

## CASE REPORTS

## *Clostridium novyi* infection: a fatal association with injecting drug users

J M Ryan, J Paul, S Curtis, N K Patel

### Abstract

**Injecting drug users frequently use accident and emergency (A&E) departments to access emergency care for local and systemic infections. *Clostridium novyi* type A is a bacterium that has recently been associated with a number of fatalities among drug injecting addicts. The clinical course is described of a patient who attended an A&E department with septicaemia who was found at postmortem examination to have been infected with *Clostridium novyi* type A. Doctors working in A&E departments should be aware of the existence of this infection and be vigilant when treating injecting drug users with localised infection.**

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### Case report

A 46 year old injecting drug user presented to the accident and emergency (A&E) department with a history of having sat on a needle five days previously. He complained that his thigh had started to get hot and he complained of light headedness and drowsiness. He had a history of hepatitis C and had been on continuous ambulatory peritoneal dialysis for six months for end stage renal disease resulting from amyloidosis. Although clearly vulnerable to infection because of his underlying medical problems he had not previously attended the department with infections.

On examination he appeared anaemic, unwell and was noted to be "shut down". He had a pulse rate of 94 beats per minute, a blood pressure of 100/62, a temperature of 38°C, a respiratory rate of 14 breaths per minute and an oxygen saturation of 93%. Examination of his chest and abdomen were normal. His left buttock looked infected.

Radiographs of his left femur were requested and baseline blood tests were sent to the laboratory. A central line was inserted because of difficulty with venous access. Shortly afterwards he was noticed to deteriorate. He became tachycardic, hypotensive and tachypnoeic with a deteriorating level of consciousness. A chest radiograph confirmed the central line to be in the correct position. No pneumothorax was seen. Radiographs of his left femur



Figure 1 Radiolucency in soft tissues.

revealed a radiolucency consistent with gas in the soft tissues (fig 1). A provisional diagnosis of septicaemia was made. He was sedated, paralysed and intubated. He was given benzyl penicillin, clavulanic acid with ticarcillin, gentamicin and metronidazole. He required an intravenous infusion of adrenaline (epinephrine). He was reviewed by the orthopaedic team who aspirated sero-sanguinous fluid from his left thigh but he developed an electromechanical dissociative cardiac arrest shortly afterwards. Resuscitation was unsuccessful and he died seven hours after arrival at the A&E department.

A coroner's postmortem examination was carried out. On general examination puncture marks were noted over the left thigh and buttock within an indurated area of skin. The underlying muscle appeared necrotic. Internal examination revealed no gross signs of septicaemia. In particular no pleural effusions or localised areas of sepsis were identified. Microbiological analysis of a swab of the left thigh yielded an organism, provisionally identified as *Clostridium sordellii*. The isolate was not retained. Toxicological analysis of postmortem blood revealed the presence of plasma morphine, dihydrocodeine, methadone and benzodiazepines at levels which in combination were consistent with severe toxicity.

In response to recent reports of unexplained deaths in injecting drug users, the autopsy specimen from the left thigh lesion was recultured and yielded an anaerobe that was identified by the Anaerobic Reference Laboratory in Cardiff as *Clostridium novyi* type A.

Department of  
Accident and  
Emergency Medicine,  
The Royal Sussex  
County Hospital,  
Brighton BN2 5BE,  
UK

Correspondence to:  
Mr Ryan  
(ryanj@pavilion.co.uk)

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## Discussion

Misuse of injected drugs has been reported to be a risk factor for infection with *Clostridium* species including *C tetani*,<sup>1</sup> *C botulinum*<sup>2</sup> and *C perfringens*.<sup>3</sup> The identification of this latest subspecies of *Clostridium* has, up to June 2000, been reported in four cases in association with a number of “mystery” deaths in Scotland, Ireland and the United Kingdom.<sup>4</sup>

A syndrome has become apparent where the presence of soft tissue inflammation, localised oedema and necrosis at sites used for injecting drugs has been associated with circulatory collapse, leucocytosis and pleural effusions. It has been noted to affect at least 104 injecting drug users in Britain and Ireland between April and August 2000, 35 of whom have died.<sup>5</sup> Indeed many other cases may have gone unrecognised and unreported or been treated with antibiotics early enough before severe systemic reactions resulted.

A case definition has been agreed by representatives of the several nations investigating the incident:

*“An injecting drug user who has been admitted to hospital or found dead since 1 April 2000 with soft tissue inflammation (abscess, cellulitis, fasciitis, or myositis) at an injection site, and with severe systemic toxicity (sustained systolic blood pressure <90 mm Hg despite fluid resuscitation and total peripheral white blood cell count >30 × 10<sup>9</sup>/L), or postmortem evidence of a diffuse toxic or infectious process including pleural effusions and soft tissue oedema or necrosis.”*<sup>6</sup>

Most patients with a serious infection will use an A&E department at some stage. Doctors providing emergency care need to be vigilant when treating injecting drug users who complain of symptoms associated with injection sites. It would appear that *Clostridium novyi* type A has the potential to produce a

toxin causing systemic collapse within a relatively short period. If the infection goes unrecognised and untreated the consequences may prove fatal. Thus, given the nature of injecting drug users and the frequency with which they present late, the time span for treating this infection may be very short.

Furthermore, given the relative frequency with which drug injectors seek healthcare in A&E departments, emergency staff could play a significant part in disease surveillance. This may be particularly important in identifying new strains of infectious diseases. Staff working in emergency departments should be continuously vigilant for evolving patterns of presentations among injecting drug users and should consider establishing a disease surveillance system in their departments.

## Contributors

John Ryan wrote the paper and acts as guarantor. John Paul and Sally Curtis reviewed the manuscript and contributed comments about the *Clostridium* species. They were also involved with the microbiological investigation. Neera Patel performed the autopsy, provided material for microbiological assessment and contributed details on the autopsy to the paper.

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