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CASE REPORT

Monomicrobial necrotising fasciitis due to staphylococcus aureus as a complication of infected intramedullary interlocking nail

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Introduction

Necrotising fasciitis is a rapidly spreading infection of the superficial fascia and subcutaneous tissues which secondarily involves the overlying skin, leading to its necrosis.[11,14,15] The condition may result in loss of life or limb if it is not diagnosed early and treated aggressively.[8,9,15] The diagnosis is based on clinical suspicion, as overt signs may be absent in the early stages.[4,7,11,14,15] The majority of cases are seen in the elderly with some underlying medical conditions contributing to compromised immunity,[4,15] but it may present in the absence of any co-morbid conditions.[1,2,12] We present such a case in a young adult who developed necrotising fasciitis secondary to an infected tibial nail. A single causative organism, staphylococcus aureus was isolated, a rarity in itself.

Case report

In 2000, a 20-year-old male sustained an open fracture of both bones of the left leg. Two months after the injury, once the wounds had healed and adequate skin cover was achieved, interlocking nailing was performed. Post operatively he developed a discharge from the wound over the distal tibia, which yielded staphylococcus aureus on culture. This failed to heal despite regular debridements and antibiotic therapy, and became a chronic sinus. He was advised to bear partial weight, and union progressed to a stage where he was advised to undergo nail removal at 1 year. He was lost to follow up, but he presented in 2004, still complaining of a persistent discharging sinus for the past 4 years. He admitted to taking short courses of antibiotics, oral and parenteral, which suppressed the discharge for short intervals. On present examination, there was a discharging sinus over the anteromedial aspect of the tibia at the junction of the middle and lower thirds of the left leg. Radiographs showed bony union at the fracture site but a sequestrum was seen lying near the anterior cortex (Fig. 1). Nail removal, debridement of the sinus and sequestrectomy were planned.

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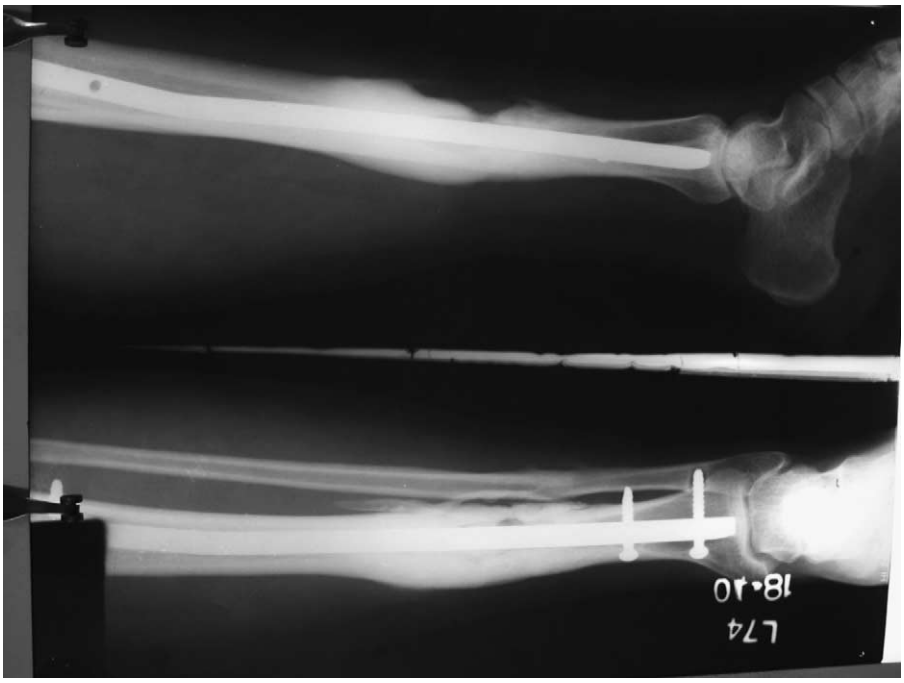

Figure 1 Radiographs of the affected extremity (AP and lateral views) showing solid bony union at the fracture site and a sequestrum lying near the anterior cortex.

Two days after admission he complained of pain in the leg. Local examination revealed oedema and redness around the sinus, which was thought to be an acute flare up of the underlying chronic osteomyelitis. The involved area was exquisitely tender. He was started on intravenous antibiotics (cefazolin and gentamicin), but the erythema and swelling spread to involve the whole of the leg and thigh over the next 48 h. Presuming it to be a locally spreading abscess, we arranged incision and drainage under local anaesthesia. On incising the skin, there was abundant serosanguinous discharge. The deep fascia had a typical dull greyish appearance, and the superficial tissues separated easily from the underlying fascia. Swabs were sent for microscopy, culture and sensitivity.

