



European Monitoring Centre
for Drugs and Drug Addiction



RAPID RISK ASSESSMENT

Wound botulism in people who inject heroin: Norway and the United Kingdom

14 February 2015

Main conclusions and options for action

Since December 2014, and as of 10 February 2015, 23 cases of botulism have been reported in Norway (eight cases) and Scotland (15 cases), affecting people who inject drugs (PWID). All the reported cases used heroin, and it is assumed that the source of the infections is contaminated heroin. The batch or batches of the heroin suspected of being contaminated with the spores of *Clostridium botulinum* have so far not been identified. It is therefore not possible to estimate the volume and distribution of contaminated heroin. However, the clustering of the cases in time and place suggest that the 23 cases could be linked to heroin from a common contaminated batch.

People who inject drugs are known to be at risk of wound botulism. Guidance on drug treatment and prevention and control of infections among people who inject drugs has been issued by ECDC and the EMCDDA in 2011 [1]. No person-to-person transmission has ever been reported.

The following measures are relevant for mitigating the risk of more cases of wound botulism in the EU/EEA Member States:

- Increase awareness about wound botulism among physicians and other healthcare providers who provide care for PWID in order to reduce the lag time between onset of symptoms and diagnosis and treatment.
- Increase awareness among heroin users, their social networks, and drug treatment and harm reduction services regarding the signs and symptoms suggestive of wound botulism infection. Emphasise the importance of seeking medical treatment immediately.
- Encourage heroin users to reduce or eliminate heroin use as much as possible by promoting access to appropriately-dosed opiate substitution treatment.
- Facilitate the exchange of information and guidelines on the investigation and control of wound botulism in PWID, e.g. case definitions, educational materials, investigation questionnaires, treatment protocols, and documents on communication strategies for vulnerable groups (see the materials developed by Public Health England [2,3]).
- Continue forensic investigations at the national and EU/EEA levels to identify contaminated batches of heroin.
- Ensure availability of antitoxin for the timely treatment of future cases. If large clusters of cases occur, mechanisms which facilitate the mobilisation of antitoxin in the EU/EEA need to be considered.

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Public health issue

Clusters of wound botulism among people who inject drugs (PWID) in Norway and in the UK.

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Disease background information

Botulism is a serious and potentially fatal paralytic illness caused by a toxin produced by the anaerobic bacterium *Clostridium botulinum*. There are three forms of disease depending on the site of toxin production: food-borne (ingestion of pre-formed toxin), intestinal, and wound. Wound botulism occurs when spores get into an open wound and reproduce in an anaerobic environment. Botulism is not spread from one person to another [4].

The botulinum toxin produces descending, flaccid paralysis without fever. Patients typically present with difficulty in speaking, seeing and swallowing. Symptoms are similar in all forms of botulism, but may take up to two weeks to appear in the wound form [4]. If untreated, paralysis may progress to the arms, legs, trunk and respiratory muscles. Treatment includes antibiotics and the administration of an antitoxin. The case-fatality rate is around 5 to 10% for adequately treated patients.

People who inject drugs are at risk of wound botulism because the bacterium can be deposited under the skin if the injected drug has been contaminated. Illicit drugs that have been associated with botulism are opiates (heroin) and stimulants (cocaine and amphetamine). The vast majority of reported cases have been associated with heroin use by intravenous, subcutaneous ('skin-popping') or intramuscular ('muscle-popping') injection routes [5].

Since the first reported cases of wound botulism in 1994 in the United States, there has been an epidemic in people who inject drugs, especially in California. The epidemic has been associated with 'skin popping' 'black tar heroin' (BTH), a form of heroin that is predominantly used in the western United States. BTH is a low grade resinous form of heroin, often smuggled in from countries south of the United States [6]. Most cases in the USA have been sporadic.

Clinically or microbiologically confirmed *Clostridium botulinum* infections among people who inject drugs have been described in the EU/EEA since 2000 [7]. Between 2000 and 2013, the United Kingdom reported 167 cases [8], Germany 21 cases [9], Ireland nine cases [10], Italy nine cases [7], and the Netherlands one case [11].

The cases in the EU/EEA, in particular those in the United Kingdom, have been associated with heroin in the form of a brown powder that requires an acidic diluent [12]. Contaminated heroin has been implicated in four different outbreaks of wound botulism among people who inject drugs in Scotland [13], Germany [9], southern England [14] and Norway [15].

It is assumed that contamination of heroin with botulism spores is common, given the non-sterile production methods, clandestine transportation, and the ubiquity of the *C. botulinum* spores in soil. Contamination is a risk at every stage, from production, storage, transport to the adding of bulking agents before sale ('cutting') [16].

Because *Clostridium botulinum* is an anaerobe bacterium, multiplication and symptomatic infection only occurs when the spores end up in a suitable anaerobic environment, such as damaged subcutaneous tissue and muscles. The bacterium does not grow in the blood. Most people who inject drugs use the intravenous route. The highest risk for botulism is among people who intentionally inject the drug intramuscularly or subcutaneously, but unintentional tissue deposits ('missed hits') can also result in infection. Heating the heroin powder to solubilise it for subcutaneous injection does not kill the spores. The use of an acidic diluent may increase tissue damage at the injection sites and thereby facilitate germination of botulinum spores [17]. Drug-related botulism has also been reported after sniffing cocaine [18].

