

## A Survey on the Clinical Presentations in Food-borne Botulism for Patients Referring to Razi Hospital During 2001-06

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### **ABSTRACT**

**Background:** Botulism is caused by a neurotoxin produced from the anaerobic, spore forming *Bacterium clostridium*. Food-borne botulism is one of the dangerous forms of food poisoning in the world. The purpose of this study was to survey some clinical presentations and laboratory findings in patients suspected with botulism toxicity that had received anti-botulism.

**Methods:** This descriptive-retrospective study was done on food-borne botulism poisoning cases admitted to the emergency ward and received anti-botulism at Razi Hospital of Rasht (north of Iran) during 2001-6. Completion of the questionnaire which included such variables as gender, age, clinical presentations, and laboratory data was based on the information available on the patients.

**Results:** Of the 31 patients that had taken anti botulism, 20 cases (64.5%) were male. Subjects were in age range of 19-55 and the mean of age was 34.5 years. Conserved foods (38.7%), salted caviar (32.3%), and fish (16.3%) were the main causes of botulism, respectively. The most common clinical symptom was vomiting (77.4%) and the most common neurological presentations were visual abnormalities (48.4%). Azotemia, leukocytosis, and leukopenia were seen in 3 cases (9.7%), in 2 cases (6.5%), and in 4 cases (12.9%), respectively.

**Conclusion:** Marine products (salted caviar and fish) have an important role in the incidence of botulism in Guilan. Botulism is seen in males more than females and its most common clinical manifestation is vomiting.

**Keywords:** Botulism, Food Poisoning, Guilan.

### **INTRODUCTION**

Botulism is characterized by cranial nerve palsies and descending flaccid paralysis (1, 2) and it is caused by neurotoxins produced by the gram-positive, anaerobic, spore-forming bacterium named *Clostridium botulinum* (1). Four naturally occurring botulism syndromes exist: food-borne, wound, infant, and adult intestinal colonization (3). Food-borne botulism results from eating foods that contain botulinum toxin which is the greatest public health concern because of its epidemic potential (1,2,3). Three types of neurotoxins (A,B,E) are responsible for most cases of food borne botulism (4). The severity of disease is correlated with the type and quantity of toxin ingested (5) and it is possible to estimate the quantity ingested on the basis of the quantity detected in the leftover food eaten by the patients (6). This bacterium is reserved in

homemade food; meat can also act as the favorable reproduction condition (7). The clinical syndrome of food borne botulism is highly distinctive (2). The initial symptoms may be gastrointestinal and can include nausea, vomiting, abdominal cramps, or diarrhea, whereas after the onset of neurologic symptoms, constipation is more typical. Dry mouth, blurred vision, and diplopia are usually the earliest neurologic symptoms. These initial symptoms may be followed by dysphonia, dysarthria, dysphagia, and peripheral muscle weakness (1). Symmetric descending paralysis is characteristic of botulism which includes symmetrical cranial nerve palsies followed by symmetrical descending flaccid paralysis that may progress to respiratory arrest (8,9). Onset usually occurs 18 to 36 hours after exposure (range, 6 hours to 8 days) (9). The diagnosis in sporadic cases and even in small outbreaks is frequently missed, partly because botulism is a

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rare disease with which most clinicians are unfamiliar (10). Administration of antitoxin is the only specific pharmacologic treatment available for botulism and intravenous administration of trivalent equine antitoxin to humans neutralizes toxin molecules that are not yet bound to nerve endings (11).

Most outbreaks of botulism in Iran are associated with traditional foods, especially vegetables and fish (12). Botulism, if not detected or diagnosed late, can be a fatal disease. Therefore, the identification of clinical manifestations is important and early detection and early treatment can save patients' lives. This study explores the clinical signs and symptoms and laboratory data of botulism in patients who referred to the emergency room of Razi Hospital during 2001-06.

## MATERIALS AND METHODS

The aim of this cross-sectional, retrospective study was to assess the frequency of admitted botulism food poisoning cases that received anti-botulism at Razi Hospital of Rasht (north of Iran) during 2001-06. The study was based on 31 patients' records. Demographic and disease information

including age, gender, the lag time between the onset of symptom and the arrival at hospital, consumed materials, signs and symptoms (visual disorder, speaking abnormality, dysphagia, abdominal pain, nausea and vomiting, diarrhea, and loss of consciousness), and laboratory abnormalities, including leukopenia, leukocytosis, and azotemia, were documented by a questionnaire. All statistical analyses were done using SPSS software (version 18, USA).

