



European Monitoring Centre
for Drugs and Drug Addiction



RAPID RISK ASSESSMENT

Wound botulism among people who inject heroin in Norway

31 October 2013

Main conclusions and recommendations

As of 28 October 2013, six cases of wound botulism have been reported in Norway among people who had injected heroin. The reported onset of symptoms was between 10 and 25 October. Two cases have been confirmed through mice inoculation and four are suspected cases with laboratory results pending. Ages range from 35 to 55 years; four of the cases are male and all cases have been hospitalised. All cases reside in the Oslo area or in neighbouring municipalities. All reported heroin use and most reported intramuscular injection of heroin. The source of infection is thought to be a batch of contaminated heroin. The geographical distribution of the potentially contaminated heroin is unknown at this time, as is the distribution stage at which the heroin may have been contaminated.

People who inject drugs (PWID) 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 recently been issued by ECDC and the EMCDDA [1]. No person-to-person transmission has ever been reported. Based on current information (cases clustered in time and space), it is very likely that the two confirmed and the four suspected cases of wound botulism among PWID in Norway are linked through exposure to contaminated heroin. The ubiquity of *Clostridium botulinum* makes contamination of heroin possible at any stage. Therefore, it is important to ensure epidemiological investigation to relate cases with the same source of heroin.

As this is an ongoing problem, the following measures are relevant for consideration in other EU/EEA Member States:

- increase awareness in hospitals and other healthcare settings to support prompt diagnosis and treatment as well as reporting to appropriate public health authorities;
- increase awareness among heroin users, their social networks and drug treatment and harm reduction services regarding the signs and symptoms of wound botulism infection and of the importance of seeking medical treatment immediately;
- encourage heroin users to reduce or eliminate heroin use by promoting access to appropriately-dosed opiate substitution treatment;
- encourage the exchange documents useful for investigation and control, such as case definitions, educational material, investigation questionnaires, protocols for treatment and documents useful to develop a strategy to address communication among vulnerable groups (including materials already developed by Public Health England [2,3]);
- continue forensic investigations at the national and EU/EEA level to identify contaminated batches of heroin, and limit the occurrence of additional cases;
- ensure availability of anti-toxin vials for possible future cases. As large clusters of cases could eventually occur, mechanisms facilitating the mobilisation of anti-toxin across EU/EEA countries should be considered.

Public health issue

Cluster of wound botulism among people who inject drugs (PWID) in Norway.

Source and date of request

The European Commission requested a rapid risk assessment on this event on 28 October 2013.

Consulted experts

ECDC internal response team

Paloma Carrillo-Santisteve, Juliana Reyes-Uruena, Ettore Severi, Anastasia Pharris, Elisabeth Bancroft, Lara Tavoschi, Johanna Takkinen, Denis Coulombier.

EMCDDA experts

Lucas Wiessing, Julian Vicente.

External experts consulted and acknowledged

Norwegian Institute of Public Health: Karin Nygard, Emily MacDonald, Hans Blystad, Karin Rønning. Public Health England: Vivian Hope.

Disease background information

Botulism is a serious paralytic illness caused by toxins produced mainly 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 syndrome produced by the botulinum toxin is an afebrile, descending, flaccid paralysis. Patients with botulism typically present with difficulty in speaking, seeing and/or swallowing. If untreated, paralysis may progress to the arms, legs, trunk and respiratory muscles. Treatment includes antibiotics and the administration of an anti-toxin. Even when these are available, the case-fatality rate is around 5 to 10%. Symptoms are similar in all forms of botulism, but may take up to two weeks to appear in the wound form [4].

People who inject drugs are at risk of wound botulism as the organism enters at sites of injection [2]. The illicit drugs that have been related with botulism are opiates (heroin) and stimulants (cocaine and amphetamine) which are the most widely injected psychotropic drugs and are administered by intravenous, subcutaneous ('skin-popping') or intramuscular ('muscle-popping') routes [5].

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

Many cases of clinically or microbiologically confirmed infections caused by *Clostridium botulinum* among people who inject drugs have been described in the EU/EEA since 2000 [7]. The largest number of cases reported is from the United Kingdom, with 165 cases of wound botulism among people who inject drugs between 2000 and 2012 [7]; in 2013 the United Kingdom reported only two new cases. From 2000 to 2009, Germany has reported 21 cases [7,8], Ireland nine cases [7,9], Italy nine cases [7], and the Netherlands one case [10].

