



## Case Report

# A Rare Case of Botulism in an Adult Patient

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### ARTICLE INFO

#### Article history:

Received 25 April 2021

Received in revised form

09 May 2021

Accepted 24 May 2021

#### Keywords:

Botulism

Botulism antitoxin

Differential diagnosis

Pharmaceutical

preparations

Humans

Aftercare

### ABSTRACT

Presentation of botulism in adults is extremely rare and symptoms can be easily confused for symptoms of acute stroke, Guillain-Barre, or myasthenia gravis. The purpose of this clinical case report is to ensure adult botulism will be included in the differential diagnoses for a patient with this presentation so swift and accurate care can be provided to ensure optimal patient outcome. A 41-year-old-female presented with complaints of sudden onset of difficulty speaking. The patient reports a history of intravenous polysubstance abuse and symptoms progressed to bilateral facial weakness, ptosis, and external ophthalmoplegia. With no notable findings from a non-contrast computed tomography and magnetic resonance imaging and given the symptoms, a diagnosis of wound botulism from intravenous drug use was made. Botulism antitoxin was given and the patient was admitted into the intensive care unit for supportive follow-up care. A colony of Clostridium species was discovered in this patient's arm and the patient showed significant improvement after a few days of care.

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<http://doi.org/10.5281/zenodo.4825690>

## Un caso raro de botulismo en una paciente adulta

### INFO. ARTÍCULO

#### Historia del artículo:

Recibido 25 Abril 2021  
 Recibido en forma revisada  
 09 Mayo 2021  
 Aceptado 24 Mayo 2021

#### Palabras clave:

Botulismo  
 Antitoxina botulínica  
 Diagnóstico diferencial  
 Preparaciones  
 farmacéuticas  
 Humanos  
 Cuidados posteriores

### RESUMEN

La presentación del botulismo en adultos es extremadamente rara y los síntomas pueden confundirse fácilmente con los síntomas de accidente cerebrovascular agudo, Guillain-Barré o miastenia gravis. El propósito de este informe de caso clínico es garantizar que el botulismo del adulto se incluya en los diagnósticos diferenciales de un paciente con esta presentación, de modo que se pueda brindar una atención rápida y precisa para garantizar un resultado óptimo del paciente. Una mujer de 41 años presentó quejas de aparición repentina de dificultad para hablar. El paciente refiere antecedentes de abuso de múltiples sustancias por vía intravenosa y los síntomas progresaron a debilidad facial bilateral, ptosis y oftalmoplejía externa. Sin hallazgos destacables de la tomografía computarizada sin contraste y la resonancia magnética y ante la sintomatología, se realizó el diagnóstico de botulismo de la herida por uso de drogas intravenosas. Se le administró antitoxina de botulismo y la paciente fue ingresada en la unidad de cuidados intensivos para cuidados de seguimiento de apoyo. Se descubrió una colonia de especies de *Clostridium* en el brazo de esta paciente, mostrando una mejoría significativa después de unos días de atención.

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HOW TO CITE THIS ARTICLE: Montes-Velez D, Bautista W, Brophy S, Chatten-Brown J, Ranasinghe L. A Rare Case of Botulism in an Adult Patient. *Iberoam J Med.* 2021;3(3):276-279. doi: 10.5281/zenodo.4825690.

## 1. INTRODUCTION

*Clostridium botulinum* is an anaerobic gram-positive spore forming bacteria widely distributed in soil. The bacteria released botulinum toxin, a neurotoxin that causes botulism. This neurotoxin spreads systemically, binding irreversibly to presynaptic nerve endings at neuromuscular junctions where the toxin can enter the cell and cleave SNARE proteins, thereby preventing acetylcholine release. Diagnosis of botulism is primarily based on clinical findings caused by the blockage of voluntary motor and autonomic cholinergic junctions. These clinical manifestations include xerostomia, nausea/vomiting, diplopia, dysarthria, dysphagia, fixed dilated pupils followed by descending paralysis, and respiratory difficulty [1-5]. Botulism can be classified as infant botulism, foodborne botulism, wound botulism, adult colonization botulism, or iatrogenic botulism [1]

A case report of wound botulism in a female with a history of polysubstance abuse is presented.

## 2. CASE REPORT

A 41-year-old female with a history of intravenous (IV) polysubstance abuse presented to the Emergency Department (ED) with complaints of sudden onset of difficulty speaking from early evening the previous day.

The patient had been sober from heroin and meth for one year but relapsed this week. She notes that three days prior she had an abscess drained at another ED. She stated no recent illness, fever, or chills and did not clarify whether she was currently on antibiotics. Her initial vitals were blood pressure 160/61 mm Hg, heart rate 116 beats per minute, respiratory rate 20 breaths per minutes, oxygen saturation 95% room air, and temperature of 36.6° Celsius. She had bilateral facial weakness, ptosis, and external ophthalmoplegia. Patient could answer questions appropriately but speech was slurred. A computed tomography (CT) without contrast and a magnetic resonance imaging (MRI) of the patient's head were done, both with no notable findings. Given the presentation of slurred speech, ptosis, facial weakness, and mild difficulty breathing, wound botulism was suspected. Patient was treated with 110 mL IV botulism antitoxin and admitted to the Intensive Care Unit (ICU).

