

# Managing a patient's symptoms in bilateral arterial leg ulceration

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Arterial ulceration of the lower limb accounts for approximately 9–22% of all cases of leg ulceration (Briggs and Closs, 2003). Hankey et al (2006) found that 20% of adults over the age of 55 are affected by peripheral arterial disease (PAD), which is a powerful predictor of myocardial infarction, stroke and death due to vascular causes.

## Atherosclerosis

Atherosclerosis is the most common cause of insufficient arterial blood supply to the lower limbs and is caused by the deposition of fatty material on the walls of blood vessels. These fatty deposits form plaques that lead to a narrowing of the lumen, increasing resistance to blood flow. Atherosclerosis may also lead to thrombi and emboli and consequently, ischaemia (Rose, 1991).

The commonest sites for atherosclerosis in the lower limb are the lower superficial femoral artery and the aortic segments, with multiple segment involvement occurring in about 7% of cases (Morison, 2006). The degree of ischaemia and the symptoms experienced depend not only on the site of the occlusion, but also on the presence or absence of effective collateral circulation. Occlusion may occur in major or more distal arteries (Morison and Moffatt, 2004).

At rest, an individual may be able to tolerate up to 70% occlusion of an artery in the lower limb without being aware of any effects. However, when walking, the increased demands for oxygen in the muscles cannot be met, causing severe pain known as intermittent claudication.

Many older people experience some degree of atherosclerosis and with an ageing population, the incidence of arterial and mixed aetiology leg ulceration is bound to rise. Risk factors for developing atherosclerosis are also related to lifestyle, including smoking, hypertension, hyperlipidaemia, obesity and diabetes. The symptoms include pain, exudate and odour, and these are compounded by a reduction in mobility and activities of daily living, all of which can have a negative effect on patients' social and psychosocial wellbeing (*Table 1*) (Moffatt et al, 2008).

## Oedema

Oedema in the lower limbs hampers the ability of any ulcer to heal by increasing the diffusion distance between blood capillaries and the tissues they serve (Butcher, 2006; Hedger, 2008). The tissues become starved of oxygen and nutrients and metabolic waste products build up. Nurses often promote elevation in patients with arterial disease, as they believe that this will help to reduce the oedema. However, this is often not well tolerated because it causes more pain as the blood flow is reduced further.

Renal oedema presents in much the same way as cardiac oedema and can occur in patients with uncontrolled renal failure (Moffatt et al, 2007). Oedema can be pitting and extend to the thighs on both legs. Patients can complain of breathlessness on exertion and lying down. If left untreated, renal oedema can cause blistering of the skin and lymphorrhoea, which damages the skin and causes further ulceration. Dependent oedema occurs in patients with immobile limbs that are left hanging downwards. Some of the worst cases of oedema are found in those who do not go to bed at all, but perhaps spend the night in a seat or sofa (Hedger, 2008).

## Slough

Wounds can be classified by the colour and nature of the tissue within their margins. A wound bed that appears yellow or grey is often referred to as 'sloughy' (Tong, 1999). Slough is a soft, devitalised tissue composed of fibrin, pus and significant volumes of proteinaceous material (Thomas, 2001). The presence of slough can slow the healing process by prolonging the inflammatory stage and providing a reservoir for infection (Tong, 1999; Schultz et al, 2004).

## Exudate

When slough is present, high levels of exudate can be caused by systemic and regional factors and oedema (Butcher, 2006). A large amount of exudate can be secondary to excessive fluid in the extracellular tissues (World Union of Wound Healing Societies [WUWHS], 2007). This fluid (known as transudate) can drain out through the wound resulting in increased fluid levels. This may be linked to conditions such as cardiac oedema or renal failure, or

**Table 1**

Clinical signs and symptoms of arterial problems (Bristol Community Health leg ulcer care pathway)

### Signs

- ▶▶ Intermittent claudication
- ▶▶ Ischaemic rest pain

### Symptoms

- ▶▶ Coldness of the foot
- ▶▶ Poor tissue perfusion — purple/pink on dependence, pale on elevation
- ▶▶ Atrophic, shiny skin
- ▶▶ Loss of hair on the lower limb
- ▶▶ Muscle wasting
- ▶▶ Thickened toe nails
- ▶▶ Gangrene
- ▶▶ Unable to palpate pulses: absent or abnormal

simply be localised oedema. Regional factors such as primary and secondary lymphoedema, venous hypertension and postoperative oedema will need more localised management (Butcher, 2006), and local factors, such as the rehydration of slough, may contribute to high levels of exudate.