In the EU/EEA, especially in the United Kingdom, the type of heroin used is a powder [11]. In two different outbreaks of wound botulism among people who inject heroin, from Scotland [12], Germany and southern England [13], contaminated heroin was implicated as the source of infection. The origins of street heroin in most parts of the world are found in Afghanistan. Contamination of heroin with botulism spores is ongoing; given the non-sterile methods of production and transport and the ubiquity of the *C. botulinum* spores in soil, contamination is possible at virtually any stage from production, transport and cut [14]. Nevertheless, as it is an anaerobe, infection only occurs if it ends up in a suitable environment: most people who inject drugs inject intravenously, only those who do not inject intravenously (miss 'hits' or intramuscular or subcutaneous injections) are vulnerable. 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 a vegetative growth of bacteria and subsequent release of neurotoxin [15].

Event background information

In Norway, prior to the present cases, nine cases of wound botulism have been reported among PWID, including a cluster of three cases in 1997. The last case before the current outbreak was an isolated case in 2010 [16].

On 19 October, the Norwegian Institute of Public Health posted an initial message on the early warning and response system (EWRS) about two PWID having developed botulism; an update was posted on 28 October with information about four additional possible cases.

Overall, six cases have been reported: two have been confirmed through mice inoculation and the remaining four are suspected cases with results pending. All cases reside in Oslo or nearby municipalities. The age range is from 35 to 55 years and four cases are male. Date of symptom onset ranges from 10 to 25 October; all six cases have been hospitalised. All cases reported using heroin and most have reported intramuscular injection of heroin. Cases have been interviewed to determine whether there is a common source of heroin.

Norway had a botulinum anti-toxin shortage which was resolved by obtaining additional doses from the Finnish Institute of Health and Welfare while waiting for shipment from a supplier in Canada.

ECDC threat assessment for the EU/EEA

The frequent occurrence of skin and soft tissue infections, including wound botulism, among PWID is a well-known phenomenon [11].

Contamination of heroin, or of a cutting agent mixed with the heroin, or of syringes used to inject drugs is the most likely source of wound botulism among PWID in the EU/EEA [7]. Given the ubiquity of *C. botulinum* spores, which are often present in soil, contamination might have happened during any of the different heroin distribution stages such as manufacture, transport, cutting, preparation or injection. As the bacterium is anaerobic, only those who do not inject intravenously (miss 'hits' or inject intramuscular or subcutaneous injections) are vulnerable. Events in the EU/EEA in the last years have shown that wound botulism cases among PWID are generally geographically limited. For the time being, there is no indication that this cluster in Norway is related to other cases having occurred in the EU.

The potential risk for the EU/EEA will depend on the stage of contamination. If heroin contamination occurred early in the stage of distribution, it cannot be excluded that additional wound botulism-infected heroin injectors will be identified in the EU/EEA. In this case, investigation of the origin of the drug supply and distribution channels could help to identify countries potentially exposed to contaminated heroin.

Botulism not being a common disease, clinicians may not consider wound botulism. This may result in undiagnosed cases or late diagnosis, potentially leading to a more severe clinical outcome.

As *C. botulinum* is not transmitted from person to person, the risk to the general population in relation to these six cases is negligible.

Conclusions/recommendations

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 recently been issued by ECDC and the EMCDDA. No person-to-person transmission has been ever reported. Based on current information (cases clustered in time and space), it is very likely that the two confirmed and the four suspected cases of wound botulism among PWID in Norway are linked through exposure to contaminated heroin. The ubiquity of *C. botulinum* makes contamination of heroin possible at any stage. Therefore, it is important to ensure epidemiological investigation to relate cases with the same source of heroin.

As this is an ongoing problem, the following measures are relevant for consideration in other EU/EEA Member States:

- increase awareness in hospitals and other healthcare settings to support prompt diagnosis and treatment as well as reporting to appropriate public health authorities;
- increase awareness among heroin users, their social networks and drug treatment and harm reduction services regarding the signs and symptoms of wound botulism infection and of the importance of seeking medical treatment immediately;
- encourage heroin users to reduce or eliminate heroin use by promoting access to appropriately-dosed opiate substitution treatment;
- encourage the exchange documents useful for investigation and control, such as case definitions,

educational material, investigation questionnaires, protocols for treatment and documents useful to develop a strategy to address communication among vulnerable groups (including materials already developed by Public Health England [2,3]);

- continue forensic investigations at the national and EU/EEA level to identify contaminated batches of heroin, and limit the occurrence of additional wound botulism cases;
- ensure availability of anti-toxin vials for possible future cases. As large clusters of cases could eventually occur, mechanisms facilitating the mobilisation of anti-toxin across EU/EEA countries should be considered.

