

# BOTULISM IN INJECTING DRUG USERS, DUBLIN, IRELAND, NOVEMBER-DECEMBER 2008

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In November and December 2008, six cases of suspect wound botulism were reported in heroin injecting drug users, all residents in Dublin, Ireland. Patients were aged between 23-42 years of age; four cases were male; one patient died shortly after admission. The patients presented to four different hospitals across the city. Botulism in injecting drug users in Ireland was last reported in 2002.

On Monday, 24 November 2008, public health authorities were notified that an injecting drug user (IDU) had been admitted to a hospital in Dublin, Ireland, with neurological signs suggestive of botulism including progressive bulbar palsy, diplopia, dysarthria, and an electromyography (EMG) test consistent with a diagnosis of botulism. The patient was treated with botulism anti-toxin and supportive measures. Serum samples taken prior to administration of anti-toxin were sent to the Foodborne Pathogen Reference Unit, London, United Kingdom (UK) for detection of *Clostridium botulinum* neurotoxin by mouse biotoxin assay. Laboratory results confirmed the diagnosis of botulism and identified the causative toxin as *C. botulinum* toxin type B.

By Friday, 28 November, three additional suspected cases of botulism had been notified, all of whom received anti-toxin. These four patients were admitted to three different hospitals in Dublin. Although two patients lived in the same area, they did not know each other. All were IDUs, but there was no evidence that they shared the same drug supply.

No additional cases were notified to the Departments of Public Health in Ireland during the week beginning on 1 December. However, during the 36-hour period from 8 to 10 December, two further patients were admitted to a fourth Dublin hospital with signs suggestive of botulism (difficulty breathing and speaking, ataxia, double vision). Both patients received botulism anti-toxin. Unfortunately, one of these patients died shortly after admission from overwhelming sepsis. At the time of writing this report, one case is laboratory confirmed, two cases are probable and three cases are possible (see next section and Table for further details).

For the purpose of this investigation, a *possible* case of drug injection-related wound botulism was defined as a person in the Republic of Ireland with a recent history (within four weeks of symptom onset) of injecting drug use and with acute onset since 1 November 2008 of either of the following symptoms in the absence of any other obvious cause:

- symmetrical cranial nerve palsy,
- difficulty in swallowing or speech,
- unexplained stridor,
- difficulty in breathing,
- or descending flaccid paralysis.

A *probable* case was defined as having the features of a possible case and laboratory results suggestive of *C. botulinum* infection but unconfirmed by neutralisation.

A *confirmed* case was defined as having the features of a probable case, with a confirmed diagnosis of botulism (by detection of botulinum toxin in serum or isolation of *C. botulinum* from a wound or abscess site).

An outbreak enhanced surveillance form was designed (available upon request) to collect relevant demographic, clinical and drug use data. This form was filled out in as much detail possible by hospital staff. Specific attempts were made to identify links between the six patients in terms of area of residence, social networks and drug supply.

A summary of selected demographic and clinical data as well as information about drug use of the cases is presented in the Table.

The outbreak has been managed by an outbreak control team led by the Department of Public Health, Health Service Executive-East (HSE-E) in Dublin. In addition to HSE-East staff, personnel from the Health Protection Surveillance Centre (HPSC), Dublin, the HSE Drug Services, Dublin, and a clinical microbiologist from one of the involved hospitals were included in the outbreak control team. As is the norm in outbreaks of suspected clostridial infections, the HPSC alerted clinical staff throughout the country (emergency medicine physicians, neurologists, infectious disease physicians, microbiology services, drug services and public health medicine physicians) through email alerts. Press releases were also issued to

the national media. Internationally, the European Centre for Disease Control (ECDC) and the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) were informed. HSE HPSC alerted other European countries using the Early Warning and Response System (EWRS), an internet based rapid alert system supported by the European Commission and run by ECDC. Advice in relation to 'skin popping' (subcutaneous injection of heroin) with potentially contaminated heroin was distributed to the drug using community through the drug services and the network of 13 local drugs task forces in Dublin.

