Botulism

- Caused by toxin from *Clostridium botulinum*, a spore-forming, obligate anaerobic bacillus
- Botulinum toxins are a group of seven related neurotoxins, A through G
- Botulinum toxins are considered one of the most potent lethal substances known to man
- The toxins inhibit the release of acetylcholine from the presynaptic nerve endings causing flaccid paralysis
- There are four naturally occurring forms of botulism – foodborne, wound, infant and child or adult intestinal colonization botulism
- Intentional exposure could occur through contamination of food or water or via aerosol
- May result in extensive respiratory muscle paralysis leading to ventilatory failure and death unless supportive care is provided
- Person-to-person transmission does NOT occur with botulism

Any confirmed or suspected case of botulism (*Clostridium botulinum*) must be reported IMMEDIATELY to the Clark County Health District at 383-1378
Alert your laboratory personnel.

Incubation
- 12-36 hours (may be as long as several days, depending on the size of the inoculum)

Clinical Signs and Symptoms
- The hallmarks of foodborne botulism are:
  - Acute bilateral cranial nerve impairment, visual difficulty (blurred or double vision), ptosis, dysphagia, dry mouth and slurred speech.
  - Cranial nerve palsies always occur in botulism.
  - Progression to descending weakness or paralysis.
  - Symptoms may extend to a symmetrical flaccid paralysis in which sensation is completely preserved and result in respiratory failure.
- Symptoms of inhalational botulism would most likely be similar to those seen in foodborne botulism
Ancillary testing

- Tensilon test may be slightly positive
- Brain imaging (CT or MRI) normal
- Lumbar puncture normal
- Electromyography may show decreased amplitude of action potentials in involved muscle groups
- Rapid repetitive electromyography (20-50 Hz) will result in facilitation (increasing pattern of action potential amplitude)
- Edrophonium chloride test negative
- Mouse inoculation test for toxin in serum or stool (referred to the Nevada State Public Health Laboratory) positive

**Bilateral cranial nerve impairment and descending paralysis**

Differential Diagnosis

- The Guillain-Barre syndrome (especially the Miller-Fisher variant)
- Myasthenia gravis
- Stroke
- Intoxication with organophosphates, atropine, carbon monoxide, or aminoglycosides
- Tick paralysis
- Paralytic shellfish poisoning
- Puffer fish ingestion
- The Eaton-Lambert syndrome

Laboratory Confirmation of Diagnosis

- Should be performed by the Nevada State Public Health Laboratory (NSPHL)
- Appropriate clinical samples for botulinum toxin testing at NSPHL include: serum and stool
- Transport and packaging of clinical specimens must be coordinated with the Clark County Health District and NSPHL

Treatment of Foodborne Botulism

- Intravenous administration of 1 vial of polyvalent (AB or ABE) botulinum antitoxin as soon as possible
- Patients with a clinical diagnosis of botulism should be treated as soon as possible
  - Confirmation by laboratory testing should always be done, but testing may require up to two days
  - Administration of antitoxin should not be withheld pending results
- Prior to treatment with antitoxin, serum should be collected to identify specific toxin
- Antitoxin must be procured from CDC via the Nevada State Department of Health (see below)
- Careful monitoring of respiratory vital capacity and aggressive respiratory care for those with ventilatory insufficiency
- Meticulous and intensive care for the duration of the often prolonged paralytic illness

To procure botulinum antitoxin call:
Nevada State Health Division Emergency Line
(775) 684-5900
Botulism Antitoxin
- May prevent progression or shorten duration of illness
- Most effective when administered early in the course of illness
- Before administration of antitoxin, skin testing should be performed to test for sensitivity to serum or antitoxin (see package insert)
- Administration of one 10-ml vial of trivalent botulism antitoxin by the intravenous route results in serum antibody levels of type A, B, and E antibodies capable of neutralizing serum toxin concentrations manyfold in excess of those reported for botulism patients
- Antitoxin need not be repeated since the circulating antitoxins have a half-life of 5 to 8 days
- For exposed infants, the risk of inducing lifelong sensitivity to horse serum should be weighed against the benefits of administering botulism antitoxin. A human-derived antitoxin product is available solely for the treatment of infant botulism under a Treatment Investigational New Drug protocol and may be procured through the California DOH
- Physicians may be asked to get an informed consent signed for administration of the antitoxin supplied by the Strategic National Stockpile (SNS)

Post-Exposure Prophylaxis
- Individuals potentially exposed, but not yet showing signs of intoxication should be closely monitored for the development of symptoms

Botulism Vaccine
- A pentavalent toxoid of *Clostridium botulinum* toxins A through E is currently under Investigative New Drug (IND) status but is not widely available. Currently there is no botulism vaccine licensed.

Infection Control
- Universal Precautions for care and transport of patients and during post-mortem care
- Isolation of patients is NOT necessary
- Botulinum toxin is NOT absorbed through intact skin
- Person-to person transmission does not occur
- 0.5% hypochlorite (a 1:10 dilution of household bleach) will inactivate botulinum toxins in case of spill
  - Rinse off the concentrated bleach to avoid its caustic effects

References

This information sheet has been adapted from material developed by the Washington State Department of Health in collaboration with the Centers for Disease Control and Prevention. Reuse or reproduction is authorized. Information updated May 11, 2001.

When You See Unusual, Think Outbreak!