

Index of Suspicion

1

Constipation, Irritability, and Poor Feeding in 2-month-old Boy

Nidhi A. Shah, MD,* Henry C. Lee, MD*

*Department of Pediatrics, Division of Neonatal and Developmental Medicine, Stanford University, Stanford, CA.

EDITOR'S NOTE

We invite readers to contribute Index of Suspicion cases at: [Submit and Track My Manuscript](#).

AUTHOR DISCLOSURE Drs Shah and Lee have disclosed no financial relationships relevant to this article. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.

PRESENTATION

A 2-month-old boy, who had been born at term, presents to the emergency department with irritability and poor feeding. The infant had been healthy with no temperature instability until approximately 2 weeks ago, when he became fussier than usual. Yesterday he refused to breastfeed and had a decreased number of wet diapers. His last stool was 5 days ago. His parents report that the infant is drooling more and appeared to choke on his secretions today.

The pregnancy was unremarkable and was completed with a normal vaginal delivery. The infant is exclusively breastfed, with good weight gain and normal development. Family members were ill with a stomach virus 10 days ago, but the infant appeared unaffected. His only medications are probiotics, chamomile, and an herbal supplement. Recent travel includes camping along the coastline. The infant has not received any vaccines.

Vital signs are as follows: temperature of 36.7°C (98.1°F), heart rate of 166 beats per minute, respiratory rate of 75 breaths per minute, blood pressure of 85/43 mm Hg, and oxygen saturation of 95%. On physical examination, the boy is grunting and has increased work of breathing, with subcostal retractions and nasal flaring. Pupils are equal, round, and reactive to light; extraocular movements are intact; and facial muscles appear symmetric. He has an absent gag reflex and absent bowel sounds. Passive tone appears to be normal, and deep tendon reflexes cannot be elicited, which may be due to agitation and difficulty of examination.

Laboratory evaluation reveals the following:

- White blood cell count 9,910/ μ L (9.91×10^9 /L)
- Hemoglobin 12 g/dL (120 g/L)
- Platelet count 454×10^3 / μ L (454×10^9 /L)
- Sodium 142 mEq/L (142 mmol/L)
- Potassium 5.4 mEq/L (5.4 mmol/L)
- Chloride 110 mEq/L (110 mmol/L)
- Serum carbon dioxide 11 mEq/L (11 mmol/L)
- Blood urea nitrogen 20 mg/dL (7.1 mmol/L)
- Creatinine 0.5 mg/dL (44.2 μ mol/L)
- Glucose 55 mg/dL (3 mmol/L)

A chest radiograph yields unremarkable results, and a plain abdominal radiograph (kidneys, ureter, bladder) shows substantial air in the bowel (Figure).

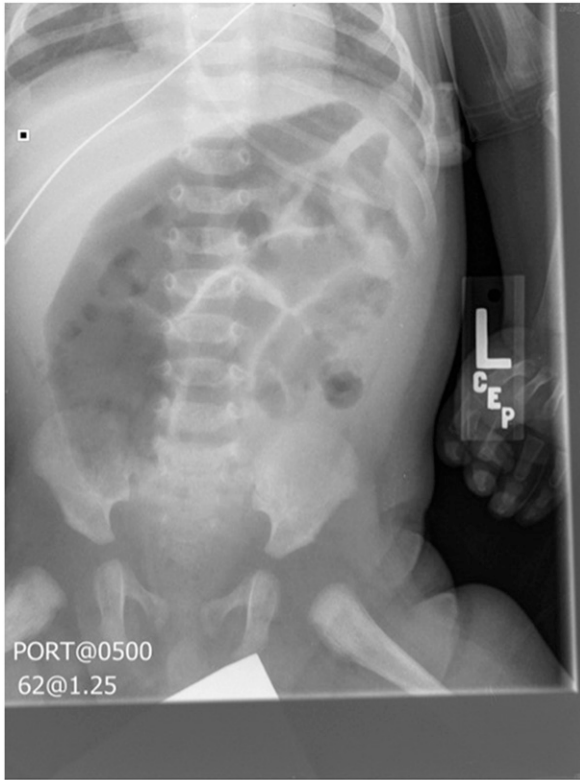


Figure. Abdominal radiograph (kidneys, ureter, bladder) showing diffuse intestinal dilation.

The infant is intubated for airway protection. Blood and urine are sent for culturing, and empiric antibiotics are initiated. Stool tests ultimately lead to a diagnosis.

DISCUSSION

Based on the infant's presentation of respiratory distress and abnormal neurologic findings, the differential diagnosis included sepsis, meningoen­cephalitis, inborn error of metabolism, exposure to or ingestion of toxin, and congenital neuromuscular disease. The findings of constipation, difficulty handling secretions, and absent gag reflex also raised the possibility of infantile botulism.

