

2. Botulism

(Notifiable)

Description: *Clostridium botulinum* (and more rarely other *Clostridia* including *Cl. butyricum*), spore forming anaerobes, can carry one of a range of neuroparalytic toxins that produce a progressive neuroparalytic syndrome that is fatal in 5-10% of cases.

Annual Numbers: an average of one case per year in Ireland.

Seasonal Distribution: There is no seasonal pattern of incidence.

Causative Agent: Botulism neurotoxin (BoNT) is responsible for the clinical syndrome and belongs to one of six alphabetically named groups; only A, B, E and very rarely F result in human illness. Botulism is a clinical and public health emergency. BoNT blocks the release of acetylcholine at the neuromuscular junction resulting in a descending flaccid paralysis.

Reservoir: *Cl. botulinum* is widely distributed in nature, being particularly prevalent in soil and aquatic and marine sediment. It is found in the gastrointestinal tract of most mammals including humans.

Transmission: There are six naturally occurring modes of transmission, three of which account for the vast majority of cases:

- **Foodborne botulism:** occurs when the spores of *Cl. botulinum* have germinated and the bacteria have reproduced in food and produced BoNT. If the food is consumed, depending on the dose of BoNT (only a tiny dose is required – BoNT is, weight-for-weight, one of the most powerful natural toxins), the patient becomes intoxicated hours or days after consumption of the food, depending on the dose of BoNT consumed. Early onset suggests a larger dose of BoNT and the likelihood of a more severe course to the illness. Outbreaks of food-borne botulism have potential to be a public health emergency because the contaminated food may be eaten by other people.
- **Infant botulism:** (also referred to as intestinal botulism) most common in infants less than six months, is extremely rare (fewer than 80 cases are reported in the US each year and only one ever recorded in Ireland in 2011). This occurs when the baby ingests *Clostridium* spores which germinate in the gut and release toxin. Infants may be at special risk because their bowel flora is not sufficiently developed to be able to displace *Clostridium*.

- **Wound botulism:** has the same symptoms as other forms, but occurs when the organism enters an open wound and is able to reproduce in the anaerobic environment provided within and beneath the dermis. Cases have been associated with injecting drug users.

NB: Wound botulism should be considered in any IDU with acute onset illness or sudden death characterised by soft tissue sepsis (abscess, cellulitis, fasciitis or myositis) and severe toxicity.

In the case of wound botulism in an IDU; **unless there is no doubt that an infected wound is the source of the patient's botulism, a food history should always be obtained to ensure that no potential foodborne source is overlooked.**

Other possible routes of infection:

Accidental botulism may follow mis-injection of pharmaceutical preparations of botulinum neurotoxin. Four cases occurred in December 2004 in Florida following cosmetic injection with botulinum toxin that was not approved for human use.

Inhalation botulism does not occur naturally, but has been demonstrated in model systems and in real cases (three cases were reported in 1962 in veterinary technicians in Germany). Aerosolised toxin is a potential route for deliberate release by bioterrorists.

Water-borne botulism may also be caused by ingestion of pre-formed toxin. This route will only pose a risk to human in some deliberate release scenarios because the toxin is inactivated by normal treatment of mains water supplies. There have been no reported cases of illness in humans worldwide due to contaminated water supplies.

Outbreak Potential: *Cl. botulinum* has moderate to high outbreak potential if transmitted through food. Asymptomatic excretion is common but of minimal clinical significance.

Incubation period: If foodborne, typically 12-36 hours (but may be up to 30 days following consumption of food). In the case of infant botulism, it is often impossible to determine when exposure occurs and so incubation cannot be calculated reliably, but an exposure interval of 30 days before onset of symptoms should be used to determine potential exposures. The same is true for wound botulism especially if associated with intravenous drug use, although 10 days is taken by many authorities, as a typical incubation period for wound botulism.

Period of communicability: Botulism is not a contagious condition.

Epidemiology: *Clostridia* and their spores are ubiquitous in the environment. While certain studies have identified BoNT type A as being more common in the Western US, Type B is more commonly found in the Eastern US and Type C is the most common form in the UK and Ireland. It is likely that all three neurotoxins are

widely distributed in nature. Type E tends to be found more in aquatic environments. All have essentially similar clinical impact.

Exposure-prone groups: Infants, those who prepare/consume home-canned food, IDUs.

Clinical Features:

Symptoms generally begin with blurred vision, dry mouth and bulbar signs including difficulty in swallowing and speaking. Occasionally, diarrhoea and vomiting occur.

Visual disturbances and a flaccid, symmetrical, descending paralysis follow. Death generally results from respiratory paralysis. Residual weakness is common following recovery.

Clinical Management of Cases: Isolation of the patient is not required. Handwashing is necessary following handling of soiled personal garments including nappies in the case of infant cases. Infant botulism is associated with honey administration, aquatic reptiles and recent, nearby dusty construction work. These risk factors should be sought.

Polyvalent botulinum antitoxin should be administered as soon as condition suspected and clinical samples obtained.

Antitoxin supply and administration: available from

**Duty Medical Officer
Cherry Orchard Hospital
Tel: 01 620 6000**

who authorises delivery of anti-toxin. **Anti-toxin administration should NOT BE DELAYED pending microbiology/toxin testing results.** Turnaround times for reliable negative results can be up to one week.

Hospital pharmacy should be informed of request.

NB: Botulism is a clinical and public health emergency. Look for blurred vision, dry mouth and difficulty swallowing and speaking

Take an urgent food history and try to rapidly determine if others (in same household/workplace/friends etc) may have consumed the same food. Determine if case is in a risk category.

Report urgently to Public Health (and speak with the Consultant on call) any suspected cases of botulism so that a thorough investigation/risk assessment can be undertaken.

The case should be notified to the local Department of Public Health. It is important to determine if the case is aware of similar cases suggesting the possibility of an outbreak. Determine if case is in a risk category.

Public Health Management of Cases: Obtain an urgent full food history (unless in a case of wound botulism where the wound is considered, with complete certainty, to be the source of the infection). Determine if there are linked cases or common food exposure. Rapidly interview and assess such people.

Public Health Management of Contacts: none necessary, unless they consumed the same food as consumed by a case transmitted by foodborne route.

Food Hygiene Implications: Food hygiene re-education is necessary for food handlers.

Exclusion: Nil necessary.

Microbiological Clearance: Not required for adults but clearance might be considered prudent in infant cases. This should be discussed with the attending microbiologist.

Notifiable: to the local [Medical Officer of Health](#).

Resources: National botulism surveillance forms are available from the HPSC website at <http://www.hpsc.ie/hpsc/A-Z/Gastroenteric/Botulism> .

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