



Case report

Patients with acute skin loss: are they best managed on a burns unit?

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Patients who are critically ill and have large areas of skin loss or breakdown present a difficult management problem. They require the combination of intensive therapy facilities to support failing organs and specialized skin care, sometimes including extensive debridement and reconstruction. The expertise required for both aspects of treatment are found uniquely on a burns unit. We present five patients with large areas of cutaneous loss or damage secondary to a variety of non-burn aetiologies who were managed on a burns unit. We suggest that a burns unit may be the most appropriate place for such patients to be treated during both the acute phase of their illness and the later stages of surgical reconstruction and physical rehabilitation.

Key words: Acute skin loss – Management – Burn unit

Case 1: Necrotizing fasciitis

A 37-year-old male was admitted to a district general hospital with a 7-day history of fever and a painful swollen left leg. The patient became rapidly unwell and a diagnosis of necrotizing fasciitis was made. He was started on broad-spectrum antibiotics and underwent debridement of the skin from the left leg and thigh, scrotum, penis and left anterior abdominal wall and chest to nipple level (30% of the total body surface area). Transverse loop colostomy was performed to divert the faecal stream. The patient required inotropic support, haemofiltration for acute renal failure and a tracheostomy for ventilation. Some 15 days after

admission, it was decided to transfer the patient to the regional burns unit for management.

On admission, the patient was ventilated, in renal failure and had lost skin over 30% of his total body surface area. The treatment in the burns unit consisted of continuing ventilation, haemofiltration and improving nutritional status (initially by total parenteral and subsequently by enteral feeding via a nasojejunal tube). An intensive daily wound care regimen was instituted and further surgical debridement of the wounds was performed. After 12 days, split skin grafting was carried out to cover all exposed wounds. The patient improved, ceased to require haemofiltration and was weaned off the ventilator. At 85 days after transfer, he was discharged

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home at which point all wounds were healed and the patient was beginning to mobilize. The loop colostomy was reversed 3 months after discharge.

Case 2: Inotropes and septicaemia

A 55-year-old female was admitted to the intensive care unit of a teaching hospital after developing sepsis following a dog bite. On admission, she had a disseminated intravascular coagulopathy, acute renal failure and hypotension. She was treated with broad-spectrum antibiotics and required ventilation, nitric oxide therapy, haemofiltration, plasmapheresis and inotropic support. Over the course of the next 48 h the patient developed areas of skin blistering over her legs and necrosis of the digits on both hands and both feet.

The patient was transferred to the Chelsea and Westminster Hospital 22 days after admission for management of her wounds and continuing respiratory and renal support. She had infarcted half of her digits and had areas of full-thickness skin loss on both legs (total body surface area 10%; Fig. 1). Her initial management consisted of nasogastric feeding and daily wound dressings. Some 20 days after transfer, the necrotic skin was surgically debrided and the non-viable digits were amputated. The patient underwent three further operations to skin graft wounds and to terminalise her digits. She required intensive wound care to achieve complete healing. After 81 days in the burns unit, the patient was discharged home with her wounds almost completely healed.

Case 3: Meningococcal septicaemia

An 18-year-old female was admitted to the intensive care unit of a teaching hospital with a diagnosis of meningococcal septicaemia. On admission she had a disseminated intravascular coagulopathy, renal failure and was ventilated. During the next 48 h, the patient developed distal necrosis of the lower limbs and required bilateral below-knee amputations. The patient remained on the ICU for 3 weeks during which time she had stabilised sufficiently for transfer to a district general hospital. She had developed necrosis of the fingertips and underwent skin grafting and debridement. Over the following 4 weeks, the patient continued to improve, but there was difficulty with mobilisation, wound care and analgesia with a high reliance on general anaesthesia for dressing changes. The patient was transferred to the burns unit to address these issues and to start rehabilitation.



Figure 1 Skin infarction secondary to septicaemia and inotropic agents.

On the burns unit, a strict regimen of dressing changes without general anaesthesia was enforced and mobilisation was commenced. All members of the burns team set specific deadlines with both the parents and the patient. With this regimen, the patient rapidly improved both physically and psychologically. Two weeks after admission, the patient was fit for discharge for out-patient prosthetic rehabilitation.

Case 4: Methotrexate toxicity

A 59-year-old male was admitted to a district general hospital with worsening psoriasis. He had been on



Figure 2 Methotrexate toxicity.

maintenance methotrexate but had not taken any for one week. A diagnosis of acute exacerbation of his psoriasis was made and he was given 10 mg methotrexate intravenously after which his condition worsened. He became systemically unwell, developed large areas of exfoliation over the whole of his body and became neutropenic and thrombocytopenic. Methotrexate toxicity was diagnosed from a skin biopsy and the patient was transferred to the burns unit.

