Case Report

A patient on haemodialysis with necrotizing fasciitis of the left arm

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Introduction

Necrotizing fasciitis is a rare aggressive infection of the soft tissues. The pathological hallmark of the condition is necrosis of fascia. Necrosis may extend to involve the subcutaneous tissue and, secondarily, skin and underlying muscle [1]. Over 70% of cases have polymicrobial infection as the underlying factor, with synergistic aerobes and anaerobes involved.

Whilst there are reports of acute renal failure occurring in the presence of necrotizing fasciitis, descriptions of this condition in patients with chronic renal failure are rare in the literature. Hence we report a case of necrotizing fasciitis of the left arm in a patient with multiple medical problems including end-stage renal failure, where initial infection of the native venous outflow from an arteriovenous (AV) dialysis fistula was felt to be the precipitating factor.

Case report

A 69-year-old male with end-stage renal failure secondary to polycystic kidney disease presented acutely in April 1997 with pain and swelling in his left arm. Two days prior to presentation there had been difficulty cannulating the radiocephalic arteriovenous fistula with needles for haemodialysis. Comorbid medical conditions included ischaemic heart disease, non-insulin-dependent diabetes, chronic obstructive airways disease, and arthritis. Past operations included coronary artery bypass surgery in 1985 and 1996, partial nephrectomy, angioplasty of the right femoral artery, AV graft left thigh, and left forearm AV fistula. The left thigh AV graft was removed in 1996 for methicillin-resistant Staphylococcus aureus (MRSA) infection. Medications included aspirin, digoxin, prednisone, calcium carbonate, salbutamol, ipratropium bromide, and erythropoietin. Allergies included penicillin, cephalexin, and sulpha drugs. He was an ex-smoker. Family history was positive for polycystic kidney disease and ischaemic heart disease.

Physical examination revealed a febrile patient with a temperature of 38.2 °C. Pulse rate was 100/min and blood pressure was 130/80 mmHg. Bilateral basal crepitations were audible on auscultation of the chest. The left arm was diffusely swollen with erythema around the cephalic vein in the upper arm. The AV fistula, although not palpable, had an audible bruit.

Biochemical investigations of note included a serum potassium of 6.3 mmol/l, serum creatinine of 818 μmol/l and serum urea of 27.6 mmol/l. The leucocyte count was 11.5 × 10⁹/l. Bacterial cultures both of the recent dialysis needle puncture site in the upper arm, and of the urine grew MRSA. Blood cultures were negative. Chest X-ray revealed mild pulmonary oedema. A Doppler ultrasound scan of the left arm AV fistula revealed an aneurysm of the cephalic vein in the upper arm plus a stenosis of the vessel at the level of the antebrachial fossa.

Intravenous antibiotic treatment consisting of vancomycin (1 g), and gentamicin (60 mg b.d.) was commenced. Haemodialysis was performed via an indwelling Vascath. Persistent hypotension on day 2 necessitated intensive care admission. 48 h later purulent discharge occurred from the most recent needle site in the left upper arm. The patient was taken to the operating room where the cephalic vein was excised from the upper arm and surrounding pus drained. Tissue biopsy culture grew S. aureus sensitive to fluclaxacinilin. The patient’s overall condition improved and he was transferred to a ward from ICU, however the arm oedema was slow to settle. On day 10 increasing left arm pain with oedema and cellulitis was evident along with spontaneous discharge of pus from the antebrachial fossa. On return to the operating room for exploration of the arm, it was discovered that necrotic deep fascia and large amounts of pus were present in the medial aspect of the arm from the mid-forearm to the distal axilla. All necrotic tissue was excised via three incisions, and biopsies sent for culture and pathology. The majority of overlying skin and adjacent...
Discussion

The necrotizing fasciitis that occurred in this patient probably originated in needle cannulation of the AV fistula in the left arm. The condition is now regarded as one of the variants of a range of necrotizing soft-tissue infections [1,2]. It can occur in any region of the body including limbs, perineum, and trunk [3–5], and has been related to previous abdominal surgery, skin ulcers, and trauma, including needlestick injury in intravenous drug users [4,6,7].

Pain in the affected region accompanied by oedema and cellulitis are commonly seen in patients with necrotizing infection [3,4]. However in this case, apart from actual skin breakdown in the antecubital fossa none of the other skin changes described (ecchymosis, blisters), nor crepitus. The last reflects the fact that there was an absence of gas-producing organisms in our patient.

Antibiotic treatment was modified to include metronidazole, ciprofloxacin, and fluconazole. Cultures of the pus and tissue grew *S. aureus* sensitive to flucloxacillin. On day 12 during planned reoperation, necrotic fascia was debrided from the left axilla, including the fascia overlying the neurovascular bundle up to the level of the first rib. The patient remained stable and with an intensive dressing regimen no further necrotizing infection was evident in the wound margins. A check CT scan of the chest and upper arm on day 15 revealed post-surgical changes in the axilla (Figure 1) and bilateral pleural effusions. By day 21 the wounds were beginning to granulate well (Figure 2).

On day 38 partial primary wound closure and split skin grafting was performed on the left arm wounds (Figure 3). However, by day 43 repeated episodes of prolonged angina were occurring, and in addition a large sacral pressure ulcer became apparent. The patient died 61 days after admission from hypotension secondary to ischaemic heart disease.
cardiovascular disease, and obesity are recognized comorbid factors for necrotizing infection, all associated with increased mortality [3,4,9]. Severe renal disease in diabetics, a markedly raised blood urea nitrogen on presentation, or the development of acute renal failure have all been implicated in mortality [8–10]. In our case most of these comorbid conditions were present and although the necrotizing infection of the arm was able to be managed successfully, the patient succumbed to complications of ischaemic heart disease 2 months after initial presentation.

References


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