Appendix 10 Recommendations for the treatment of skin ulcers, skin infection and problematic oedema

Changes in skin innervation, blood flow, interstitial fluid (oedema), the trophic constitution of the skin, and skin temperature can increase the risk of skin ulceration.[130] Some of these changes are often present in complex regional pain syndrome (CRPS). When ulceration occurs, this allows the entry and multiplication of microorganisms, so that patients are at risk of developing cellulitis and deeper tissue infections.

Assessment

In a patient with CRPS and skin ulceration in the affected limb, non-invasive Doppler studies should be used to exclude peripheral ischaemia.[130] For the lower limb, assessment of the ankle/brachial pressure index (ABPI) is essential to identify any ischaemic element, and should be carried out by someone trained in this technique, usually a nurse in tissue viability. Application of compression without taking into account the ABPI can result in gangrene.

Because all skin ulcers harbour skin microorganisms, swab cultures taken from patients with skin ulceration are usually positive. Positive swab cultures should not be treated unless there are signs of clinical infection.[131,132] Indication of infection includes systemic symptoms (eg fever and leucocytosis) or local signs such as spreading redness, warmth, induration, pain or tenderness. Erythema may be well demarcated or more diffuse. In severe cases, blistering/bullae, superficial haemorrhage into blisters, dermal necrosis, lymphangitis and lymphadenopathy may occur.[131,132]

Deep infection (eg necrotising fasciitis or osteomyelitis) has the risk of threatening a limb, and if suspected should be treated aggressively (see 'Management' below).

There is often a need to exclude underlying osteomyelitis, which may be suggested by bone destruction or periosteal reaction on plain X-rays, or if probing the wound using a blunt, sterile, stainless-steel probe one encounters bone,[133] but magnetic resonance imaging (MRI) is considered the imaging test of choice when osteomyelitis is suspected.[134] If osteomyelitis is suspected, the early intervention of an orthopaedic surgeon is essential.

Management

General measures such as adequate diet, ensuring adequate haemoglobin level, diabetic control and cessation of smoking should be emphasised where appropriate.[135]

The management of skin ulceration in CRPS follows general principles established for the management of diabetic foot ulcers. Removal of necrotic tissue, callus, infected or foreign material should be achieved by sharp debridement.[136] For deep or sloughy ulceration, weekly sharp debridement should be considered.[136] Pressure should be relieved using felted foam dressings and low-pressure garments (eg Alcast Walkers boots®, casts, or open shoes).

If infection is diagnosed on clinical grounds, then the choice of antibiotic should be based on the pathogens isolated from swabs, and if possible, tissue culture. The commonly useful broad-spectrum antibiotics are flucloxacillin in mild cases, with clindamycin, cephalexin, ciprofloxacin and amoxicillin-clavulanic acid (Augmentin) useful in more severe infection.[137] Soft-tissue infections require 10 days' therapy, while osteomyelitis may require more than 6 weeks of therapy.[130] Antimicrobial therapy in patients who do not improve can be guided by both skin biopsy,[138] which is more reliable than superficial swabs, and early advice from a bacteriologist/microbiologist.

In patients who have had at least two episodes of infection at the same site, prophylaxis with low-dose penicillin V or erythromycin (both typically 250mg bd) for a year should be considered.[139,140] Dressings that promote a moist wound environment should be the focus of care of chronic wounds.[140] Typically such dressings may include hydrocolloid dressings, or for wounds producing exudate, silver or iodine impregnated dressings, especially when infection is present.[141] Rarely platelet-derived growth factor[142] (Regranex®, Becaplerin gel®) or allogeneic cultured dermis (Dermograft®, Apligraf®) can be used in the wound dressing. While these have been shown in randomised controlled trials to promote wound healing in clean wounds, they are relatively expensive.

Where oedema is present in a patient with skin ulcerations, after full vascular investigation and since the oedema present in CRPS can foster both poor nutrition with consequent ulceration and superinfections when infection has been treated or excluded, appropriate compression bandaging should be used to disperse tissue fluid. The inclusion of the tissue viability and/or lymphoedema teams is crucial. Compression is usually achieved using wool (to even pressure and absorb exudate) and compression bandaging (eg Profore lite®, Profore®, Elset®) in spiral or figure of eight configuration, or graded compression hosiery, depending on vascular status. Other treatment for lymphoedema includes the use of intermittent pump compression (eg Flowpac® pump). Dermatologists should be aware that treatment with spinal cord stimulation (SCS) by pain specialists or neurosurgeons may reduce limb swelling in some cases.[104]

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