## RESULTS

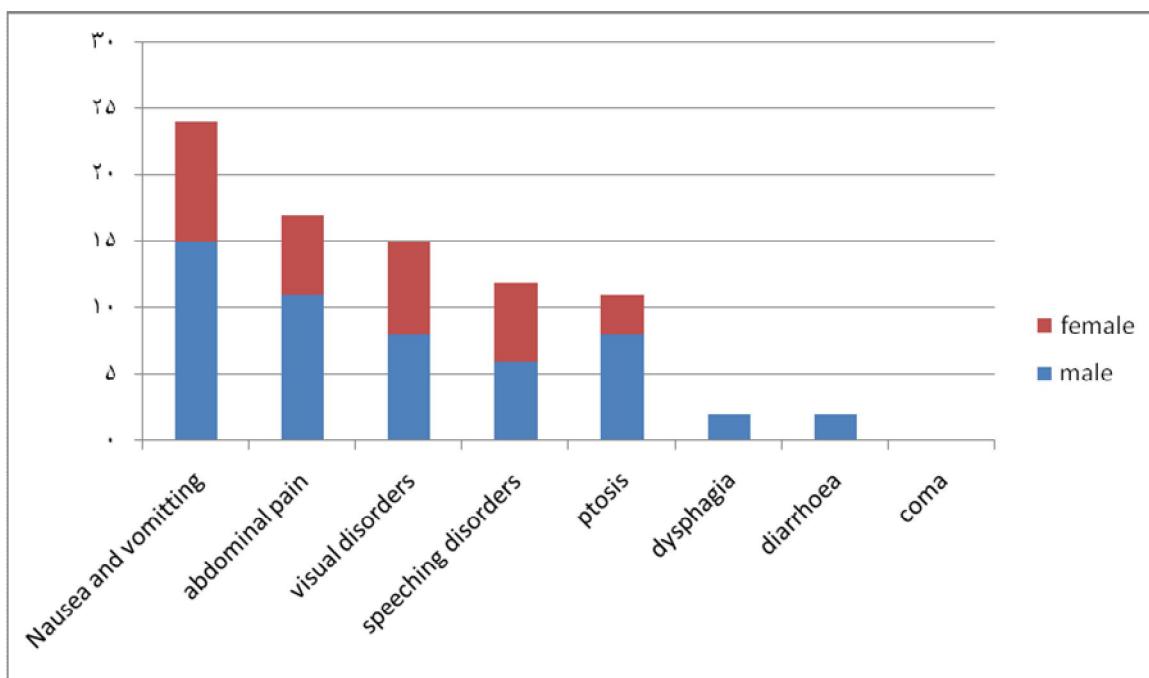
Out of the 31 patients, there were 11 females (35.5%) and 20 males (64.5%) with the mean age of  $34.5 \pm 11.4$  years. Subjects were in age range of 19-55. The most common reason of poisoning was due to conserved foods (38.7%), and salted caviar consumption (32.3%). The other causing factors included fish (in 5 cases, 16.1%), and calabash (in 3 cases, 9.7%) (Table 1). Honey poisoning was also seen in one case who was a 35-year-old woman with ptosis, vocal disorder, diplopia, and haziness. There were no other suspected foods in the patient's history except for honey. NCV and EMG tests confirmed botulism

**Table 1.** Frequency of the type of consumed food in patients with suspected botulism that referred to Razi Hospital according to gender

Consumed food	Gender	
	Female	Male
Salted caviar	4	6
Honey	1	0
Conserved food	3	9
Calabash	2	1
Fish	1	4
<b>Total</b>	<b>11</b>	<b>20</b>

The clinical manifestations of studied patients included nausea and vomiting as the most common symptoms (77.4%), abdominal pain (54.8%), visual disorders, such as blurred vision and diplopia (48.4%), speech disorders (38.7%), ptosis (35.5%), diarrhea (6.5%), and dysphagia (6.5%) (Figure 1). Azotemia was seen in 3 patients (9.7%), whereas leukocytosis

and leukopenia were seen in 2 (6.5%) and 4 cases (12.9%), respectively. The mean time of hospitalization was  $3 \pm 1.2$  days, and the range of hospitalization was between 2 and 7 days. Totally, 2 cases died. In one of them, the serum toxin was analyzed by Pastor Institute and the consumed material was fish. Out of the subjects, 5 cases had been transmitted to ICU.