Event background information

On 26 December 2014, the Norwegian Institute of Public Health posted a message on the Early Warning and Response System (EWRS) about a case of botulism in a person who injects drugs (PWID). On 26 January 2015, Norway reported information about two additional possible cases. As of 10 February 2015, eight cases of wound botulism have been confirmed among people who inject heroin in Norway. All cases bought the heroin in the Oslo area [19]. One of the cases had not injected the heroin during the incubation period; he reported that he smoked the drug.

Prior to the present cases, Norway reported 16 cases of wound botulism among PWID, including a cluster of three cases in 1997 [20] and a cluster of seven cases in 2013 [15].

On 1 January 2015, NHS Greater Glasgow and Clyde's Public Health Protection Unit, Police Scotland and Health Protection Scotland (HPS) reported an investigation into two probable cases of botulism among PWID in the Greater Glasgow and Clyde area [21].

From 21 December 2014 to 9 February 2015, 15 probable or confirmed cases of wound botulism were reported in Scotland. In the cases where information is available, the drugs were bought in, or sourced, via Glasgow.

Of the six cases which were confirmed microbiologically, three are type B.

Since 21 December 2014, 21 people have been admitted to hospital in Scotland with severe illness and suspected botulism. Seven of the suspected cases have been reported since 1 February 2015. Two of these 21 cases had other causes that could explain the symptoms, and four cases remain under investigation for botulism (these are currently not counted as probable cases). The hypothesis that all or some of these cases are linked to a single batch of contaminated heroin has yet to be substantiated. In the meantime, HPS continues to stress the urgency of communicating the risk of botulism associated with contaminated heroin [22].

The United Kingdom reported 167 cases of wound botulism among PWID between 2000 and 2013 [8] while no cases were reported before 2000. There are usually several sporadic cases of wound botulism among PWID reported each year [14]. The most recent cluster of cases in the UK was in 2009 [8].

So far in 2015, one case of wound botulism among PWID has been reported in England. Investigations are ongoing, and this case is currently considered as a sporadic case with no links to the cases in Scotland or Norway. There have been no cases in Wales or Northern Ireland in recent years [23].

ECDC/EMCDDA joint threat assessment for the EU/EEA

People who inject drugs frequently suffer from skin and soft tissue infections, and wound botulism is a well-documented risk [12,24].

Heroin, cutting agents or syringes that have been contaminated with *Clostridium botulinum* spores are the most likely sources of infection for this cluster of wound botulism among PWID in the EU/EEA [7]. Given the ubiquity of *C. botulinum* spores, contamination may happen during any of the stages of heroin production, cross-border transportation, distribution, 'cutting' before sale and preparation for injection. The highest risk for botulism is among people who intentionally inject the drug intramuscularly or subcutaneously, but unintentional tissue deposits ('missed hits') can also result in infection. Historically, both sporadic cases and clusters of wound botulism have occurred among PWID. When clusters occur, they tend to be limited to a certain geographic area. It has not been confirmed that the two clusters in Norway and Scotland are linked to a common supply of heroin. However, having large two clusters this close in time is unusual.

People who inject drugs are continuously at risk of wound botulism because of the frequent penetrations of the skin, the ubiquity of the spores in the environment, and the possibility of using contaminated heroin. This background risk increases with the amount of contaminated heroin circulating in the EU and at what stage of the production and distribution chain the heroin was contaminated.

It cannot be excluded that additional cases of wound botulism will occur among PWID. Investigation into the origin and supply routes of the implicated heroin could possibly identify other countries at risk.

Botulism is a rare condition, and clinicians may not always consider wound botulism as the cause of disease. This may result in undiagnosed cases or late diagnosis, potentially leading to a more severe clinical outcome. It has been shown that a pragmatic public health prevention approach can have a strong effect on reducing the spread of blood-borne and other infections among people who inject drugs. Prevention is feasible and effective, if properly implemented [1].

As *C. botulinum* is not transmitted from person to person, the risk to the general population in relation to these 23 cases detected in Norway and the UK is negligible.

Conclusions and options for action

People who inject drugs are known to be at risk of wound botulism. Guidance on drug treatment and prevention and control of infections among people who inject drugs has been issued by ECDC and the EMCDDA in 2011 [1]. No person-to-person transmission has ever been reported.

The clustering of cases in time and two geographical places suggest that the 23 cases of botulism in PWID, eight cases in Norway and 15 in Scotland, could be linked to contaminated heroin from a common batch. However, the batch or batches of the heroin suspected of being contaminated with the spores of *Clostridium botulinum* have so far not been identified. It is therefore not possible to estimate the volume and geographical distribution of contaminated heroin in Europe.

The following measures are relevant for mitigating the risk of more cases of wound botulism in the EU/EEA Member States:

- Increase awareness about wound botulism among physicians and other healthcare providers who provide care for PWID in order to reduce the lag time between onset of symptoms and diagnosis and treatment.
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- Ensure availability of antitoxin for the timely treatment of future cases. If large clusters of cases occur, mechanisms which facilitate the mobilisation of antitoxin in the EU/EEA need to be considered.

ECDC and EMCDDA will continue to monitor all incoming information on the evolution and epidemiology of this outbreak.

Contact

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