

# THE EPIDEMIOLOGICAL INVESTIGATION OF THE PRIMARY SOURCE OF BOTULISM RECORDED IN THE COUNTY OF ARGEȘ IN FEBRUARY 2009

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**Abstract:** The article presents the data of the epidemiological investigation of botulism primary source, registered in the county of Argeș, in February 2009, aiming at identifying the incriminating food product responsible for the botulinum intoxication.

**Keywords:** botulism, primary source, epidemiology

**Rezumat:** Articolul prezintă date ale investigației epidemiologice a focarului de botulism, înregistrat în județul Argeș în februarie 2009 având ca obiectiv identificarea alimentului incriminat în producerea intoxicației botulimice

**Cuvinte cheie:** botulism, focar, epidemiologie

## PURPOSE OF THE STUDY

To identify the incriminating food product responsible for the botulinum intoxication of the six patients diagnosed with botulism.

## MATERIAL AND METHOD

- Collecting data from the patients' medical records from the County Emergency Hospital of Pitești and also from "Matei Balș" National Institute of Infectious Diseases;
- Interviewing the patients – a preliminary interview taken at the time when the suspicion was noted and an interview after the botulinum etiology of the intoxication was confirmed;
- Correlating the results from the laboratory tests sent by "Cantacuzino" National Institute of Research and Development for Microbiology and Immunology ("INCDMI Cantacuzino") for the six patients;
- Analyzing the data for statistically significant associations between food consumption and the disease (the attack rate, the relative risk and its confidence interval with a probability of 95%, the statistically significant test of the distribution of the disease related to the incriminated food product).

## RESULTS

- The 6 patients came to the Infectious Diseases Department of the County Emergency Hospital of Pitești. Following a neurological examination and considering the epidemiological context, a clinical diagnosis of botulism was established and they were

transferred to "Matei Balș" National Institute of Infectious Diseases in Bucharest.

- From the patients' history, it was recorded that on February 12, 2009, the 6 patients and 2 other non-intoxicated persons consumed at lunch, food prepared in their own households (homemade ham in Florea and Militaru households, homemade cow cheese in Militaru household) and also two types of canned fish Sardinella, one in natural oil and the other one in tomato sauce. The two non-intoxicated persons had eaten only from the canned fish in tomato sauce and 5 out of the 6 intoxicated persons consumed both types of canned fish. The patients confirmed that the patient with the most severe disease consumed the largest quantity of the canned fish in natural oil and only from this one, which also suggests a dose-effect relationship.
- The analysis of the epidemiological data suggests a statistically significant association between the consumption of canned fish in natural oil and the disease. The specific attack rate among the persons who ate the lunch on February 13, 2009 for the canned fish in natural oil is 100% (table no. 1)
- The patients were clinically and epidemiologically diagnosed with botulism and the results from the tests made at NCDMI Cantacuzino Institute confirmed the botulinum etiology of the intoxication. The Botulinum toxin type B was identified in the serum of the 6 patients.

**Table no. 1. The specific attack rates among the persons who had lunch on February 13, 2009**

Food	Exposed consumers	Exposed consumers who got sick	The specific attack rate <sup>1</sup>
Canned fish in oil	6	6	100,00%
Ham (fatback) <sup>3</sup>	7	6	85,71%
Canned fish in tomato sauce <sup>2</sup>	7	5	71,43%
Scrambled eggs <sup>4</sup>	8	6	75,00%
Cottage cheese <sup>3</sup>	8	6	75,00%

<sup>1</sup> The specific attack rate among the consumers exposed to each type of food, separately

<sup>2</sup> Industrial canned fish

<sup>3</sup> Homemade

<sup>4</sup> Ingredients: eggs and oil

The patients and the non-intoxicated persons cannot specify from which ham each one consumed, but other family members consumed the ham brought both by Florea ham and Militaru (prior to February 13, 2009, but from the same chunk) without getting sick. Furthermore, the same people who ate the lunch on February 13, had also eaten from the cottage cheese prior to that date, and so had done the other family members of the Militaru family who did not get sick.

