CASE REPORT

A misdiagnosed burn: necrotising fasciitis in an elderly patient

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SUMMARY

A 91-year-old man was admitted having been found unresponsive in his bed. He was previously well, but had sustained a laceration over the dorsum of his forearm after a recent fall. Initial appearances were innocuous, and suggestive of a superficial wound infection. A review of the wound by the plastic surgeons led to the diagnosis of a full-thickness burn, despite a lack of supporting evidence in the history. No clinician who had initially assessed the patient was involved in his ongoing care. Rapid clinical deterioration ensued, with sepsis and deteriorating mental state. Necrosis spread rapidly up his arm, and the diagnosis of necrotising fasciitis was made. The patient was urgently taken to theatre for circumferential excision of the necrotic tissue. He was subsequently managed on the intensive care unit where he made a promising initial recovery, but later died from pneumonia in the ward.

BACKGROUND

Necrotising fasciitis is a rare yet extremely serious soft tissue infection, which if not diagnosed promptly can lead to rapid clinical deterioration and death. It is estimated that there are approximately 500 cases of necrotising fasciitis per year in the UK.¹

The key to successful diagnosis is a low threshold of clinical suspicion of what may initially present with non-specific symptoms: pain, fever and malaise. Visible skin changes may only appear late, after 5 days or later. In the past, differential diagnoses have included haematoma, bursitis, phlebitis, sciatica, cellulitis, septic arthritis or deep venous thrombosis.² We report an unusual addition to this list: a full-thickness burn.

Rapid clinical deterioration invariably ensues with signs of septicaemia, areas of skin infarction and severe pain that may appear disproportionate to the initial clinical appearance. Once necrotising fasciitis is suspected, immediate plans for surgical exploration and debridement are imperative. In the interim, prompt fluid resuscitation, intensive care input and broad spectrum antibiotic therapy should be instated. Even with surgery, mortality is 20–40%.^{3 4}

CASE PRESENTATION

A 91-year-old man was admitted under the physicians' care having been found unresponsive in his bed at home. On arrival he was lucid enough to provide a history of being recently well with no significant medical history. He was the main carer for his elderly wife, and was usually fully independent.

He was noted to have a slightly cellulitic laceration over the dorsum of his right forearm which he reported was from a fall a week previously. A review by the plastic surgeons resulted in advice to allow the wound to heal by secondary intention after being thoroughly cleaned. The following morning, a further review was requested from the plastic surgeons as his wound now looked blistered. A different surgical team reviewed the wound, and found there to be significant desquamation over the forearm, with thrombosed superficial veins. The patient was confused and incoherent, and appeared to be in pain though the affected area on the forearm seemed insensate.

INVESTIGATIONS

Inflammatory markers were only mildly elevated on admission with a C reactive protein (CRP) of 33 and white cell count of 6. Creatine was elevated at 158. The following day after the correct diagnosis was established, the CRP was found to have risen to more than 156, with a creatine of 200. An arterial blood gas demonstrated a metabolic acidaemia

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Figure 1 Preoperative appearance of dorsal aspect of patient's upper limb.

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with pH 7.26, lactate of 2.1 and base excess of -10 . Blood cultures later yielded *Streptococcus pyogenes*, sensitive to a range of antibiotics including penicillin G.

DIFFERENTIAL DIAGNOSIS

The appearances were clinically suspicious for a full-thickness burn. The surgical team wondered whether the elderly patient had an underlying cognitive impairment, and had inadvertently burned himself at home. Advice was given that the regional Burns Unit would be contacted regarding ongoing management. An hour later the surgical team was contacted again, and informed that the wound now looked worse. On review, the patient was floridly septic, with progression of erythema and desquamation to the upper arm (figures 1 and 2). The clinical and biochemical picture was that of a necrotising fasciitis, and the patient was urgently prepared for surgery.

