

SUPPLEMENTARY BOX.

Clinical Guidelines for Diagnosis and Treatment of Botulism: Recommendations and Key Points for Clinicians

Diagnosis of Botulism

Key Points for Clinicians

- Be aware of the spectrum of signs and symptoms of botulism, ranging from limited cranial nerve palsies (e.g., ptosis) to respiratory failure and complete extremity paralysis.
- Be aware that the respiratory system might be compromised early in the illness, when respiratory muscles (e.g., diaphragm) are unaffected but the upper airway is compromised from paresis of cranial nerve muscles, resulting in pharyngeal collapse or pooling of secretions.

Recommendations

- Consider botulism when myasthenia gravis or Guillain-Barré syndrome are suspected and in a patient with unexplained symmetric cranial nerve palsies, with or without paresis of other muscles.
- Conduct thorough, serial neurological examinations to detect the neurological deficits of botulism and their progression.
- If botulism is suspected, immediately contact the local or state health department's emergency on-call staff to arrange an emergency expert clinical consultation and, when indicated, request botulinum antitoxin from CDC.

Ancillary Testing

Recommendation

- When feasible, consider using electrodiagnostic testing to assist in diagnosis of a suspected botulism case. When conducted and interpreted by experts, EMG, RNS, and NCSs can provide useful diagnostic data.

Exposure Risk Factors and Botulism Diagnosis

Recommendation

- Clinicians should ask patients about possible exposures to well-described sources of botulinum toxin, while keeping in mind that absence of such exposures does not exclude the possibility of botulism.

Laboratory Testing

Recommendations

- Treat patients with suspected, symptomatic botulism with botulinum antitoxin on the basis of clinical findings; do not await laboratory confirmation because results might take several days, and they can be negative in patients who have botulism. (For risks and benefits of BAT treatment, see Allergic Reactions and Other Side Effects of Botulinum Antitoxin.)
- Discuss specimen collection with the expert consultant from CDC or the local or state health department.
- Collect specimens for laboratory confirmation of the clinical diagnosis of botulism as soon as possible because toxin levels decrease over time (Table 5; Box 2). Obtain serum before BAT is administered.

- Store and transport specimens for botulism testing at refrigeration temperatures (36°F–46°F [2°C–8°C]); do not freeze.

Monitoring Illness Progression in Patients with Botulism

Recommendations

- Conduct frequent, serial neurologic examinations, with an emphasis on cranial nerve palsies, swallowing ability, respiratory status, and extremity strength.
- In settings of contingency and crisis standards of care, in which time is limited, focus examinations on signs and symptoms of early onset (Box 1). Consider brief, focused training in the emergency setting on the neurologic examination.
- When possible, have the same health care provider conduct the serial neurologic and other examinations.
- Adjust the frequency of neurologic and other examinations on the basis of signs and symptoms, with very frequent examinations for patients with rapid progression and for patients who have respiratory or bulbar symptoms but have not required intubation.
- Institute frequent, serial monitoring of respiratory and bulbar function. Serial measurements might be more helpful than a single measurement.
 - o Focus the respiratory examination on respiratory rate, lung field auscultation, and work of breathing, including use of accessory muscles of respiration, nasal flaring, and paradoxical breathing (1).
 1. Use spirometry to obtain serial objective data. Patients with facial weakness might not achieve an adequate seal around the spirometer mouthpiece and so might require a mask device (1,2). If spirometry is not available, consider using the sniff nasal inspiratory pressure or the single breath count test.
 2. Consider respiratory status in the context of neurologic status, as paralysis can alter signs typically associated with respiratory distress. For example, facial paralysis can produce a placid expression that can obscure distress from respiratory insufficiency and also prevent nasal flaring, and diaphragmatic paralysis can result in paradoxical abdominal movement, in which the abdomen moves inward during inspiration (3).
 - o Focus bulbar dysfunction examination on dysphagia, dysarthria, nasal voice, drooling, and impaired gag reflex (1). When feasible, consider assessing the patient's swallowing ability to help determine whether the patient can safely consume liquids or solids (4).
- Continuously monitor cardiac rhythm and frequently measure blood pressure.
- Frequently monitor for urinary retention, constipation or ileus, dry mouth, and dry eyes.

Botulinum Antitoxin Treatment

Recommendation

- Health care providers who suspect botulism on the basis of clinical symptoms should immediately call the emergency contact number of their local or state health department to arrange for an emergency clinical consultation and, when indicated, shipment of antitoxin (<https://www.cdc.gov/botulism/health-professional.html>).

Allergic Reactions and Other Side Effects of Botulinum Antitoxin

Recommendations

- Do not routinely perform skin testing for sensitivity before BAT administration.

- Ensure that epinephrine and antihistamine treatments are available for all patients receiving BAT. Caregivers capable of identifying and responding to anaphylaxis should observe patients during antitoxin administration.