Considering the above-mentioned data, the suspicion regarding the cottage cheese and the scrambled eggs association with the Botulinum toxin was eliminated, for which we do not have any information from the medical literature.

The analysis of the epidemiological data suggests a statistically significant association between the consumption of the canned fish in oil and the disease, but it does not support a similar association between the ham, and the canned fish in tomato sauce with the disease (table no. 2).

**Table no. 2. The association between the consumption of specific food and the disease**

Food	Relative risk (95% C.I.)	Fisher's exact <sup>1</sup>
Canned fish in oil <sup>2</sup>	Not defined	0,036
Ham (lard) <sup>3</sup>	Not defined	0,250
Canned fish in tomato sauce <sup>2</sup>	0,71 (0,45 – 1,14)	0,750

<sup>1</sup> An expected value < 5 recommends the test

<sup>2</sup> Industrial can

<sup>3</sup> Homemade

In spite of these, the Botulinum toxin type B identified in the patients is known in the Romanian medical specialty literature to be more frequently isolated from canned meat rather than from canned fish.

Specialists from the Department of Public Health Control within the Department of Public Health in Argeş performed a control in Florea's household from Strambeni village and stated that the incriminated ham was kept in an aired space at the outdoor temperature in a half-open storehouse. The ham from Militaru's household was kept in the freezer.

### DISCUSSIONS

Although the probability of an association between the intoxication with Botulinum toxin type B and the consumption of industrial canned fish is low, it is not excluded. There are cases mentioned in the medical literature that attest the association of this type of toxin with the canned fish.

Data from the Romanian medical literature are limited, but the literature from CDC, Atlanta, documents 263 cases of botulinum intoxication in the U.S.A. between 1990 and 2000. Out of these, 131 (50%) were with type A toxin, 27 (10%) with type B toxin, and 97 (37%) with type E toxin. These cases corresponded to 160 events (primary sources of food poisoning - sporadic

cases). Out of these, in 126 cases (79%), a specific type of food was incriminated based exclusively either on epidemiological data, or on the epidemiological data confirmed by laboratory tests (the detection of the same type of toxin in the patients' serum and in the food). Out of all the events, in 23 (14%), type B toxin was detected in the patients. In 6 cases, (26%), the contaminated food could not be identified. Six other events which implied the type B toxin (26%) were proved to be caused by aquatic/marine animals (salmon/white fish, seal) canned in the households in Alaska.

All the above information supports that the intoxication with type B toxin could have been also produced by consuming canned fish. Although the probability of this association between the intoxication with Botulinum toxin type B and the consumption of industrial canned fish was only 4% from the data in U.S.A., this was equal with the probability of associating Botulinum toxin type B and the consumption of industrial meat.

### LIMITS OF THE INVESTIGATION

The investigation of this primary source has the following limitations mainly due to the time elapsed from the moment of exposure (the incriminating lunch) and detection (the supposition of Botulinum intoxication):

- Memory errors of the inquired persons, an important factor for issuing and testing the hypothesis regarding the incriminated food product;
- The unavailability of the remaining food product from the canned fish in oil consumed on the specific date, to be tested in the National Sanitary Veterinary and Food Safety Authority (A.N.S.V.S.A). laboratory;
- Among the samples from the canned fish tested, there were no samples from the supermarket in Piteşti, were the canned fish in oil were bought from and consumed on that specific lunch.
- D.S.V.S.A. has taken samples from only 60 sardines cans – in natural oil from a quantity of 1358 cans from the same batch, meaning 4.42%, the result being negative for the presence of Botulinum toxin.

### CONCLUSIONS

The primary source of botulism was most probably the ingestion of a type of fish – sardines – in natural oil from an industrial can, consumed by the six patients. The epidemiological data were not sustained by the laboratory tests performed on the samples taken from the product by the Department of Sanitary Veterinary and Food Safety Authority (4 42% of the sequestered).