



Case report

Botulism disguised as parotitis

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ABSTRACT

Botulism is an acute toxin-mediated neuroparalytic syndrome caused by some *Clostridium* species. It typically presents itself as an acute symmetric descending paralysis of cranial and peripheral nerves, which can potentially evolve to respiratory failure and death. We report a case of botulism diagnosed in a patient presenting with a parotitis probably due to xerostomia, even though he had already sought medical assistance for blurred vision and dysphagia. The neurological symptoms resolved without administration of antitoxin and botulism diagnosis was confirmed with identification of both toxins B and F in patient's serum. We aim to illustrate the need for a high clinical suspicion for the diagnosis of botulism and to report an atypical case of botulism with the production of toxins B and F, the latter being of rare occurrence.

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Introduction

Botulism is an acute toxin-mediated neuroparalytic syndrome, caused by some *Clostridium* species. In humans, the disease is caused by toxins types A, B, E or rarely F and H [1]. *Clostridium botulinum* is responsible for most cases and can produce all the above mentioned toxins, while toxin E may also be produced by *C. butyricum* and toxin F by *C. baratii*, which account for a minority of cases [2].

Clostridium spp. are strictly anaerobic, rod-shaped, Gram-positive, spore-forming microorganisms that exist commonly in soil, dust, aquatic environments and in the intestine of animals, but are not considered part of the normal human intestinal flora [3]. The disease is primarily caused by the ingestion of botulinum toxin present in contaminated food (foodborne botulism) or by *in situ* toxin production after germination in a wound (wound botulism) or in the intestine (infant botulism and, rarely, adult intestinal botulism) [4].

For all forms of the disease, the clinical syndrome consists of an acute onset of symmetrical bilateral cranial nerve palsies, commonly followed by descending symmetrical flaccid paralysis of involuntary muscles and symptoms of dysautonomia, reflecting the acetylcholine release inhibition across the neuromuscular junction by the neurotoxins, after their irreversible binding to the presynaptic nerves. The cranial nerve involvement manifests as a combination of blurred vision (secondary to fixed pupillary dilation and palsies of the III, IV and VI cranial nerves), diplopia, nystagmus, dysarthria, dysphonia, ptosis, bilateral facial paralysis, manifested by absence of facial expression, dysphagia and impaired gag reflex. Autonomic symptoms may include constipation, urinary retention, changes in resting heart rate, loss of responsiveness to hypotension or postural change, hypothermia, xerostomia and sore throat [4–6].

The case of botulism here described was diagnosed in the context of a parotitis, a probable complication of the reduced salivary flow, in which two botulinum toxins were identified in the patient's serum.

Case report

A 40-year-old male patient with no past relevant medical history presented in the emergency department with complaints

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of a painful swelling in the left mandibular region and fever for 24 h. Physical examination revealed an enlarged and painful left parotid gland with no purulent discharge from the orifice of Stensen's duct. Ultrasonography revealed an enlargement of the gland with normal echotexture loss and thickening of the surrounding fat, without calculi or duct obstruction, and laboratory tests revealed a leukocytosis of 20,390/uL with 86 % neutrophils and a C-reactive protein of 105 mg/L. He was admitted to the infectious diseases ward with a diagnosis of a probable bacterial parotitis and was started on intravenous amoxicillin-clavulanate.

Clinical enquiry revealed a precedent two-week history of sequentially additive symptoms of two days of self-limited vomiting and diarrhea after eating a homemade smoked pork sausage, followed by blurred vision, difficulty in swallowing and dry mouth sensation. These symptoms had previously prompted two clinical evaluations without any diagnosis being made. On re-examination, an expressionless face and bilateral ptosis were also found. A clinical diagnosis of botulism with superimposed parotitis due to xerostomia was made.

The patient completed 5 days of intravenous amoxicillin-clavulanate for the parotitis with resolution of the fever and the inflammatory signs in the mandibular region and was discharged, maintaining a discrete ptosis and facial paralysis. No antitoxin was administered. On follow-up evaluation 2 weeks after discharge, he was fully asymptomatic.