On admission he was dehydrated, hypotensive and confused. He had a 35% total body surface area of epidermal skin loss. His management on the burns unit involved carefully regulated fluid resuscitation, administration of granulocyte-colony stimulating factor for neutropaenia, nasogastric feeding and physiotherapy. His wounds were managed with daily tulle gras dressings. Some 11 days after transfer, his skin areas were almost completely healed, his neutropaenia had resolved and he was discharged to the dermatology ward.

Case 5: Toxic epidermal necrolysis

A 58-year-old male alcoholic was being treated for a chest infection as an in-patient in a district hospital when he developed a wide-spread rash. This worsened over the course of 3 days and he became systemically unwell and was transferred to the intensive care unit. By this stage, he had 45% total body surface area of skin loss. A skin biopsy showed toxic epidermal necrolysis and the patient was transferred to the burns unit for further management.

On admission to the burns unit, aggressive treatment was not deemed to be appropriate due to the severity of the condition and the patient's pre-morbid state. He was managed palliatively with wound care and analgesia. The patient died 3 days after transfer.

Comment

During the acute treatment of a thermally injured patient, there is a requirement for intensive care skills, aggressive surgery and meticulous wound care. Once this initial phase of treatment has ended, the next aim is early rehabilitation with input from physiotherapists, occupational therapists, psychologists and social workers. All these services are found on a modern burns unit. It is an integrated team that provides the complete range of services for the management of a patient during their acute illness and early rehabilitation.

The non-burn conditions described present the same challenges as thermal injuries^{1,2} and require similar treatment. There are various management scenarios that correspond to different types of burns. There are conditions that behave like superficial burns and require non-surgical management with careful fluid resuscitation. Toxic epidermal necrolysis (TEN) behaves in a very similar manner to a superficial dermal burn.³ There are similar fluid shifts, hypermetabolism and high nutritional requirements.⁴ The most important initial aim is the prevention of secondary infection by good wound care, as this is the most common cause of death.⁵ TEN is commonly managed in burns units in the US.⁶ It has been shown that patients with TEN who are managed in a burns unit have a better outcome than those who are not.⁵

There are also conditions that correspond to deeper burns and require resuscitation, early debridement and skin coverage. Patients with necrotizing fasciitis need this kind of management.⁷ If a regimen of early debridement and skin coverage is followed, then mortality can be as low as 4%.⁷ If therapy is delayed or the debridement is inadequate, then mortality can be as high as 38%.

Some non-burn conditions, such as meningococcal septicaemia and infarction secondary to inotropic agents, may not require early surgery,⁸ but the sequelae may require extensive reconstructive surgery and rehabilitation.⁹ This is a similar scenario to electrical injuries, where there may be extensive soft tissue or limb loss that requires reconstruction. Finally, some patients with skin loss may have non-survivable injuries and may need admission for palliation of symptoms and analgesia. Patients with non-survivable burns are often admitted to

a burns unit for terminal care because it may be very distressing for non-burn staff to look after these patients. In addition, correct wound dressings can minimise the pain suffered by such patients before death.²

A burns unit is the most suitable environment to manage these patients for a number of reasons. The medical team on the burns unit is used to dealing with critically ill patients who need intensive care support. The team is well practised in taking such patients to the operating theatre and carrying out quick, aggressive debridements and skin grafting. There is easy access to the operating theatre as these patients, like burns patients, often require repeated operations. The extent of the patients' wounds and the size of the dressing changes can be difficult for normal nursing staff to cope with. It is our experience that burns nurses are the most suitable staff to deal with these complex wounds. Finally, a burns unit has, as part of the team, the allied staff to start early rehabilitation. This is a very important factor to ensure a good long-term outcome.

Patients with skin and soft tissue loss due to non-thermal causes can be managed outside a burns unit, but if they are, we believe that one of the elements of their care will be compromised. This is reflected in the fact that the outcome for some of these conditions is significantly worse if they are not treated on a burn unit.⁵ There are several settings when referral may be an advantage: (i) when patients are acutely unwell and require intensive care support and aggressive surgery; (ii) when patients require extensive reconstructive surgery and rehabilitation; and finally (iii) it may be reasonable to admit patients for symptom control prior to death. A burn unit may be an underused and

undervalued resource when dealing with these complex patients. Referral to a burns team should be considered as a treatment option by clinicians dealing with such cases.

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