European Monitoring Centre for Drugs and Drug Addiction

ecdc EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

JOINT ECDC AND EMCDDA
RAPID RISK ASSESSMENT

Anthrax cases among injecting drug users Germany

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Source and date of request

ECDC and EMCDDA decision, 21 June 2012.

Main conclusions and recommendations

As of 21 June 2012, two cases of anthrax among IDUs have been reported from Regensburg, Germany. Both cases had onset of symptoms in June 2012. It is probable that both cases are linked through exposure to heroin contaminated by *Bacillus anthracis*. The geographical distribution of the contaminated heroin is unknown at this time, but it is possible that the batch has the same source as the contaminated heroin incriminated in the 2009/2010 outbreak in Scotland (with cases also reported from Germany and England). The risk of exposure for heroin users in Germany and other countries is presumably still present and therefore it is likely that additional cases among IDUs will be identified in the near future.

Public health issue

Anthrax among injecting drug users and risk of new infections through contaminated product.

Consulted experts

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Disease background information

Anthrax is an acute infectious disease caused by the Gram-positive spore-forming bacterium *Bacillus anthracis*. Anthrax most commonly occurs in wild and domestic animals like cattle, sheep, goats, camels, and is endemic in a number of mostly agricultural countries in South and central America, southern and eastern Europe, Asia, Africa, the Caribbean, and the Middle East. In most industrialised countries, anthrax is a rare disease, and infection in humans is usually due to occupational exposure to infected animals or their products.

Anthrax infection is classically described as occurring in three forms: cutaneous (about 95% of all cases occurring), pulmonary with severe atypical pneumonia, and gastrointestinal. Symptoms of disease vary depending on how the disease was contracted. The incubation period is usually 1 to 7 days, but can be as long as 60 days. Untreated, the case–fatality rates range from 5 to 20% for cutaneous anthrax, to more than 85% for pulmonary and gastrointestinal anthrax. Antibiotic treatment is effective and can prevent most deaths in cutaneous cases; however, mortality in pulmonary and gastrointestinal cases remains high even with treatment.

Bacillus anthracis spores can live in the soil for many years and humans can become infected with anthrax by handling products from infected animals or by inhaling anthrax spores from contaminated animal products. Anthrax infection can also be acquired by eating undercooked meat from infected animals. Infection with anthrax has also been reported at injection sites among injecting drug users [1]. The risk of person-to-person transmission is generally extremely low, but could result from direct contact with infected open wounds. Specific information on the infection risk from infected IDUs e.g. through needle sharing is not available.

Outbreaks of anthrax infection among IDUs are rare. The most recently reported outbreak occurred in Scotland [2] where between December 2009 and July 2010, 119 cases of anthrax following heroin injection, were reported. The last case was investigated in October 2010 [3]. That outbreak also acquired European dimensions as two confirmed cases were identified in Germany (city of Aachen) as well as one probable case detected serologically (city of Passau, Bavaria) which did not meet the surveillance case definition [4, 5]. A further five cases were identified in England (four of whom died) during the same period [6]. A Rapid Risk Assessment issued on 11 February 2010 by the European Centre for Disease Prevention and Control (ECDC) and the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) concluded that it was reasonable to assume that all cases had been exposed to a single batch of heroin that was contaminated with *B. anthracis* [7].

Genetic typing studies carried out on the Scottish outbreak strain supported these conclusions and suggested that all heroin-outbreak associated isolates were from a single strain emanating from a single infected source, perhaps even a single infected animal. In addition, it was found that the outbreak strain was 'closely related to strains identified previously from anthrax infected goats in Turkey' ([3] p 55). This favoured an outbreak hypothesis that the heroin implicated as the vehicle for anthrax infection in the outbreak was probably contaminated in transit between the source country and the final destination via contact with a contaminated animal, carcass or hide in Turkey [3].

Bacillus anthracis is listed as category A pathogen in the list of bioterrorism agents of the US CDC, and belongs to the group of 'very high threat' agents of the EU. Deliberate release of spores may also lead to infection in humans.

Event background information

As of 21 June 2012, two cases of infection with *B. anthracis* have been reported among injecting drug users in the city of Regensburg, Bavaria, Germany. The first case had a history of intravenous and intramuscular injections with heroin and other substances. He presented to a hospital on 5 June with an infected injection site and died on the same day from anthrax septicaemia [8]. The infection with *B. anthracis* was confirmed by blood culture and PCR by the Institute of Microbiology at the University of Regensburg. Molecular typing on the isolate of this case has been conducted by the Bundeswehr (German Armed Forces) Institute of Microbiology in Munich and has shown that it is identical or very closely related to the strain isolated during the above-described outbreak in 2009/2010 [9]. The second case presented at a hospital with fever and swelling of a heroin injection site on 18 June. The injection had occurred three days earlier. The infection with *B. anthracis* was confirmed by blood culture and PCR. This second case is currently hospitalised [9, 10].