TREATMENT

Initial management was with intravenous fluid resuscitation and urinary catheter insertion. Intravenous flucloxacillin was initially started for the wound but subsequently changed to co-amoxiclav to additionally cover a urinary source of infection. When necrotising fasciitis was suspected, advice was sought from the microbiologists who recommended the addition of clindamycin. The patient was urgently taken to the operating theatre where extensive circumferential excision of the skin, from mid-humeral level proximally to proximal inter-phalangeal joints of his hand distally, was undertaken (figures 3 and 4). The underlying muscle appeared healthy, and so further debridement was avoided. The area was washed and dressed and the patient subsequently transferred to the intensive care unit. Samples of tissue sent for microbiological analysis yielded a profuse growth of *S pyogenes*. Skin and subcutaneous tissue sent for histological examination confirmed extensive acute necrotising inflammation.

OUTCOME AND FOLLOW-UP

The patient was managed on the intensive care unit postoperatively for 12 days where he initially required vasopressor support. A review of his wounds on the unit on the first postoperative day revealed no further progression of necrosis. Split-skin graft coverage was performed on the fifth postoperative day. He developed ventilator-associated pneumonia while in the intensive care unit, which initially responded well to antibiotic therapy. He was transferred to the ward on day 12 for continuing rehabilitation but unfortunately deteriorated again with sepsis from his pneumonia and died 3 weeks after admission.

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Figure 2 Preoperative appearance of volar aspect of patient's upper limb.

DISCUSSION

Necrotising fasciitis is a rapidly progressive soft tissue infection where delays in diagnosis significantly increase mortality.^{5–7} The management involves early debridement and broad-spectrum antibiotic therapy with cardiovascular support as necessary.

Many patients who develop necrotising fasciitis have a history of pre-existing conditions that leave them susceptible to infection. Local factors include trauma, recent surgery, intravenous drug abuse, chronic venous ulceration and superficial skin infections. Local trauma can be trivial, such as a laceration, insect bite or abrasion.⁸ Systemic factors such as advanced age, diabetes mellitus, chronic renal failure, peripheral vascular disease or any cause for immunosuppression, are also known risk factors.⁶

Although burns are a recognised risk factor for the condition, it is unusual for an area of necrotising fasciitis to be mistaken for a burn. In our case, the clinical appearances were initially similar to that of a burn, but the rapid physiological and cognitive deterioration in conjunction with evolving signs around the arm suggested an alternate diagnosis. The patient was promptly reviewed, urgent resuscitation was started and he was transferred to the operating theatre.

Several factors contributed to the initial misdiagnosis. First, the medical and surgical teams reviewing the patient on the second day of admission had not seen the wound on initial presentation. It was subsequently dressed and obscured from view until the dressings were changed the following morning. While the findings were noted to be different to that previously documented, the extent of progression was not appreciated. Only when the surgical team returned for a further review on the

Figure 3 Postoperative appearance of dorsal aspect of patient's upper limb.

Figure 4 Postoperative appearance of volar aspect of patient's upper limb.

second day of admission was the rapidly evolving nature of the infection appreciated. This raises the question of whether serial photographic records filed within the patient's case notes might have rendered the rapidly progressive nature of the condition more readily apparent.

Second the surgical team when confronted with a confused and incoherent elderly patient, mistakenly assumed that there was an underlying cognitive impairment and hence rationalised the possibility of an inadvertent burn. While his previously independent status was noted in his clerking history, this was overruled by the presumed diagnosis. Rather than compartmentalising the patient's issues into 'medical' and 'surgical' a more collaborative approach between medical and surgical teams might have prevented this 'snapshot' error where the context of the patient's previous clinical course was neglected.

Third, only a medical student who had initially clerked the patient was able to claim full continuity of care. She briefly questioned the diagnosis of a burn, but the opportunity to utilise her knowledge of the patient's presenting history and the appearance of his arm, was overlooked.

Learning points

- ▶ This case highlights the importance of detailed, accurate handovers and case note documentation, to ensure that clinicians subsequently reviewing the patient for the first time can appreciate a clinical deterioration.
- ▶ Clinicians should be wary of assuming pre-existing cognitive impairment in the elderly and infirm. Collateral history is invaluable.
- ▶ Clinicians should readily reconsider their diagnoses if new or discordant information emerges.
- ▶ Clinical photographs may be useful to objectively document appearances within the case notes. Patients' consent should be sought where possible.

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