Sporadic human anthrax in urban Brisbane

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Introduction

In July 1998, a young man was admitted to a Brisbane Hospital with a skin infection, subsequently diagnosed as cutaneous anthrax; the first reported case in Queensland since 1939. This report describes clinical and microbiological aspects of the case and the public health investigation.

Clinical Case

On 18 July 1998, a 20 year old forklift driver attended the Emergency Department feeling unwell with a painful lesion over the right anterior superior iliac spine (ASIS). He had first noticed a small painful papule in the area 24 hours beforehand. A 1cm lump was present over his ASIS, surrounded by a 10cm area of reddened, indurated skin. He was febrile and had tender inguinal lymphadenopathy. A differential diagnosis of cellulitis or a spider bite was made. The patient was commenced on oral dicloxacillin and observed overnight. The next morning he was still febrile and the area of induration and erythema was larger. He was admitted under the Orthopaedic Service with a diagnosis of cellulitis and commenced on intravenous penicillin and flucloxacillin. The lesion continued to progress and 24 hours later had developed into a 10cm area of necrotic skin with vesicles. Brawny induration extended over the lower part of the abdominal wall and down the leg. The patient was toxic and in pain. The diagnosis was changed to necrotising fasciitis, swabs of the vesicle fluid were taken and he was taken to theatre where the necrotic tissue with surrounding margins was resected. Gram stain of the fluid showed no polymorphs with scanty gram positive bacilli and gram positive cocci. Clostridial infection was suspected and high dose intravenous penicillin and flucloxacillin continued. Two courses of hyperbaric oxygen therapy were administered. Following debridement, his temperature settled rapidly and he improved clinically. The patient remained in hospital for a further three weeks for skin grafting to be carried out on the affected area, and was discharged on 14 August.

Microbiology

Cultures of the vesicle fluid grew Bacillus species and coagulase negative staphylococci. The bacillus was inoculated into a Vitek Bacillus Card. As *Bacillus anthracis* is not identified by the card, the organism was initially reported as an unidentified Bacillus species. It was subsequently identified as *B. anthracis* on the basis of lack of haemolysis, non-motility, penicillin sensitivity, production of a capsule on bicarbonate serum agar in CO_2, capsular staining with McFadyeans Stain and positive 'string of pearls' test.[1] The Brisbane Southside Public Health Unit (BSPHU) was notified and an investigation was commenced.

Public Health

Upon confirmation of the diagnosis, an investigation team was established which included public health, clinical and laboratory staff, and representation from the Department of Primary Industries, and the Workplace Health and Safety Program of the Department of Employment, Training and Industrial Relations. The aim of the team was to coordinate the investigation to determine the source of the infection, to assess the risk to others and to prevent further cases of the disease.

A detailed history was obtained from the case that included occupational details and other sources of potential exposure to anthrax during the incubation period of the disease (up to seven days, usually within 48 hours).[2] The areas identified for further investigation included the workplace, home environment and exposure to soil through contact sport (rugby). The case had not worked with or been exposed to any livestock or animals during the incubation period.

The case worked as a labourer in a warehouse. During the incubation period he was exposed to new, imported hessian (plant fibre) material used in the packaging of Australian ginned cotton. He was also involved in repackaging of fertiliser produce. Investigations revealed that the fertiliser product was chemical based and not derived from blood and bone produce. Subsequent

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microbiological analysis of 62 samples from all of the hessian bags used by the case during the incubation period did not reveal the presence of anthrax. Investigation of the home and sport exposures did not reveal any items of concern. In particular, there was no history of animal exposure, no use of blood and bone fertilisers on the football fields, and no exposure to imported animal products in the home.

During the investigation, all people who shared similar exposures were counselled and provided with information on anthrax, its presentation and modes of transmission. Three people from the case's workplace and a number of sporting associates sought medical attention in regard to skin lesions. However, more than one month after the initial presentation, no further cases of cutaneous anthrax have been detected.

Discussion

Human anthrax is a rare disease in Australia with an average notification rate between 1917 and 1991 of 0.08 notifications per 100,000 population per year.[3] The last recorded case of human anthrax in Queensland occurred in 1939.[4] Most cases in Australia in the last 50 years have been related to animal outbreaks in the endemic areas in Victoria and central New South Wales. The last human case was in Victoria in 1997.[5] Cases in developed countries are usually associated with exposure to contaminated animal products.[5,6,7] The source of this case of cutaneous anthrax could not be determined by this investigation.

As non-pathogenic Bacillus species are commonly cultured from environmentally contaminated clinical specimens, laboratories may not investigate the isolation of a Bacillus species past the genus level. Therefore, it is important that this disease is recognised clinically and that where non-haemolytic Bacillus species with characteristic colonial morphology is isolated from a skin lesion, further examination is undertaken to identify the organism. Testing should include penicillin susceptibility testing, a motility test and, if in accordance with the diagnosis, a capsule stain of the organism grown under appropriate conditions.

In this case, the imperative to debride a suspected case of necrotising fasciitis led to surgery and skin grafting. This is usually not necessary with cutaneous anthrax,[8] however, with extensive eschar formation plastic surgical revision may be required.

Where there is no clear exposure, as in this case, the most common differential diagnosis for cutaneous anthrax would be a necrotising spider bite. It is conceivable that such a case could be treated successfully with penicillin, the Bacillus species isolated not be identified, and a potential sporadic case of cutaneous anthrax be entirely missed. Clinicians need to be aware of the clinical features that suggest the diagnosis and laboratories need to ensure that processes are set in place to identify any potential isolate of *B. anthracis*.

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