Botulism was confirmed by identification of botulinum toxins B and F in patient's serum by the standard mouse bioassay. No toxin was found in the food sample (smoked pork sausage from the same source as the one that was eaten by the patient) but genes involved in the production of type B botulinum neurotoxin were detected by molecular biology in it, according to ISO / TS 17919:2013, and the presence of type B botulinum neurotoxin gene (BoNT/B) was confirmed by Sanger sequencing. No neurotoxin was detected nor neurotoxin producing strains of clostridia were isolated in stool or food samples.

Discussion

Despite its distinctive clinical presentation, botulism is a rare disease and may remain unnoticed, especially in milder cases and by younger physicians, many of whom have never seen a case. The diagnosis needs clinical and laboratory investigations to detect the neurotoxin and the neurotoxin producing clostridia in clinical or food samples, which may confirm but not refute the diagnosis [7]. In this case, the diagnosis was delayed for 2 weeks and it was made in the context of a complication after an observation by an infectious diseases physician by associating a clinically compatible case (progressive facial and oropharyngeal muscle paralysis and xerostomia) with the history of homemade smoked pork sausage consumption.

Although signs and symptoms of botulism are the same regardless the type of toxin and the site of its production, severity and course of disease may vary depending on the toxin involved. Toxin A causes the most severe syndrome, while toxin B causes milder disease, toxin E is variable in severity and disease by serotype F is characterized by rapid and severe progression to quadriplegia followed by relatively rapid recovery [4,6]. The mild clinical presentation in this case is suggestive of a more prominent role of toxin B rather than toxin F, which may be due to a lower inoculum of the latter.

Worldwide there are few cases of type F botulism described in humans. In fact, in a systematic review of 197 foodborne botulism outbreaks reported between 1920 and 2014, type F toxin was identified as the causative agent in only 1 % of the outbreaks, while types A, B and E toxins were responsible for 34 %, 16 % and 17 % of the occurrences, respectively [8]. In Portugal, this is the second

case described in the literature where type F botulinum toxin was detected in a patient [9]. Although there was no cultural isolation of the implicated bacterium, this could be either a case of botulism by toxin B and F-producing *C. botulinum* or of two neurotoxins producer *Clostridium* spp. Both hypotheses are peculiar. Commonly, each strain of *C. botulinum* produces only a single toxin type but some strains possess from one to three neurotoxin genes and, therefore, can produce one to three different neurotoxins [10]. Since botulism is nowadays a rare disease, having disease caused simultaneously by two different species of *Clostridia* would be extremely unlikely.

Antitoxin is the only specific treatment and should be administered as soon as possible since it does not reverse established paralysis [6]. Neurologic recovery only occurs after motor neurons regeneration and may take weeks to months [5,6]. The antitoxin was not administered as the neurological deficits had been stable for one week and there were no signs of respiratory involvement. Even if it had been administered, the outcome would have been unpredictable as the currently available treatment in Europe is a trivalent antitoxin ABE, which has no proven effectiveness in cases of botulism caused by toxin F [11].

Although no major complications developed, an early diagnosis may be important for public health reasons. In this case, all individuals that had eaten the same sausage that was eaten by the patient were screened and none developed symptoms.

This case highlights the importance of being acquainted with this disease for its (early) recognition, prompt treatment (if clinically indicated) and additional public health investigation and measures since diagnostic confirmation may be delayed, the clinical course can be potentially fatal and there can be outbreaks if the source is associated with the ingestion of contaminated food products. It also represents one of the rare cases of type BF botulism described in humans. However rare, the occurrence of new cases of type F botulism adds concern to the already raised by the European Centre for Disease Prevention and Control regarding effective treatment and the need of a better surveillance [11].

Ethical approval

Patient agreed with the publication of this article.

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CRedit authorship contribution statement

João Paulo Caldas: Writing - original draft, Writing - review & editing, Conceptualization, Project administration. **Rita Filipe:** Writing - original draft, Conceptualization. **Rita Queirós:** Investigation. **António Grilo Novais:** Investigation. **Francisco Almeida:** Writing - original draft, Conceptualization. **Luís Malheiro:** Writing - original draft. **Teresa Teixeira Lopes:** Writing - original draft. **Margarida Saraiva:** Writing - original draft. **Margarida Tavares:** Conceptualization, Investigation. **António Sarmiento:** Supervision.

Declaration of Competing Interest

None.

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