**CASE REPORT**

**Clostridium novyi** causing necrotising fasciitis in an injecting drug user

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**Microbiology**

A swab and a sample of necrotic debris were cultured within one hour of surgery and a Gram’s stain prepared. A sample of resected tissue stored overnight at 4°C was cultured after homogenisation in a Griffith’s tube (Merck BDH, Poole, Dorset, UK). An aliquot of this specimen was also cultured after enrichment in cooked meat medium for 18 hours at 37°C. Culture media included blood agar and chocolate blood agar incubated in air and 5% CO₂ at 37°C for 48 hours, MacConkey agar in air at 37°C for 24 hours, and fastidious anaerobic agar (FAA) in an anaerobic cabinet (Don Whitley, Shipley, UK) for five days. A Gram’s stain of the specimen showed pus cells and necrotic tissue but no organisms. Culture media incubated aerobically were examined after 24 and 48 hours and showed no growth. The FAA plates were inspected after 48 hours of continuous anaerobic incubation. The medium inoculated with homogenised tissue showed a few small translucent colonies, which on further incubation showed spreading growth with haemolysis of the underlying medium. The organism was identified as *Clostridium novyi* type A by the Anaerobe Reference Unit, Public Health Laboratory Service, Cardiff. The production of α toxin was demonstrated. This isolate was not obtained from the swab, directly cultured necrotic material, or from the enrichment medium.

**Discussion**

Six weeks after this patient’s admission, on 9 June 2000, “serious unexplained illness” was described among injecting drug users in England and Wales. Similar cases had been reported earlier in Scotland and Ireland. Oedema and necrosis at the injection site were often associated with severe toxæmia and a high mortality rate. No consistent agent had been identified. A specific case definition was later formulated of “an injecting drug user admitted to hospital or found dead since 1 April, 2000 with soft tissue inflammation (abscess, cellulitis, fasciitis, or myositis) at an infection site and either severe systemic toxicity (total peripheral white blood cell count < 90 × 10⁹/litre and sustained systolic pressure < 90 mm Hg despite fluid resuscitation) or evidence at necropsy of diffuse toxic or infectious process including pleural effusion and soft tissue oedema or necrosis at an injection site.” Our patient did not meet the full case definition. Systemic toxicity may have been modified by oral antibiotics but the degree and extent of local oedema and necrosis presented a distinctive picture. Our patient was one of the first injecting drug users presenting with this syndrome in England to yield *C novyi* from infected tissue.

Although ubiquitous, *C novyi* is only rarely reported as a pathogen, contributing to mixed infections in contaminated traumatic wounds. The establishment of *C novyi* as a single pathogenic agent in healthy tissues may require special conditions or contributory factors, such as a heavy bacterial load or the presence of foreign material.

When injected into experimental animals infection may not be established unless 1% calcium chloride is added to the inoculum. All affected injecting drug users injected heroin subcutaneously with citric acid, and it is likely that the presence of foreign material facilitated the establishment of *C novyi* infection in these patients.

Operative findings in our patient were of a necrotising fasciitis. Muscle involvement was consistent with severe infection. Microbiological culture of affected tissue most often yields mixed anaerobes and facultative anaerobes.

**Abbreviations**: FAA, fastidious anaerobic agar
Infection with a single agent has so far only been ascribed to *Streptococcus pyogenes*. However, the typical clinical picture can be reproduced when *C. novyi* is injected into experimental animals. The animals develop toxæmia and massive oedema spreading from the site of inoculation. In the mouse, the oedema is said to be so extensive that the animal “assumes the shape of a flattened pear”. Postmortem examination shows tissue necrosis and thick gelatinous oedema with no gas formation or pus. These findings are strikingly similar to the typical presentation in affected injecting drug users and support the causative role of *C. novyi*.

*Clostridium novyi* is a nutritionally demanding strict anaerobe, which dies rapidly on exposure to air. It fails to grow unless optimal anaerobic conditions are afforded and this may account for the many culture negative cases among affected injecting drug users. Arguably, homogenised tissue is most likely to yield a positive culture.

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REFERENCES
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