Timing of Botulinum Antitoxin Administration

Recommendations

Early in the Course of Illness

- Administer botulinum antitoxin to patients with suspected botulism as early as possible in the course of illness. The greatest benefit accrues to those who receive it within the first 2 days of illness onset.

Later in the Course of Illness

- Patients with suspected botulism whose symptoms or signs (e.g., paralysis) are progressing should be treated with BAT regardless of the time that has elapsed since symptom onset.
- Patients with suspected botulism whose symptoms and signs are not progressing and who have some voluntary muscle function are less likely to benefit from antitoxin treatment, especially if >7 days have passed since symptom onset, because toxin is infrequently detected beyond this point of illness.

Characteristics of Patients and Success of Antitoxin Administration

Recommendation

- Patients with suspected botulism should be treated with BAT regardless of age, sex, other demographic characteristics, or underlying medical conditions.

Retreatment of Adults

Recommendations

- Do not give patients with suspected botulism a second dose of BAT unless progression of paralysis clearly continues after the initial dose should have taken effect and suspicion for botulism is high.
- If neurologic signs progress for >1 day after administration of one vial of BAT, consider diagnoses other than botulism.

Infants and Children

Key Point for Clinicians

- Although weight-based dosing of BAT is advised in the package insert, evidence is lacking to suggest this method is more effective than dosing based on toxin load or that adverse reactions are dose related. Children who have ingested a large amount of toxin might require more antitoxin than is indicated by the weight-based dose described in the BAT package insert.

Recommendation

- Children suspected of having foodborne botulism and treated with BAT according to the weight-based dose described in the package insert should be monitored closely for worsening paralysis. When confidence in the diagnosis of botulism is substantial, failure to respond might indicate that the dose was insufficient, and retreatment should be considered.

Pregnant Women

Recommendation

- Pregnant women with suspected foodborne botulism should be treated with BAT in the same manner as nonpregnant patients.

Antitoxin Shortages

Key Points for Clinicians

- Carefully assessing history of illness and monitoring patients to identify those at greatest risk for progress to respiratory arrest might help in decision-making.
- Patients who do not require intubation but have progressing signs and symptoms are at highest risk for developing respiratory compromise.
- Patients who do not require intubation, do not have respiratory compromise, and are reliably observed to have stable (nonprogressing) signs or symptoms might be considered to be at less risk for developing respiratory compromise.
- Patients who do not require intubation but have progressing signs or symptoms might receive some benefit from antitoxin administration.
- Limited data indicate that patients who seek care ≥ 7 days after illness onset are less likely to have botulinum toxin in circulation.
- No demographic criteria can be used to definitely identify patients with botulism who are likelier to benefit from antitoxin treatment.

Recommendation

- Proactively develop an approach to handle BAT shortages as part of an emergency planning process that incorporates the full range of stakeholders, including local communities.

Treatments Other than Botulinum Antitoxin

Key Points for Clinicians

- Patients with suspected, symptomatic botulism should be treated with BAT and receive supportive care (e.g., intensive care including intubation and mechanical ventilation when necessary).
- Evidence does not indicate benefit from any treatment modalities other than antitoxin, although data are limited.

Recommendation

- Aminoglycosides, magnesium, clindamycin, tetracycline, or calcium should only be administered to patients with botulism after careful consideration and with appropriate monitoring.

Botulism, Antitoxin, and Breast Milk

Recommendations

- Treat breastfeeding women in accordance with recommendations in the treatment section of these guidelines (see Treatment Considerations).
- If the mother continues to breastfeed, monitor the infant closely for signs and symptoms of botulism and for adverse events from BAT.

- Although the risk for acquiring botulism from the breast milk of mothers who have botulism and do not receive antitoxin treatment is unknown, clinicians and family members should be aware that botulism is a life-threatening illness and that the delay between a request for antitoxin to administration of the antitoxin is typically 1–2 days; interruption of breastfeeding for this period would have minor to no consequences for the child.

Critical Care: Considerations During Shortages

Recommendations

- Inform staff members that patients with botulism are typically cognitively intact.
- Establish a system to enable communication between the patient and health care providers. Explain procedures before performing them.
- Provide meticulous attention to bladder and bowel care and the prevention of complications, such as urinary tract infections, DVT, and pressure ulcers.
- Assess patients for anxiety and depression and provide psychological support as needed.
- Institute speech, physical, and occupational therapy as soon as possible.
- Consider music and massage therapy and asking family members or staff members to read aloud to the patient.
- Evaluate for and treat dry eyes and dry mouth; anticipate the possibility of copious oral secretions.
- Educate family members about botulism, and provide information about supportive care, treatment, and prognosis. Discuss psychosocial support resources that might be available to family members, and consider instituting support groups if multiple patients are hospitalized in the same facility or in nearby facilities.

References

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