ECDC and EMCDDA will continue to monitor the evolution of this situation in terms of the epidemiological information available.

Contact

For further information, please send an e-mail to: info@ecdc.europa.eu or info@emcdda.europa.eu

References

1. European Centre for Disease Prevention and Control. Prevention and control of infectious diseases among people who inject drugs 2011 [cited 2013]. Available from: http://ecdc.europa.eu/en/publications/Publications/111012_Guidance_ECDC-EMCDDA.pdf.
2. Public Health England. Wound botulism cases associated with injecting drug use 2013. Available from: <http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Botulism/GeneralInformation/botu020WoundbotulismcasesassociatedwithIDU/>.
3. Public Health England. Severe illnesses due to anthrax, botulism and tetanus in people who use drugs: Update october 2013. 2013. Available from: http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1317140125941.
4. Barzilay E SJ, Toyofuko H. Botulism. In: DL H, editor. Control of communicable diseases manual United States of America 2008. p. 79-87.
5. Schoener EP, Hopper JA, Pierre JD. Injection drug use in North America. Infectious disease clinics of North America. 2002;16(3):535-51, vii. eng.
6. Yuan J, Inami G, Mohle-Boetani J, Vugia DJ. Recurrent wound botulism among injection drug users in California. Clinical infectious diseases: an official publication of the Infectious Diseases Society of America. 2011 Apr 1;52(7):862-6. PubMed PMID: 21317399. Epub 2011/02/15. eng.
7. Hope VD, Palmateer N, Wiessing L, Marongiu A, White J, Ncube F, et al. A decade of spore-forming bacterial infections among European injecting drug users: Pronounced regional variation. American journal of public health. 2012 Jan;102(1):122-5. PubMed PMID: 22095355. Epub 2011/11/19. eng.
8. Schroeter M, Alpers K, Van Treeck U, Frank C, Rosenkoetter N, Schaumann R. Outbreak of wound botulism in injecting drug users. Epidemiology and infection. 2009 Nov;137(11):1602-8. PubMed PMID: 19351433. Epub 2009/04/09. eng.
9. Barry J, Ward M, Cotter S, Macdiarmada J, Hannan M, Sweeney B, et al. Botulism in injecting drug users, Dublin, Ireland, November-December 2008. Euro Surveill. 2009;14(1):pii=19082. Available online: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19082>.
10. Vermeer-de Bondt P, Vos L. Tetanus in an injecting drug user in the Netherlands: Single case so far. Eurosurveillance Weekly. 2004;8:19.
11. Brett MM, Hood J, Brazier JS, Duerden BI, Hahne SJ. Soft tissue infections caused by spore-forming bacteria in injecting drug users in the United Kingdom. Epidemiology and infection. 2005 Aug;133(4):575-82. PubMed PMID: 16050501. Pubmed Central PMCID: PMC2870283. Epub 2005/07/30. eng.
12. CDC. Unexplained illness and death among injecting-drug users--Glasgow, Scotland; Dublin, Ireland; and England, April-June 2000. MMWR Morbidity and mortality weekly report. 2000 Jun 9;49(22):489-92. PubMed PMID: 10881764. Epub 2000/07/06. eng.
13. Health Protection Agency. Wound botulism cluster in injecting drug users: 2009. 2010.
14. Kaushik KS, Kapila K, Praharaj AK. Shooting up: The interface of microbial infections and drug abuse. Journal of medical microbiology. 2011 Apr;60(Pt 4):408-22. PubMed PMID: 21389334. Epub 2011/03/11. eng.
15. Davis LE, King MK. Wound botulism from heroin skin popping. Current neurology and neuroscience reports. 2008 Nov;8(6):462-8. PubMed PMID: 18957182. Epub 2008/10/30. eng.
16. Jensenius M, Lovstad RZ, Dhaenens G, Rorvik LM. A heroin user with a wobbly head. Lancet. 2000 Sep 30;356(9236):1160. PubMed PMID: 11030296. Epub 2000/10/13. eng.