Exudate can have a damaging effect on the skin (Vowden and Vowden, 2003), not only extending the margins of a wound, but also causing maceration and excoriation. When fluid stays in contact with healthy skin for long enough, the keratinocytes begin to absorb fluid and swell (although keratinocytes usually recover once they have an opportunity to dry out). Many dressings do not have the capacity to cope with the abundance of exudate from an oedematous leaking limb (WUWHS, 2007). Keratinocytes are unable to recover if the dressing cannot keep exudate at bay, leaving the tissues weak and prone to trauma or further damage.

### Management

Arterial leg ulcers are a symptom of an underlying disease process, and management usually relies on correcting this with angioplasty or vascular surgery where possible. Compression bandaging is contraindicated in the presence of arterial disease (where the ankle brachial pressure index [ABPI] is below 0.8.). However, in the author's wound care service, reduced compression with careful supervision has been successfully applied in patients who have an ABPI as low as 0.5, but this is not practised in all wound care services.

Managing highly exuding wounds is one of the most commonly cited clinical problems (Fletcher, 2002). High levels of exudate cause problems when selecting dressing products that are capable of handling fluid levels and preventing damage to the surrounding skin. Fletcher (2002) states that leakage of exudate through dressings not only increases the

risk of cross-infection, but also causes distress from soiling of clothes and bedding and the resultant malodour.

For venous ulceration the gold standard of treatment is compression to reverse venous hypertension and reduce oedema (Royal College of Nursing [RCN], 2006). However, for many patients with significant arterial disease, compression is not indicated and where surgical intervention is not appropriate, community nurses are often left to manage the symptoms. These nurses may only have the GP for support, as many trusts do not have leg ulcer services or leg ulcer nurse specialists. This was certainly the case in the author's trust until four years ago.

### Case report

This case report details the management of Ms T, a 74-year-old female who had arterial leg ulceration and oedema. She was managed by the district nursing team and a clinical nurse specialist.

Ms T sustained a laceration to her left lower leg in August 2008. The wound was located above the lateral malleolus and was compounded by the fact that Ms T had bilateral chronic oedema, which caused the wound to enlarge. Ms T's oedema had also caused blistering on her right leg.

As this was Ms T's first episode of leg ulceration she was not known to the district nursing team. Her past medical history and medication is detailed in Table 2. Ms T also smoked moderately.

Ms T was originally seen by the practice nurses who treated her leg wounds with foam dressings. They were advised by the author to re-refer her for a further vascular review as the wounds were deteriorating. The previous vascular assessment a few years earlier had shown that Ms T had arterial disease and was suffering from

intermittent claudication (IC); the ankle brachial pressure index (ABPI) result being 0.4 on both legs. This indicated that only about 40% of her resting arterial blood flow was reaching her feet. Due to these results, which were confirmed by the vascular department in the discharge letter, the author did not feel the need to perform a further Doppler scan.

An angiogram (repeated as an inpatient in February 2009) revealed the poor state of Ms T's arteries and for this reason surgical vascular intervention was ruled out.

