
Case Report

The First Case of Type A Botulism Associated with Eating Barbecued Caviar Fish

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ABSTRACT

Botulism is a paralytic illness caused by the neurotoxin of clostridium botulinum. Food born botulism may develop after eating foods contaminated with botulinum toxin. Botulinum neurotoxin predominantly affects the peripheral neuromuscular junction and autonomic synapse, and its effects are primarily manifested as weakness.

A 12-year-old boy presented with severe weakness, diplopia and dropping eyelids 6 hours following ingestion of barbecued caviar fish. Clinical presentations were constipation, dry mouth, diplopia, blurred vision, ptosis, dilated and reactive pupils, weakness and lethargy. Based on the clinical findings, the patient received three antitoxin A, B, E monovalent; and stool, gastric fluid as well as serum samples were sent for toxicological evaluation with standard mouse bioassay. Type A toxin was detected in stool sample of the patient. Ten days later, the patient was discharged in a good condition. This study confirmed that prompt administration of antitoxin can prevent progression of disease based on clinical judgment and may also be life saving.

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INTRODUCTION

Clostridium botulinum spores are found throughout the world in soil samples and marine sediments (1). Botulism is a paralytic illness caused by neurotoxin of *Clostridium botulinum*. Food born botulism may develop after eating foods contaminated with botulism toxin. It usually develops 12-36 hours following the toxin ingestion

but may occur in 2 hours or up to 10 days. Botulinum neurotoxin predominantly affects the peripheral neuromuscular junction and autonomic synapse, and its effects are primarily manifested as weakness (2, 3). It is estimated that the human LD50 for inhalation botulism is 1-3 nanograms of toxin/kilogram body mass (4).

Rarely, botulism may be confused with diphtheria, organophosphate poisoning or brain stem infarction (6). Magnesium intoxication may mimic botulism (6). Botulism toxins are divided into seven types (A-G). Type A,B and E cause most of the human cases of toxicity; type F cases have rarely been reported (2,3,7,8). Botulinium neurotoxin type A (BoNT/A), the most toxic substance known to mankind, is produced by *Clostridium botulinum* type A. Hemagglutinin-33 is a 33Kda subcomponent of neurotoxin-associated proteins (NAP), which is resistant to protease digestion, a feature likely to be involved in the protection of the botulinium neurotoxin from proteolysis (9).

The sufferers initially complain of nausea and dry mouth, and then illness which is characterized by cranial nerves paralysis, followed by descending flaccid muscle paralysis. This can involve the respiratory muscles as well (1).

Cranial nerve dysfunction is manifested as blurred vision, ptosis, and facial weakness, nystagmus, dysphagia, dysarthria and hypoglossal weakness. The following cardinal clues have been proposed by CDC:

- 1) Fever is absent unless infection occurs.
- 2) Neurological manifestations are usually symmetrical
- 3) The patient remains responsive (10,11, 12)
- 4) Sensory deficits, except blurred vision are rare
- 5) Heart rate is normal or decreased and hypotension is absent.

The most sensitive test is mouse bioassay that requires up to 4 days for final result (3, 7). Prompt administration of polyvalent equine source antitoxin can decrease the progression of paralysis and severity of illness but will not reverse the existing paralysis. Due to these findings, clinicians should not wait for laboratory confirmation of the diagnosis to commence therapy.

In Iran, for the first time Lapeyssonnic (representative of WHO) reported botulism in a group of patients admitted to Poursina Hospital in Rasht about 40 years ago which was confirmed toxicologically and clinically (7). Since then, several outbreaks of botulism have been reported. This report summarizes a food-born outbreak of botulism type A toxin after eating barbecued caviar fish.

CASE REPORT

A 12-year old boy presented with severe weakness, diplopia and dropping eyelids 6 hours following ingestion of barbecued caviar fish. He had been referred from Gorgan to infectious ward of Lohman Hakim Hospital in Tehran.

The following signs and symptoms were present:

Constipation, dry mouth, diplopia, blurred vision, ptosis, dilated and reactive pupils, weakness, and lethargy.

Immediately after the admission, serum, stool, and gastric specimens were collected and submitted to Pasteur Reference Laboratory for botulinium toxin detection, using the standard mouse bioassay technique. Unfortunately, sample of caviar fish was not available. Type A toxin was detected in stool sample. Based on clinical findings, the patient received three monovalent A, B, E, antitoxin. Twenty-seven hours after the administration of equine-source antitoxin, ptosis, lethargy, weakness, diplopia and blurred vision improved significantly. But reactive dilated pupils and difficulty in accommodation did not improve completely. The patient was discharged in a good condition 10 days later.