**Figure 1.** Relative frequency of clinical presentations in patients with suspected botulism that referred to Razi Hospital according to gender

## DISCUSSION

There number of male patients (20) was more than the number of female patients (11) 31 that had received anti-botulism in the period of the study. This higher rate of botulism poisoning in men in comparison with women is probably due to the cultural differences between them; men are more willing to eat canned foods and are less likely to heat food.

Regarding the cause of disease, canned food and salted caviar were the most common cause with 38.7% and 32.3%, respectively. Totally, the high percentage of toxicity was attributed to consuming fish and salted caviar. In the study done by Tavakoli, et al. on contamination levels of *Clostridium botulinum* in different fish species, contamination was seen in 8.33% of two fish species (trout and perch) in the north of Iran, while this rate was 1.66% for fish in southern Iran (13). Therefore, northern fishes have a great potential to infect people with botulism.

Because in the region near the Caspian Sea, botulism contamination in fish in the sea is high, measures to encourage people to eliminate the discharge of fish immediately after catching the objects, keep products at temperatures below 3° C, and heating foods adequately before use is essential to prevent botulism. This shows that with adequate

advertising through public media, and urging people to boil canned foods, the risk of botulism can be reduced.

Laboratory tests that were used in this study consisted of leukopenia, leukocytosis, and azotemia. In this study, azotemia was seen in 3 patients (9.7%), one due to diarrhea and the other two due to prerenal sate was the reason of elevated BUN and Cr (the rate was more than 20). The elevated BUN and Cr switched to the normal range during hospitalization because of the patients received hydration therapy. Since this was a descriptive study and sufficient sample size was not available for statistical analysis, one of our main purposes was to survey some laboratory data in botulism patients. Although no references to laboratory abnormalities were found and there was no access to any articles on the accompanying leukocytosis, leukopenia, and azotemia, it was hypothesized that prerenal azotemia in many patients is because of repeated vomiting due to food poisoning. As well as, likely to be seen leukocytosis or leukopenia in some patients according to cause of disease that is a bacteria (*clostridium bacterium*). However, although leukocytosis and leukopenia were observed in our study, the same could also be seen in the general population.

Regarding clinical presentations, nausea and vomiting (77.4%) and then abdominal pain

(54.8%) were the most common symptoms. These findings are similar to those found in Aminzadeh, et al's study on 80 cases that showed these symptoms in 17 patients (21.3%) as the most common first symptom, whereas only 3 cases (3.8%) had abdominal pain as the first symptom (2). In the Texas botulism epidemic, nausea and vomiting were seen in 31% of patients and 59% of patients had abdominal pain (18). In the present study, the most common neurologic signs and symptoms were visual disorders (48.4%) and ptosis (35.5%). In the Texas botulism epidemic, the most common neurologic signs and symptoms were dysphagia (69%) and then visual disorders (59%) (14). The comparison between the clinical presentations in our study and those in the Texas botulism epidemic showed higher rates of digestive disorders against neurologic problems in our study than the recent study.

Considering all of these findings, it can concluded that anti-botulism is administered too hasty for many patients. Although, usually, in the empirical disease management, there was no escape from this snaps.

## CONCLUSION

It seems necessary to recommend the restaurants of this province that serve fish and salted caviar in their menu list of foods to observe sanitation rules to prevent botulism due to fish contamination in the Caspian Sea and the greater role of aquaculture in causing this disease. It is also necessary to hold courses on early detection and on time referral for physicians. Continuing education by the media on preventing botulism and giving enough information to general population have a significant role in increasing people's awareness. For further studies in this field, providing a standard questionnaire to assess people's knowledge and attitude about botulism is recommended.

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