Venous Leg Ulcers

Appearance

Venous ulcers are usually large, shallow, painless and situated around the medial or lateral malleoli. They are associated with other signs of venous hypertension such as varicose veins, varicose eczema, haemosiderin pigmentation, atrophie blanche and venous flare. Oedema of the lower leg may be present and chronic venous stasis can lead to warty hyperplasia of the skin or thickening of the subcutaneous tissues.

Venous ulcers are caused by incompetent valves in the veins of the lower leg, especially in the perforators. These incompetent valves cause blood to be squeezed out into the superficial veins, when the calf muscles are contracted, instead of upwards towards the heart. Dilation of superficial veins occurs (varicosities) and the subsequent raised venous pressure results in oedema, venous eczema and ulceration. Valves may also become damaged following the venous hypertension that occurs in pregnant women and there may be congenital absence of valves.

Epidemiology

The prevalence in the UK is 1-3 per 1,000. It increases with age and reaches 20 per 1,000 in the 80-plus age group. There is no socio-economic predilection but ulcers take longer to heal in lower socio-economic groups. This may be due to difficulties in accessing evidence-based management, such as Doppler assessment and compression therapy.

Diagnosis

The diagnosis is usually made clinically. A leg ulcer is defined as the loss of skin below the knee on the leg or foot, which takes more than two weeks to heal.

History

The following history may suggest venous ulceration:

- Pre-existing varicose veins.
- Deep vein thrombosis.
- Phlebitis.
- Previous fracture, trauma or surgery.
- Family history of venous disease.
- Symptoms of venous insufficiency - for example, pains or heaviness in the legs, aching, itching, swelling, breakdown of the skin surface, pigmentation, eczema.

Features in the history which suggest a non-venous cause include:

- Family history of non-venous ulcers.
- History of: heart disease, stroke, transient ischaemic attack.
- Diabetes mellitus.
- Peripheral arterial disease or intermittent claudication.
- Cigarette smoking.
- Rheumatoid arthritis.

Examination

80% of all leg ulcers are venous ulcers and a large shallow relatively painless ulcer with an irregular granulating base in the ‘gaiter’ region of the leg (between the knee and ankle) is likely to be venous in origin. There may be surrounding stasis dermatitis.
Examination can help to rule out a number of differential diagnoses, as follows:

- **Arterial ulcer** - look for reduced pulses in the foot and ankle and possibly the femoral artery. These ulcers occur most commonly in areas of poor blood supply (eg, the tip of the toes or over the tibia) and are typically painful and deep. Other evidence of poor blood supply may include peripheral cyanosis and claudication.
- **Neuropathic ulcer** - this is painless and deep, often with overlying hyperkeratosis. It occurs at sites of loss of nerve supply and recurrent trauma, ie the heel and the metatarsal heads.
- **Malignancy** - malignant ulcers in this area are rare but the possibility should not be overlooked. Watch out for an ulcer with a rolled everted edge. If ulceration occurs in the area of scar tissue, Marjolin's ulcer should be considered.[6] Chronic venous ulcers can develop into malignant ones, so any non-healing ulcer should be referred for biopsy.
- **Rheumatoid ulcer** - these look a bit like arterial ulcers and are sharp, deep, well-demarcated ulcers with a punched-out appearance. They occur typically on the dorsum of the foot and calf and may be slow to heal. Venous ulcers also occur in rheumatoid patients, so the differentiation may be difficult. It is, however, worthwhile referring suspected rheumatoid ulcers to a rheumatologist, as such ulcers often respond well to a disease-modifying antirheumatic drug (DMARD).

**Investigations**

By the very nature of epidemiology, the patient may be elderly, frail and with reduced mobility, so that investigations in these circumstances may be limited. Primary care clinicians are advised to liaise with local community services to see what is available. Skilled nurses may well be able to carry out at least some of these investigations in the community.

Prevailing guidelines recommend the following:[1, 3]

- **Measurement of ankle brachial pressure index (ABPI) using Doppler** - this is to exclude an arterial ulcer.[6] A blood pressure cuff is applied to the lower calf muscle just above the ankle. A Doppler ultrasound probe is placed over the dorsalis pedis artery. The maximum cuff pressure at which a pulse can be heard is then recorded. The figure is then expressed as a ratio of the systolic pulse measured at the brachial artery. An index of 0.80 or less suggests significant peripheral arterial disease. In these cases, the Scottish Intercollegiate Guidelines Network (SIGN) recommends referral to a vascular specialist.
- **Measurement of the surface area** - this gives an indication of rate of healing or failure to progress.
- **Swabs for microbiology** - this is only necessary if there are clinical signs of infection such as cellulitis.
- **Patch testing** - if there is associated dermatitis, chronic ulcer patients should be referred for patch testing using what is known as the 'leg ulcer series'. This is a group containing the kind of allergens to which a leg ulcer patient would be exposed - eg, chemicals contained in leg ulcer dressings.
- **Biopsy** - if the ulcer has an atypical appearance or fails to heal after twelve weeks of active treatment.
- **Other tests** - if an alternative or additional cause for the ulcer is suspected, consider other tests such as FBC, ESR, CRP, albumin, HbA1c, autoantibody screen and clotting and haemoglobinopathy screen.

