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Botulism Outbreak — Nome, January 2019

Background

Foodborne botulism is a life-threatening illness caused by consumption of food contaminated with botulinum toxin. The bacteria that make botulinum toxin, *Clostridium botulinum*, are naturally occurring and found ubiquitously in the environment.¹ During 1950–2017, all Alaska foodborne botulism cases, for which a food source was identified, occurred following consumption of traditionally-prepared Alaska Native foods.²

Botulinum toxin acts at cholinergic neuromuscular junctions by inhibiting the release of acetylcholine from presynaptic motor neurons. The action is believed to be irreversible. Both autonomic and voluntary motor activities are affected. The disease is characterized by neuromuscular paralysis that begins with the cranial nerves and progresses to peripheral and respiratory musculature. The incubation period for foodborne botulism is typically 18–36 hours (range: 6 hours to 10 days).¹ The only specific treatment for botulism is heptavalent botulinum antitoxin (HBAT), which prevents further progression of paralysis by preventing unbound, circulating toxin from binding to motor neurons. With early administration of antitoxin and supportive care, the case-fatality rate is <5%.¹

On January 2, 2019, the Alaska Section of Epidemiology (SOE) received report of three adults presenting to the Norton Sound Regional Hospital emergency department complaining of nausea, vomiting, dizziness, and double vision. All three patients had eaten at a potluck meal on January 1, 2019. We launched an immediate investigation to determine the source of toxin, and to identify and prevent additional cases.

Methods

During January 2–3, 2019, a team comprised of Nome Public Health Nurses and SOE epidemiologists interviewed potluck attendees to determine which foods they consumed and whether they had symptoms of botulism. The team also reviewed clinical records of hospitalized cases. All potluck attendees were monitored for symptoms for 10 days after the potluck. Serum and stool samples were collected from hospitalized patients; all leftover foods were collected for botulism testing. Clinical samples and suspected food items were tested at the California Department of Public Health Microbial Diseases Laboratory. [Note: Botulism testing is usually performed by the Alaska State Public Health Laboratory; however, earthquake damage required that specimens be sent to a reference laboratory.] Cases were classified as probable and confirmed according to national case definitions.² Risk ratios (RRs) and 95% confidence intervals (CI) were calculated for food items to identify the source of the outbreak.

Results

Of the 14 persons who ate food at the potluck, 9 (64%) reported at least one symptom compatible with botulism during January 1–11 (Table). Four (44%) persons experienced mild symptoms and were managed as outpatients; none received HBAT. Five (56%) experienced symptoms severe enough to warrant closer observation or hospitalization; one of whom subsequently received a diagnosis other than botulism. The remaining four received HBAT and were transferred to the Alaska Native Medical Center. One of these patients was intubated, sustained multiple cardiac arrests, and subsequently died 13 days after symptom onset.

Potluck participant interviews identified 17 food items that were consumed during the potluck. Food items identified as statistically significant predictors of illness were aged whale flipper (RR: 3.3; 95% CI: 1.29–8.59) and “Eskimo ice cream” with reindeer fat (RR: 2.4; 95% CI: 1.22–4.68). Laboratory

testing identified botulinum toxin type E in the aged whale flipper and two patient serum samples.

In total, four patients were classified as having had “confirmed” cases of botulism; all four of these patients were hospitalized and received HBAT. The age range of these four patients was 49–68 years; three were male; all identified as Alaska Native.

Table. Signs and Symptoms of Botulism by System*

System	Sign/Symptom
Gastrointestinal/ Urinary	Abdominal pain Diarrhea Intestinal ileus Nausea Urinary retention Vomiting
Neurologic	Blurry vision Decreased gag reflex Dilated or unreactive pupils Diplopia Dry mouth Dysphagia
Muscular	Dyspnea (without gasping) Fatigue Respiratory muscle paralysis Symmetrical skeletal muscle weakness

*Adapted from Table 6 in *Botulism in Alaska*.²

Discussion

Here we describe a type E botulism outbreak linked to consumption of aged whale flipper that involved four confirmed cases and five hospitalizations. As was seen during this outbreak, the clinical features of botulism can be grouped into three major areas: neurologic, gastrointestinal/urinary, and muscular (Table). Often times, the initial presenting symptoms may be somewhat vague and nonspecific (e.g., dry mouth, nausea, and abdominal discomfort). For this reason, it is important to educate new clinicians and periodically remind seasoned clinicians about the unique epidemiology of botulism in Alaska and the importance of taking a food history from patients with compatible symptoms.

Tragically, one person died during this outbreak. The case-fatality rate of foodborne botulism in Alaska has declined considerably in recent decades,² likely due in part to increased availability of antitoxin, increased botulism awareness, and prompt public health interventions. Prior to 2019, the last two deaths attributed to botulism occurred in 2014 and 2007.²

Recommendations

1. Urgent administration of HBAT should be considered for any patient with a clinically compatible illness and a recent history of consuming traditional Alaska Native foods (e.g., aged or “fermented” animal products; dried animal products; and traditional condiments, such as seal oil).
2. Clinicians must *immediately* report suspected botulism cases to SOE at 907-269-8000 or 800-478-0084 afterhours.
3. Detailed information about botulism, including a clinician checklist, HBAT instructions, and specimen collection and handling guidance are available online.³
4. Asymptomatic persons should be monitored daily for signs and symptoms of botulism for 10 days after last exposure.

References

1. CDC. Botulism Webpage. Last reviewed October 2018. Available at: <https://www.cdc.gov/botulism/general.html>
2. SOE. Botulism in Alaska. November 2017. Available at: <http://dhss.alaska.gov/dph/Epi/id/siteassets/Pages/botulism/monograph.pdf>
3. SOE Botulism homepage. Available at: <http://dhss.alaska.gov/dph/Epi/id/Pages/botulism/resources.aspx>