## 3. DISCUSSION

Wound botulism is an infection caused by a neurotoxin released by *C. botulinum* or its spores that can complicate any wound. This is most commonly associated with IV drug users who inject black tar heroin (a dark gummy heroin product) either subcutaneously or intramuscularly [1, 3, 6-9]. Repeated subcutaneous or intramuscular

injections lead to lowered tissue oxygenation, thereby promoting growth of anaerobic bacteria, toxin release, and increasing the chance of contracting botulism [2]. The botulinum toxin inhibits acetylcholine release at presynaptic nerve terminals by cleaving SNARE proteins which are involved in neurotransmitter vesicle fusion. This results in decreased neural transmission in both autonomic and motor peripheral nerves which can manifest with signs and symptoms including dry mouth, dysphagia, diplopia, fixed and dilated pupils, cranial neuropathies, and descending weakness. Unlike foodborne botulism, gastrointestinal symptoms such as vomiting, abdominal pain, and diarrhea are absent, and fever may be present [1, 2, 10].

When considering patients with findings that indicate a neurological disorder such as Guillain-Barre (cranial neuropathies followed by flaccid paralysis), myasthenia gravis (ptosis, extraocular movement weakness), or acute brain stroke (motor, sensory, and/or cognitive impairments) [11], but the specific pattern of weakness and neurophysiological findings do not completely support these diagnoses, botulism should be a strong contender for a diagnosis<sup>1</sup>, especially if the patient has a history of IV drug use with the presence of wound sites [6]. In the case of this patient, she presented with previously drained abscesses and a history of polysubstance intravenous drug use. Paired with the patient's neurological symptoms, wound botulism was considered as the most likely diagnosis.

Normal treatment for wound botulism includes antitoxin, antibiotics (for the wound sites), debridement of the wound site, and supportive care which were given to this patient [2, 7, 12]. Early recognition of botulism is extremely important to the favourable outcome of a patient. A patient given antitoxin sooner will most likely have shorter hospital stays and fewer days on ventilatory support<sup>6</sup>. In addition, because the heptavalent botulism antitoxin (HBAT) can only interact with unbound toxin, usually in the blood, it is crucial that a dose is administered as early as possible to ensure better outcomes [13]. This does mean that the antitoxin can prevent the uptake of the toxin at post-synaptic cholinergic receptors and progression of symptoms, but it cannot reverse the symptoms from the already bound and internalized toxin. To prevent long term respiratory distress and paralysis, botulism needs to be diagnosed and treated as early as possible.

Because the botulism antitoxin is regulated in the US, almost every case is recorded unless misdiagnosed or the patient never seeks care. The last report released by the CDC in 2017 recorded 182 confirmed cases of botulism

with only 19 of those being wound botulism [14]. Of the 19, 17 patients were intravenous drug users, one was involved in an all-terrain vehicle crash, and another sustained an arm fracture contaminated with soil<sup>14</sup>. This just goes to highlight the rarity of wound botulism as well as the prevalence of wound botulism amongst intravenous drug users.

Once this patient was diagnosed with wound botulism, the antitoxin was administered and supportive measures were enacted. Immediately after the administration of the antitoxin, it was noted that the patient did not significantly improve but also did not continue to deteriorate. This was expected since the antitoxin is not known to reverse the symptoms but is known to stop the progression of further symptoms [13]. Her wounds were treated with IV Vancomycin and Infectious Disease (ID) consultant prescribed her Penicillin for 72 hours. Her ptosis, quadriparesis, and swallowing deficits were significantly improved after a few days, and the patient had only subjective sensory loss over her left side according to Neurology consult. A colony of *Clostridium* species was cultured from the wounds on the patient's arms; along with the significant improvements following antitoxin administration, wound botulism was confirmed again. The patient had complete resolution of her symptoms while in the hospital as an inpatient with the treatment she was given. She was discharged to home in a stable condition and advised to follow-up at the outpatient clinic. No further information is available on care offered at the outside clinics.

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## 4. CONCLUSIONS

Botulism is a rare neuromuscular disorder that shares clinical features with Guillain-Barre syndrome, myasthenia gravis, and acute brain stroke. Wound botulism itself is most common in IV drug users who inject into their skin where the spores can enter and reproduce, eventually releasing their toxin<sup>5</sup>. The symptoms of botulism are severe and hold the potential to be deadly as well as leave the patient with lifelong deficits such as respiratory problems. Given the need for a swift response to ensure favourable outcomes, clinicians should be aware of the possibility of wound botulism for patients with a history of IV drug use presenting with unusual neurological and respiratory symptoms for a prompt diagnosis and treatment.

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