Heroin used by one patient was obtained and has been sent to the Foodborne Pathogen Reference Unit for testing by the Irish police. However, *C. botulinum* could not be isolated from this sample. No other cases of wound botulism were reported in Ireland in 2008 apart from those reported here. There have been two cases of suspected wound botulism in drug users in different areas in the north of England since 25 December 2008. One of these is unconfirmed (serum sample collected several days after onset of symptoms), whilst testing for the second case is on going. Both cases had classic symptoms and have received anti-toxin. The authors are unaware of any other outbreak occurring in European countries in this time period.

### Discussion

Since 2000, there have been three outbreaks of clostridial infections in IDUs in Dublin. In an outbreak of *Clostridium novyi* Type A in 2000, 22 patients were infected, of whom eight died [1-3]. A simultaneous outbreak occurred in the north of England and Glasgow, Scotland. In 2002, an outbreak of botulism involving three IDUs occurred in Ireland [4,5].

There is laboratory confirmation of a clinical diagnosis of botulism in approximately 40% of wound botulism cases, either by detection of botulinum neurotoxin in the patients' serum or by isolation of *C. botulinum* from wounds. Reasons for this low confirmation rate include delay in recognition of clinical signs and subsequent delays in specimen collection. Once toxin reaches the nerve endings, it binds irreversibly, thus reducing the amount of toxin in the serum to below detectable levels. In addition, inadequate volumes of serum sent for testing may reduce the sensitivity of the test, and the administration of systemic antibiotics prior to specimen collection

may reduce the viability of organisms in pus taken from associated wound abscesses.

The fact that only one case in this outbreak has been laboratory-confirmed, with the remaining cases classified as possible or probable, can be attributed to the difficulties mentioned in the paragraph above. Two of the cases were given anti-toxin before serum samples were obtained and thus toxin was not detectable.

Wound botulism became a notifiable disease in Ireland on 1 January 2004. Prior to this date, only food-borne botulism was notifiable under the disease category of *Acute Infectious Gastroenteritis*.

Wound botulism occurring among IDUs was first reported in the United States in 1982 [6]. Since then both sporadic botulism cases and outbreaks have been reported among this sub-population. A number of other European countries have also reported outbreaks among IDUs in recent years [7-11].

Heroin users who inject either subcutaneously or intramuscularly are at particular risk, as administration using this method is conducive to wound infection, abscess formation and generation of the anaerobic conditions for germination of *C. botulinum* spores and subsequent release of neurotoxin [7]. Spores of *C. botulinum* are often present in soil and may contaminate heroin or heroin taking equipment. Heating the heroin powder to solubilise it for subcutaneous injection does not kill the spores, and the acidulant used for solubilisation enhances tissue damage at the injection sites, facilitating the germination of botulinum spores and leading to release of neurotoxin.

Botulism (both food-borne and wound) is extremely rare in Ireland, unlike many European countries which routinely see food-borne cases each year. Wound botulism is much rarer, but both sporadic cases and outbreaks have been reported in European countries in recent years [7-11]. Maintaining high levels of awareness of the risk of botulism among the population of injecting drug users is vital to insure that they are aware of the risk and urgently seek medical attention if they develop any of the signs or symptoms associated with the disease. Alerting clinicians to botulism increases the likelihood of rapid diagnosis, early hospitalisation and appropriate treatment with anti-toxin and other supportive treatment of these patients, thus decreasing mortality and complications. Delays in

### TABLE

Demographic, clinical and drug use history, reported botulism cases, Dublin, 2008