**Primary care management**[1, 3]

- **Graduated compression** - before this treatment is tried, diabetes, neuropathy and peripheral arterial disease should be excluded and pre-existing swelling controlled by bed rest or elevation. The treatment involves applying bandages to the leg, maximising the pressure at the ankle and gaiter area and reducing the pressure as one goes higher up the leg. This helps to control or reverse venous insufficiency. There are many options available in terms of types of dressing, number of layers and whether to use elasticated or non-elasticated bandages. For uncomplicated venous ulcers, SIGN recommends an elasticated multi-layer dressing (wool padding, dressing to keep padding in place, elasticated bandage and outer cover). This approach was confirmed by a Cochrane review. This review also found that four-layer dressing promoted faster healing than short stretch bandaging.[7]
- **Debridement and cleaning** - adherent slough should be debrided and any trapped pus released. Somewhat surprisingly, a randomised study found that cleaning traumatic soft tissue wounds with tap water resulted in a lower rate of infection than if sterile saline was used.
- **Dressing** - the treatment of choice for most vascular ulcers is an occlusive hydrocolloidal dressing which allows for epithelial cell migration and the influx of leukocytes and moisture. A Cochrane review found that alginate dressings were similarly effective.[8] Topical growth factor has also been used to promote healing.
- **Antibiotics** - these are not indicated for uninfected ulcers.[9] If there is clinical suspicion of infection (eg, the presence of cellulitis), a swab should be taken and oral antibiotics instituted. Topical antibiotics can cause sensitivity and there is no place for them, except for metronidazole gel, which may be useful for malodorous ulcers.[10]
- **Pentoxifylline** - this is recommended at a dose of 400 mg tds for the treatment of chronic venous ulcers. An ulcer is deemed chronic if it fails to respond to first-line treatment after four weeks. It should be given for six months. It is thought to improve the microvascular circulation.
- **Topical steroids** - a moderately potent steroid (eg, clobetasone) may be helpful in treating surrounding venous (stasis) dermatitis. Persistent dermatitis which fails to respond to treatment suggests an iatrogenically-induced allergy and is an indication for patch testing.
- **Aspirin** - a Cochrane review could not find sufficient evidence to come to a conclusion about the risks and benefits of aspirin as an adjunct to compression bandaging. Further research is required.[11]

**Prognosis**

Better results can be expected if the patient is mobile, able to walk and has no significant comorbidities.

**When to refer**[1, 3]
Referral is indicated in the following situations:

- After failure to respond to two weeks of primary care treatment.
- Diabetes mellitus.
- Peripheral arterial disease (ABPI <0.8).
- Rheumatoid ulcer.
- Suspicion of malignancy.
- Atypical distribution of ulcers.
- Dermatitis resistant to topical steroids.
- Patients who may benefit from venous surgery or skin grafting.
- Failure to progress (especially in patients with significant comorbidity).

Intermittent pneumatic compression\[13\]
A Cochrane review found that this improved re-ulceration rate but found no evidence to support the selection of any particular type, length or brand.

Hyperbaric oxygen therapy
This is being increasingly used but further research is needed to confirm its benefits.\[14\]

Clinical Editor Notes (July 2017)
Dr Hayley Willacy draws your attention to a recent review of topical haemoglobin spray - Granulox\[15\]. RCT and observational study evidence has been presented to support the use of this spray, with further supporting evidence provided from case series data. Within both RCTs, the primary endpoint was met and no treatment related adverse events were reported. However, limitations surrounding the studies should be acknowledged, particularly potential methodological weaknesses in the observational studies. The economic evaluation presented provides evidence that Granulox® is likely to be effective and produce resource savings.

Venous surgery
This is indicated in the following situations:\[16\]

- The patient is fit for surgery (local anaesthesia if necessary).
- There is sufficient mobility to activate a calf muscle pump.
- The patient is prepared to attend hospital for investigation and surgery.
- Obesity is controlled (body mass index <30).
- Superficial venous incompetence: no deep venous incompetence on duplex imaging, or predominantly superficial venous incompetence on ambulatory venous pressures with tourniquet occlusion of the superficial veins.

Skin grafting
Pinched skin grafting may be indicated in patients with extensive areas of ulceration. This has been done successfully by nurses in the community who have been trained in the technique.\[16\] However, a Cochrane review has found that further evidence is required to support the use of skin grafting apart from bilayer artificial skin which was supported by evidence. Trials showed that bilayer skin grafts were effective when combined with compression bandaging.\[17\] For complicated ulcers, artificial dermis combined with a thin skin graft has shown promising results.\[18\] A minced skin graft has also been developed which is faster than the pinched skin method and may produce better cosmetic results.\[19\]

Prevention\[3\]

Primary prevention of venous insufficiency
Avoidance of prolonged standing or sitting, control of risk factors (eg, obesity) and use of compression hosiery when there are early signs of venous insufficiency (eg, stasis dermatitis) can all help to prevent the development of ulcers.

Secondary prevention of a recurrent ulcer
- Correctly fitted compression hosiery should be worn for five years after an ulcer.
- Underlying comorbidities - eg, diabetes, rheumatoid arthritis - should be managed appropriately.
- Vascular surgery should be considered if the patient fits the criteria (see above).

Further reading & references
- Venous Ulcer Guideline; Association for the Advancement of Wound Care (AAWC) (2010)
1. Leg ulcer - venous; NICE CKS, February 2016 (UK access only)
3. Management of chronic venous leg ulcers; Scottish Intercollegiate Guidelines Network - SIGN (August 2010)
15. Granulox® haemoglobin spray - Innovative Medical Technology Overview: Number 006/2016; Healthcare Improvement Scotland

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