Stool tests were ordered for botulinum toxin, but samples could not be obtained efficiently due to ileus. A saline enema was performed, and stool was obtained on the second attempt. The stool was sent to the state laboratory for botulinum testing. Because of the delay in sending the stool and the high suspicion for infantile botulism, botulism immunoglobulin (BabyBIG) was administered empirically. The infant showed improved spontaneous movement within hours of treatment and was able to be extubated 2 days later. The state laboratory confirmed the diagnosis of infantile botulism 1 day after treatment was initiated. The infant was discharged from

the hospital 5 days after treatment with completely normal neurologic function.

The Condition

In the United States, an average 145 cases of botulism are reported annually, of which 65% are cases of infantile botulism. Botulism is caused by *Clostridium botulinum*, a gram-positive, spore-forming bacterium that produces a toxin which blocks cholinergic transmission on the presynaptic side of ganglia and neuromuscular junctions. Although infantile botulism is most commonly associated with ingestion of raw honey, most cases actually occur from the ingestion of spores found in dust and dirt. Of the 4 subtypes of *C botulinum*, types A and B are responsible for most cases. Type A botulism is believed to be more severe than type B.

Infantile botulism affects infants up to 12 months of age, although the median age of onset is 3 to 4 months. Older children are believed to be less susceptible to botulism due to their mature gastrointestinal tracts, which can excrete the spores before they germinate. The condition most commonly presents with constipation and poor feeding, followed by progressive descending weakness and hypotonia. Infants can rapidly decompensate because cranial nerve function is compromised, leading to a loss of suck and gag reflexes and eventually respiratory failure.

Diagnosis

Diagnosing infantile botulism can be difficult. The most sensitive test for diagnosis is identification of toxin in the stool. Because constipation is present in almost all affected infants, however, stool can be difficult to obtain. Serum markers are often negative.

Management

Supportive treatment is the mainstay of the therapy. Infants with respiratory failure must be intubated to protect the airway and placed on mechanical ventilation. Paralysis may progress rapidly, and heightened vigilance is required to prevent sudden deterioration. During the period of ileus, nasogastric decompression along with parenteral nutrition may be required.

BabyBIG is a safe and effective therapy to treat both types A and B infantile botulism. It contains primarily immunoglobulin G that is pooled from donors. Because of the lack of adverse effects associated with the treatment, infants with clinical presentations consistent with infantile botulism should be empirically treated with BabyBIG even before confirmation of the diagnosis. Systemic antibiotics should be discontinued because they might lead to lysis of *C botulinum* in the intestines, resulting in further release of toxin.

In a randomized, controlled study, administration of BabyBIG reduced length of hospital admission, duration of intensive care, and duration of mechanical ventilation for treated infants compared to those who were not treated with BabyBIG.

- Infantile botulism almost always presents with feeding difficulty and constipation, followed by a descending paralysis.
- Botulism immunoglobulin should be administered early, even without the results of confirmatory tests.

Lessons for the Clinician

- Infantile botulism is most commonly caused by ingestion of spores found in dirt and dust.

Suggested Readings for this article are at <http://pedsinreview.aappublications.org/content/37/9/391>.

Parent Resources from the AAP at HealthyChildren.org

Case 1: Constipation, Irritability and Poor Feeding in a 2-month-old Boy

- <https://www.healthychildren.org/English/health-issues/conditions/infections/Pages/Botulism.aspx>
- Spanish: <https://www.healthychildren.org/spanish/health-issues/conditions/infections/paginas/botulism.aspx>

Case 1: Constipation, Irritability, and Poor Feeding in 2-month-old Boy

Nidhi A. Shah and Henry C. Lee

Pediatrics in Review 2016;37;391

DOI: 10.1542/pir.2014-0114

Updated Information & Services	including high resolution figures, can be found at: http://pedsinreview.aappublications.org/content/37/9/391
References	This article cites 2 articles, 1 of which you can access for free at: http://pedsinreview.aappublications.org/content/37/9/391#BIBL
Subspecialty Collections	This article, along with others on similar topics, appears in the following collection(s): Critical Care http://classic.pedsinreview.aappublications.org/cgi/collection/critical_care_sub Infectious Disease http://classic.pedsinreview.aappublications.org/cgi/collection/infectious_diseases_sub Neurology http://classic.pedsinreview.aappublications.org/cgi/collection/neurology_sub
Permissions & Licensing	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: http://classic.pedsinreview.aappublications.org/site/misc/Permissions.xhtml
Reprints	Information about ordering reprints can be found online: http://classic.pedsinreview.aappublications.org/site/misc/reprints.xhtml

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™





Pediatrics in Review

An Official Journal of the American Academy of Pediatrics

Case 1: Constipation, Irritability, and Poor Feeding in 2-month-old Boy

Nidhi A. Shah and Henry C. Lee
Pediatrics in Review 2016;37;391
DOI: 10.1542/pir.2014-0114

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://pedsinreview.aappublications.org/content/37/9/391>

Pediatrics in Review is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1979. Pediatrics in Review is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2016 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0191-9601.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