The Robert Koch Institute (RKI), the Bavarian Health and Food Safety Authority (LGL), the local health authority of Regensburg, the Institute of Microbiology at the University of Regensburg and the Bundeswehr Institute of Microbiology in Munich, and the police are continuing their investigations of these cases at present. Updated information on anthrax and anthrax among IDUs has been posted on the website of RKI [11] and public health authorities and drug counselling facilities have been informed throughout Germany.

Actions by European partners

The European early warning network of the EMCDDA, as well as the expert networks on drug-related infectious diseases and drug-related deaths have been alerted of the two new cases in Germany and surveillance has been strengthened to report possible additional cases in Europe.

EUROPOL has been informed and is conducting enquiries in support of the EU Member States' national authorities in an attempt to gather information that may assist in identifying a possible source of contamination. At this time, EUROPOL is not aware of possible deliberate contamination of heroin or cutting agents with *B. anthracis* by either drug traffickers or other criminal or terrorist elements. Consequently, with the information currently available for these two new cases, as well as the cases in 2009/2010, accidental contamination seems the most plausible explanation for these incidents.

ECDC threat assessment for the EU

The frequent occurrence of skin and soft tissue infections among IDUs is a well known phenomenon [12–14]. However, anthrax infection of injecting drug sites has been reported less frequently. A single case of anthrax was diagnosed in a heroin user in Norway in 2000, but no further cases were detected [1]. The first unusual, large-scale and geographically dispersed outbreak of anthrax infection following injection of heroin from a single batch contaminated with *B. anthracis* was that reported from Scotland, England and Germany between 2009 and 2010 [3–6].

The two current cases of anthrax reported from Regensburg in Germany are therefore not entirely unexpected. However, it is likely that these cases are the first signal that an existing contaminated batch from the 2009/2010 outbreak (recently been released to the market) or a new batch of *B. anthracis*-contaminated heroin is circulating among the injecting drug-users community in Germany and potentially elsewhere. Similar to the outbreak in Scotland, these recent cases suggest that contaminated heroin or a contaminated cutting agent mixed with the heroin may be a common vehicle of infection. So far, no other link than injecting drugs has been demonstrated between the German cases.

Considering the complex international distribution chain of heroin, and the clustering in time of cases in Germany, the exposure to a contaminated batch of heroin distributed in Germany is likely. At present, it is probable that additional cases of anthrax will be identified among German IDUs. As the precise distribution channels of the current batch of anthrax-contaminated heroin is not known, the possibility cannot be excluded that other anthrax-infected IDUs will be identified in EU countries in the near future. Investigation of the origin of the drug supply and distribution channels, if possible, may help to identify countries potentially exposed to a contaminated batch of heroin. It is likely that the risk of exposure is still present as both cases in Regensburg have occurred during the month of June 2012.

As anthrax has rarely been associated with severe infection among drug users, clinicians may not consider anthrax in the differential diagnosis of severe infections in this population and this consequently may result in undiagnosed cases. This highlights the importance of clinical awareness in healthcare settings of the risk of injection-related infection with rare pathogens among the IDU population.

Conclusions

Based on current information, it is probable, although not confirmed, that the two cases in Regensburg, Germany, reported within 15 days of each other, are linked through exposure to heroin contaminated by *B. anthracis*. The geographical distribution of the contaminated heroin is unknown at this time, but it is possible that the batch has the same source as the contaminated heroin incriminated in the 2009/2010 outbreak. The risk of exposure for heroin users in Germany and other countries is presumably still present and therefore it is likely that additional cases among IDUs will be identified in the near future.

The following measures (as were implemented during the 2009/2010 outbreak) continue to be relevant for consideration in affected areas:

- Increase awareness in hospitals and other healthcare settings, including drug services, to support surveillance efforts, and to provide information on the distribution of the contaminated products.
- Increase awareness in non-governmental organisations and support groups for drug users in Europe in order to keep people who inject drugs appropriately informed about this event.
- Conduct genotyping of isolates of cases in Germany and any new cases to confirm a link among cases as well as with genotypes found in the environment or animals.
- In the event that cases are identified in other Member States: 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 in Scotland during the 2009/2010 outbreak.
- Continue forensic investigations at the National and European levels to identify contaminated batches of heroin and limit the occurrence of additional anthrax cases.

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

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