the name implies, happens through the same colonization mechanism as infant botulism. It's extremely rare and not at all well understood.

And finally, the last way of getting botulism can happen when people get too high a dose of *botulinum* toxin from medical treatment. You may not know that Botox<sup>®</sup> and Dysport<sup>®</sup> are trade names for *botulinum* toxin. They do wonders when they're given to patients and have both licensed and off-label therapeutic uses for things like cervical torticollis, migraine headaches, and wrinkles, among other things. But because *botulinum* toxin is injected, people can get botulism if the dose is too high. And when it does happen, it's called iatrogenic botulism.

So you can see that people can get botulism from many different ways and contaminated food is just one of these ways.

[Reginald Tucker] This is surprising information. So, if there are so many ways to get botulism, why is it so rare?

[Agam Rao] The bacterium *Clostridium botulinum* is common in our surroundings. Its natural habitat is soil. But even though the bacterium is common, the illness, botulism, is not. This is because you have to have the right conditions for the bacterium to produce toxin in order for people to get botulism. For example, in addition to the bacteria in a food, a wound, or inside a person, there are specific conditions that are needed for toxin to be produced from the bacteria. One of these mandatory conditions is low oxygen. But there are other requirements too and all of the conditions are necessary. The right conditions are rarely achieved, but that being said, botulism occurs all over the world and cases have occurred in every state in the United States. In 2010, there were still 112 confirmed cases of botulism in the US.

[Reginald Tucker] I've heard that non-infant botulism is apparently more rare than infant botulism, but there've been several cases of botulism lately in non-infants. Why is this?

[Agam Rao] You're right that infant botulism is the most common type of botulism these days, but non-infant botulism, including foodborne and wound botulism occur every year. The absolute number of each has varied over the last 50 years, but in recent years, the percentage of each has actually been more or less stable. Even though it's an illness that has been happening for centuries, we're always learning new things about it and new reports of strange foods or rare kinds of botulism are published all the time.

[Reginald Tucker] How can we avoid or minimize getting botulism?

[Agam Rao] A lot of cases of botulism are preventable. Starting with foodborne botulism, as I mentioned earlier, foodborne botulism is often from home-canned foods and is caused by not following home-canning instructions. Foodborne botulism can also be caused by food that is not kept refrigerated. In Alaska, foodborne botulism is often caused by traditional Alaska native foods, including fermented fish, because of the way these foods are sometimes prepared. So people can avoid getting foodborne botulism by strictly following home-canning guidelines, being careful to refrigerate foods that are supposed to be refrigerated, and not consuming if they have been left unrefrigerated, strictly following the instructions on labels, and being aware of the risk of botulism from some Alaska native foods. Similarly, wound botulism can be prevented by immediately seeking medical care for infected wounds and by not using injectable street drugs. Honey can contain *C. botulinum*, so children younger than 12 months old should not be fed honey in order to prevent infant botulism from happening. And then finally iatrogenic botulism can be prevented by avoiding high doses of the toxin during medical treatments.

[Reginald Tucker] Thanks, Dr. Rao. Two papers further in discussing botulism, *Asymmetric Type F Botulism with Cranial Nerve Demyelination* and *Intestinal Toxemia Botulism in 3 Adults, Ontario, Canada, 2006-2008* appear in the January 2012 issue of CDC's journal, *Emerging Infectious Diseases*. You can see both articles online at [www.cdc.gov/eid](http://www.cdc.gov/eid).

If you'd like to comment on this podcast, send an email to [eideditor@cdc.gov](mailto:eideditor@cdc.gov). I'm Reginald Tucker, for *Emerging Infectious Diseases*.

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