Over the next 24 h, the skin started showing signs of haemorrhagic blisters and necrosis. The only significant systemic clinical signs were tachycardia in the absence of fever and a decreased urine output. Blood investigations revealed raised urea and creatinine. The total leukocyte count was 20.3×10^9 /L with a shift to the left. Under GA, all the necrotic tissue was debrided (Fig. 2). The antibiotics were changed after the preliminary culture results grew staphylococcus sensitive to

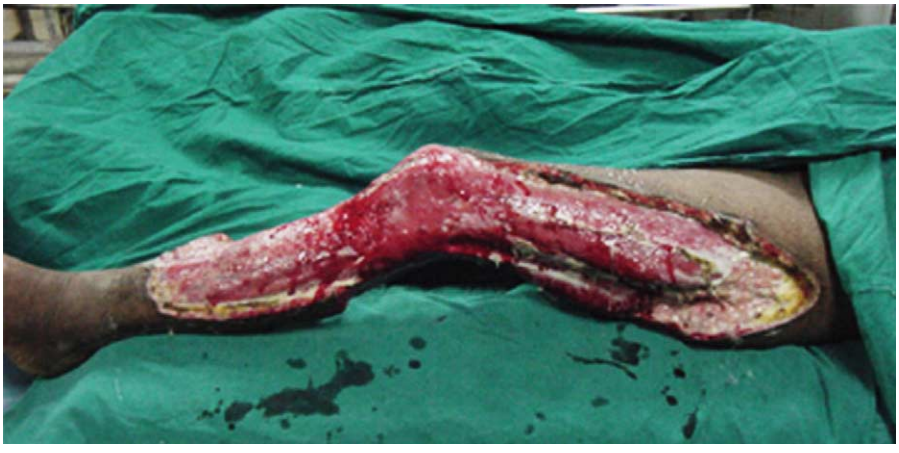

Figure 2 Photograph of the affected extremity showing extensive necrosis of skin and fascia involving the entire leg and thigh.

penicillin. Twenty-four hours after the first debridement, the patient developed icterus, the haemoglobin levels dropped to 6.5 g/dL and the platelet counts were 110×10^9/L. Liver function tests were deranged with total bilirubin of 4.9 mg/dL and liver enzymes were raised to three times their normal values. Supportive therapy in the form of blood transfusion, fluid management and O_2 inhalation was instituted. Further debridement was performed within 24 h of the first debridement and this time the interlocking nail was also removed, along with the remaining necrotic tissue. The clinical condition improved within 2 days of the second debridement and the biochemical parameters returned towards normal by the end of 5th day. Within two weeks, the wounds granulated with simple daily dressings. Split skin grafting was used to cover the extensive defects. Knee mobilisation was encouraged once the graft had been taken up. At the final follow up after six months the patient had a full range of motion in the knee.

Discussion

Necrotising fasciitis begins in a localised area, but spreads rapidly to involve the surrounding areas extensively. In the early stages, clinical signs are few and a high index of suspicion is required to diagnose the condition.[13,15] Local pain out of proportion to the clinical condition is the most consistent early finding.[1,13,15] Local swelling, tenderness and erythema, fever and hypotension are also usually present.[11,13,15] Frank skin necrosis with blistering appear in later stages making the diagnosis more obvious.[13,15]

The clinical spectrum of the disease may range from fulminant to subacute forms.[6] The use of broad spectrum antibiotics prior to admission may modify the clinical picture at the time of presentation.[11] In our patient, the initial subacute presentation could be attributed to the infecting pathogen, staphylococcus aureus and the altered virulence of the infecting pathogen due to repeated use of antibiotics by the patient. Patients may present with multiorgan failure and shock which is associated with a higher mortality.[4]

Necrotising fasciitis is usually a polymicrobial infection;[4,15] monomicrobial necrotising fasciitis is rare and mainly caused by group A streptococcus.[4,11,15] Staphylococcus aureus has been reported to occur mainly in combination with streptococcus.[4,15] Isolated staphylococcal infections resulting in necrotising fasciitis are only few.[3,10]

The infections mostly affect the elderly with comorbid conditions like diabetes mellitus, peripheral vascular disease, alcoholism with chronic liver disease, and cancer with immunosuppression.[5,15] The disease may affect healthy individuals with no predisposing illness.[1,2,12] The initial event is usually blunt trauma, pre-existing ulcers and bedsores, and postoperative infection.[4,5,11,15] Rare portals of entry include snakebite, strangulated hernia, IV lines, burn injury, insulin injection sites.[15] Necrotising fasciitis secondary to an infected interlocking nail has never been reported.

Patients with necrotising fasciitis require early and aggressive surgical debridement and IV antibiotics. Second debridement is usually necessary.[13] Biopsy from the suspected lesion is the only way to firmly establish the diagnosis, but can only be used where frozen section is available.[11] Attention should be paid to the clinical signs at the time of debridement. The serosanguinous discharge, greyish necrotic fascia and ease of dissection between the subcutaneous tissues and fascia clinch the diagnosis.[11,15] Cultures should be sent at the initial debridement, broad spectrum antibiotic therapy should be instituted, and may be changed according to the microbiological findings.[4] The mortality increases once the diagnosis and surgical debridement is delayed.[15] Other factors contributing to the increased mortality are old age and the presence of two or more co-morbid conditions,[15] the presence of multiorgan failure at the time of admission, elevated blood lactate/serum creatinine and body surface area involved.[4] Our patient survived despite the development of systemic features. This may have been partly due to his younger age, staphylococcus aureus being the pathogenic organism[3,10] and the altered virulence of the pathogenic organism.

In conclusion, necrotising fasciitis can affect young individuals with an underlying chronic infection and the presentation may be subacute. Early diagnosis is crucial. Staphylococcus alone is a rare cause and may have a better outcome.

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