

# Infant Botulism

Infant botulism is the most commonly reported form of botulism in the United States. In Alaska, four infants have been diagnosed with infant botulism, the most recent case occurred in 2009.<sup>49</sup> In contrast to foodborne botulism where the toxin is ingested, infant botulism results from ingestion of *C. botulinum* spores with subsequent intestinal colonization and toxin production. Most infants affected by botulism are between 3 and 20 weeks of age. In the United States, infant botulism is usually due to toxin type A or B. There are currently other clostridial species, *C. baratti* and *butyricum*, that elaborate botulinum toxins, and are also recognized to be causative agents for infant botulism.<sup>50</sup>

The first symptom of infant botulism is often constipation, followed in several days by progressive muscular weakness, poor sucking reflex, weak cry, and difficulty swallowing. Respiratory arrest occurs in half of affected infants. Numerous examples exist of infants presenting with apnea, or becoming apneic, during a diagnostic procedure.

## Table 14. Tests to aid in the diagnosis of infant botulism<sup>51</sup>

**Test 1.** Take the patient to a dark room. Shine a bright light into the infant's eye; note quickness of pupillary constriction. Remove the light when constriction is maximal; let the pupil dilate again. Immediately repeat, continuing for 2–3 minutes. **Findings:** The initially brisk pupillary constriction may become sluggish and unable to constrict maximally (fatigability with repetitive muscle activity is the clinical hallmark of botulism).

**Test 2.** Shine a bright light onto fovea, keeping it there for 1–3 minutes, even if the infant tries to deviate the eyes. **Findings:** Latent ophthalmoplegia may be elicited, and/or purposeful efforts to avoid the light may diminish. Also observe for initial squirming of the extremities that may diminish due to fatigability.

**Test 3.** Place a clean fifth finger in the infant's mouth, taking care not to obstruct the airway. Note the strength and duration of the reflex sucking. **Findings:** The suck is weak and poorly sustained. The gag reflex strength also may be quickly checked (if the infant has not been fed recently).

Examination may show a decreased gag reflex; cranial nerve involvement including ptosis, ophthalmoplegia, and facial

nerve palsy; mydriasis; and areflexia or generalized hypotonia. Some simple tests are available to assist in obtaining a diagnosis (Table 14).<sup>51</sup>

Patients are usually afebrile and have normal cerebrospinal fluid. Electromyography may be helpful in differentiating botulism from other causes of neuromuscular disease. Diagnosis is made by demonstration of botulinum toxin in stool and supported by a positive stool culture. It is unusual to find toxin in serum.

Therapy for infant botulism is primarily supportive; mechanical ventilation can be lifesaving. Antimicrobials, particularly aminoglycosides, have been reported to increase the incidence of respiratory paralysis;<sup>52</sup> however, complications, such as respiratory infections, may require antimicrobial therapy.

Prompt diagnosis and treatment of infant botulism with human-derived Botulinum Immune Globulin Intravenous (BabyBIG<sup>®</sup>) might reduce the length of time needed for recovery. BabyBIG<sup>®</sup> can be obtained from the California Department of Public Health, Infant Botulism Treatment and Prevention Program (IBTPP, 510-231-7600; see also [www.infantbotulism.org](http://www.infantbotulism.org)). BabyBIG<sup>®</sup> should be requested from the IBTPP pediatrician on-call without awaiting laboratory confirmation. BabyBIG<sup>®</sup> was shown to be most effective if given within 7 days of hospital admission.<sup>53</sup> FDA approval of BabyBIG<sup>®</sup> was based upon studies that its use produced a statistically significant reduction in the durations of hospital stay, mechanical ventilation, and tube feeding.

Since 2008, BabyBIG<sup>®</sup> has been administered to two Alaska infants. For one infant, botulism was one of numerous diagnoses being considered based on clinical findings and a preliminary result of nonspecific toxicity from a stool specimen. In consultation with IBTPP physicians, BabyBIG<sup>®</sup> was recommended and administered. Unfortunately, this infant was ultimately diagnosed with spinal muscular atrophy. BabyBIG<sup>®</sup> was also used in 2009 for the confirmed case mentioned above. Botulism was suspected in this infant based on clinical findings and again, after consultation with IBTPP physicians, BabyBIG<sup>®</sup> was recommended and administered. Stool from this infant tested positive by direct toxin assay and culture for type A toxin.

Antitoxin, such that is used in cases of foodborne botulism, has not been shown to affect the outcome of infant botulism. However, depending on the type of botulism (i.e., not A or B)

the use of HBAT may be considered in consultation with the Section of Epidemiology and CDC.

One of the four cases of infant botulism in Alaska occurred in an Alaska Native (Table 15). In a study conducted outside of Alaska, affected infants had higher birthweights, their mothers tended to be Caucasian, and they were more commonly breast-fed.<sup>54</sup>

Approximately 20% of infant botulism cases reported to the CDC have been associated with the ingestion of honey. The sources for the other cases are unknown, but hypotheses include soil, household dust, and other foods. Honey should not be fed to infants less than 1 year of age. No other specific prevention measures exist. The source of botulism was unknown for all four Alaska cases.

**Table 15. Characteristics of the four confirmed Alaska infant botulism cases, 1982-2010.**

Year Demographics	Toxin Type	Presenting Symptoms	Clinical Course
<b>1982</b> • White 6-month old female • Anchorage/Mat-Su Region • Unknown breastfeeding status	A	Unknown*	Unknown*
<b>1987</b> • Unknown race 3-month old female • Gulf Coast Region • Mostly breastfed; some water and formula	B	9-day history of constipation, increasing lethargy and decreasing muscular tone; 3-day history of decreased suck reflex, inability to swallow, droopy head and weak cry	6-day hospitalization**
<b>1992</b> • White 5-month old male • Southwest Region • Breastfed; rice cereal	A	~5-7 day history of increasing weakness and inability to suck	10-day hospitalization <sup>†</sup>
<b>2009</b> • Alaska Native 6-month old female • Interior Region • Breastfed	A	3-week history of constipation; 1-week history of febrile respiratory illness, hypotonia appreciated at follow-up visit	Given BabyBIG <sup>‡</sup> ; 7-day hospitalization <sup>‡</sup>

\*Patient backloaded in 1987 after review of laboratory data at CDC.

\*\*See Section of Epidemiology Bulletin, available at: [http://www.epi.alaska.gov/bulletins/docs/b1987\\_10.htm](http://www.epi.alaska.gov/bulletins/docs/b1987_10.htm)

†See Section of Epidemiology Bulletin, available at: [http://www.epi.alaska.gov/bulletins/docs/b1992\\_03.htm](http://www.epi.alaska.gov/bulletins/docs/b1992_03.htm)

‡See Section of Epidemiology Bulletin, available at: [http://www.epi.alaska.gov/bulletins/docs/b2009\\_17.pdf](http://www.epi.alaska.gov/bulletins/docs/b2009_17.pdf)