Case (No.)	Sex	Age (years)	Onset of symptoms	Clinical features/skin abscesses	Mechanical ventilation	Anti toxin given/date	Recent* heroin injection	Case classification	Outcome
1	M	33	20/11/2008	Dysarthria, indurated area	No	Yes 21/11/2008	Yes	Confirmed	Alive
2	M	23	21/11/2008	Respiratory problems	Yes	Yes 27/11/2008	Yes	Probable	Alive
3	F	34	17/11/2008	Respiratory problems	Yes	Yes 27/11/2008	Yes	Possible	Alive
4	M	39	21/11/2008	Respiratory problems/ abscess	Yes	Yes 27/11/2008	Yes	Probable	Alive
5	M	38	04/12/2008	Dysarthria	No	Yes 8/12/2008	Yes	Possible	Alive
6	F	42	10/12/2008	Dysarthria and ataxia/ abscess	No	Yes 10/12/2008	Yes	Possible	Died

\*within four weeks of clinical disease onset

administration of anti-toxin treatment increase mortality, hospital stay and rehabilitation time. Raising the index of suspicion also increases the likelihood of additional cases being considered.

Our working hypothesis is that a contaminated supply of heroin is responsible for this outbreak, supported by the number of cases and focus in the Dublin area over a short period of time. However our investigation to date has failed to identify common links between cases. Such links were identified in the clostridial outbreak among IDUs in Dublin in 2000 [1-3], when common social networks and common drug dealers were identified for some of the cases. At that time, similar *C. novyi* outbreaks were occurring in northern England and Glasgow, Scotland, supporting the hypothesis of a common contaminated supply.

The fact that no further cases have been identified suggests that rapid dissemination of information and local action may have averted further cases. The authors would welcome hearing of any wound botulism cases seen in other countries around this time.

## References

1. Mullen L, Barry J, Igoe D, Keenan E, Ward M, Murray K. Unexplained illness among injecting drug users in Dublin: a case-control study. *J Epidemiol Community Health*. 2002;56(8):575-6.
2. Centers for Disease Control and Prevention (CDC). Unexplained illness and death among injecting drug users-Glasgow, Scotland; Dublin, Ireland; and England, April-June 2000. *MMWR Morb Mortal Wkly Rep*. 2000;49(22):489-92.
3. Gill ON, O'Flanagan D, Barry J, Djuretic T, Jones J, Murray K. 'Serious unexplained illness' among injecting drug users in Britain and Ireland. *Euro Surveill*. 2000;4(25):pii=1577. Available from: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=1577>.
4. Botulism in injecting drug users. *EpiInsight*. 2002;3(6). Available from: <http://www.hpsc.ie/hpsc/EPI-Insight/Volume32002/File,661,en.PDF>
5. Murray-Lillibridge K, Barry J, Reagan S, O'Flanagan D, Sayers G, Bergin C, et al. Epidemiological findings and medical, legal and public health challenges of an investigation of severe soft tissue infections and deaths among injecting drug users - Ireland, 2000. *Epidemiol Infect*. 2006 Aug;134(4):894-901.
6. MacDonald KL, Rutherford GW, Friedman SM, Dietz JR, Kaye BR, McKinley GF, et al. Botulism and botulism-like illness in chronic drug abusers. *Ann Intern Med*. 1985;102(5):616-8.
7. Davis LE, King MK. Wound botulism from heroin skin popping. *Curr Neurol Neurosci Rep*. 2008;8(6):462-8.
8. Burnens A. Wound botulism in Switzerland. *Euro Surveill*. 1999;3(9):pii=1447. Available from: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=1447>.
9. Burnens A. Cases of wound botulism in Switzerland. *Euro Surveill*. 2000;4(5):pii=1666. Available from: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=1666>.
10. Kuusi M, Hasseltvedt V, Aavitsland P. Botulism in Norway. *Euro Surveill*. 1999;4(1):pii=44. Available from: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=44>
11. Alpers K, van Treeck U, Frank C. Outbreak of wound botulism in injecting drug users in Germany, October-December 2005. *Euro Surveill*. 2005;10(50):pii=2859. Available from: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=2859>

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