DISCUSSION

Food born botulism is frequently recognized in outbreaks; whereas, the other forms are sporadic. Home- canned vegetables (13), fruits and food products (for example preserved green olives (14) or

home-preserved asparagus) are now the most common sources of botulism (15). In this study, we report a case of food-born botulism associated with barbecued caviar fish.

Sex, age, race or socioeconomic class are not important in epidemiology of botulism. But season may have some role in outbreak of disease and in winter, outbreaks are more common. This case was reported in winter as well. Improper food procurement and storage in winter may be associated with increased rate of botulism in this season.

Clostridium botulinum, is an obligate anaerobe found commonly in the environment. Intoxication with type E is exclusively associated with eating animal foods of marine (salt or fresh water) origin. Those who eat raw or fermented marine fish or meat are at high risk of botulism type E toxin (16). It is possible that preserving the caviar fish in a closed container was responsible for this food- born botulism. Iranians should be instructed about the appropriate techniques of storage and preparation of traditional foods; otherwise, these products may entail hazardous complications. Prior investigators have recommended to boil the food products for 10 minutes or to use microwave oven for 3-5 minutes to inactivate the toxins (3).

REFERENCES

1. Hauschild AHW: *Clostridium botulinum* in: Doly MP. Food borne bacterial pathogens. New York: Arcel Dekker, 1989;112-189.
2. Schechter R. Arnon SS. Botulism In: Behrman RE, Kliegman RM, Jenson HB, Nelson text book of pediatrics, 17th edition, Saunders, 2004, Vol 1, 947-50.
3. Vahdani P. Botulism and food poisoning, 1st Nazhat, 2001, page 111-78.
4. Horowitz BZ. Botulinum toxin. *Crit Care Clin* 2005; 21 (4): 825- 39, viii.
5. Dunbar EM. Botulism. *J Infect* 1990; 20(1): 1- 3. Erratum in: *J Infect* 1990; 20 (3): 273.
6. Cherington M. Botulism. *Semin Neurol* 1990; 10 (1): 27- 31.
7. Saebi E, Infectious Diseases in Iran, 1st Arjmand, 1992, page 120-67.
8. Boyadjive I, Leon M, Garnier F. A care of type A botulism. *Ann Fr Anesh Reanim* 2005; 24(11-12): 1397-9.
9. Zhou Y, Foss S, Lindo P, Sarkar H, Singh BR. Hemagglutinin-33 of type A botulinum neurotoxin complex binds with synaptotagmin II. *FEBS J* 2005; 272 (11): 2717- 26.
10. Weber JT, Hibbs RG Jr, Darwish A, Mishu B, Corwin AL, Rakha M, et al. A massive outbreak of type E botulism associated with traditional salted fish in Cairo. *J Infect Dis* 1993; 167 (2): 451- 4.
11. Hughes JM, Hatheway CL, Ostroff SM. Botulism In: Scheld WM, Whitloy RJ, Durack DT. Infections of the CNS. 2nd ed. Philadelphia: Lippincott-Raven; 1997: 615-28.
12. Tacket CO, Rogawask MA. Botulism. In: Simpson LL Botulinum neurotoxin and tetanus toxin. San Diego, Academic Press; 1989: 351-78.
13. Botulism from Home-canned, Bamboo shoots-Nonprovince, Thailand, 2006, MMWR, 14: 2006; 55 (14): 389-92.
14. Cawthorne A, Celentano LP, D'Ancona F, Bella A, Massari M, Anniballi F, et al. Botulism and preserved green olives. *Emerg Infect Dis* 2005; 11 (5): 781- 2.
15. Zanon P, Pattis P, Pittscheider W, Roscia G, De Giorgi G, Sacco G, et al. Two cases of food borne botulism with home-preserved asparagus. *Anesthesiol Intensivmed Notfallmed Schmerzther* 2006; 41 (3): 156- 9.
16. Middaugh J, Lynn T, Funk B, Jilly B. Botulism type E outbreak associate with eating beached whale, Alaska, 2003, MMWR. www.Cdc.Gov/edi.2003 January, 52(02), 24-6.