Ms T was admitted to hospital soon after the request for a vascular referral in January 2009 due to renal failure and anaemia and had to be dialysed. Chronic kidney disease has been well established as a risk factor for cardiovascular disease (Shilipak et al, 2008), and studies have also suggested that atherosclerosis has a role in kidney disease in older people. Older people with chronic renal disease have been found to develop

**Table 2**  
Past medical history and medication

- ▶▶ Hypertension
- ▶▶ Osteoarthritis in hands
- ▶▶ Intermittent claudication
- ▶▶ Peripheral vascular disease (PVD)
- ▶▶ Acute renal failure
- ▶▶ Smoking
- Medication:
- ▶▶ Paracetamol, aspirin
- ▶▶ Hydromorph
- ▶▶ Temazepam
- ▶▶ Durogesic
- ▶▶ Simvastatin
- ▶▶ Ondansetron



Figure 1. Leg ulcer on the right leg at assessment in March 2009.

atherosclerotic plaques in the renal arteries, which may compromise renal perfusion (Kasiske, 1987; Shilipak et al, 2008).

When Ms T was discharged from hospital in February 2009, both of her legs had developed ulcers. These were large in circumference and demonstrated 100% slough in the wound beds (Figures 1 and 2). Wound dressings were the only treatment she had received for these ulcers while an inpatient.

Ms T was unable to attend the treatment room at her GP surgery as her general health and mobility had decreased, rendering her housebound and reliant on visiting services. The

district nurses from her GP practice were unable to visit as Ms T lived outside the practice's catchment area. (GPs sometimes change their catchment area and it is not until a patient needs a district nurse visit that this is identified.) Ms T was forced to change her GP so that district nurses could visit.

An occupational therapy assessment was performed on Ms T's return home. This concluded that the bed be brought downstairs and that she would live on the ground floor of her home. The bed was also raised with bed blocks and the resettlement team were to input care. The resettlement team also monitored Ms T's discharge and helped with her social and physical needs (this would continue for up to six weeks post

discharge), as well as planning a home care package.

Ms T also developed mobility issues due to pain and frailty and her heavy legs — her feet were covered in padding and bandages and were often wet and cold within hours of being dressed by the district nurses.

The author became involved in Ms T's care once she had been discharged from hospital, as the district nurses contacted the wound care service for advice and support.

#### Presenting features

Ms T presented with arterial leg ulcers caused by insufficient blood supply, which resulted in pain, tissue loss, slough, and high exudate, causing further wound breakdown. IC had been diagnosed when she was an outpatient a few years earlier. Ms T was also unable to mobilise well and after her return from hospital could only move from chair to bed.

An assessment of Ms T's pain was carried out by the author at the first visit using a numerical visual analogue scale (VAS) (WUWHS, 2004, 2008). Ms T scored her pain at 8–9 on a scale of 0–10, 10 being very severe. This was due to the arterial insufficiency and her oedematous bilateral legs.

Ms T stated that the very short time she actually spent in bed (1–2 hours initially), left the bed sheets soaked through with exudate, causing a great deal of work for her carers.

Before the author's assessment, an alginate dressing with padding and a sub-bandage wadding layer had been used (K-Soft® [Urgo Medical]) to absorb exudate and shape the legs. A second layer, a type-2 classified bandage was applied after the wadding layer to give light support. All bandages were classified according to their properties (Hopkins, 2006).



**Care plan**

Ms T's main problems were pain and exudate management. Therefore, after discussion with Ms T and the district nurses, it was decided to use a sorbion sachet S® (Sorbion) dressing, which uses hydration response technology (HRT). This dressing is made up of physically modified cellulose fibres and gelling agents, which help to remove excessive exudate, slough, toxins, odour and bioburden.

A sub-bandage padding layer (K-Soft) and two-layers of soft cotton conforming bandages (K-Lite) were also applied. One layer of the K-Lite (layer 2) was applied in a spiral and the second layer of the K-Lite as a figure-of-eight. Cutimed® Sorbact® (BSN Medical) gauze dressing was also used under the sorbion sachets as a hydrophilic dressing to reduce the bacterial burden, as the presence of *Pseudomonas* was evident from the odour and green colour of the exudate. 3M™ Cavilon™ No Sting Barrier Film (3M) was also used to try and protect any surrounding skin that was not already excoriated. A cream emollient was used to wash, moisturise and protect the healthy skin on the legs.

After four weeks the regimen was reviewed and it was found that the ulceration was shallower and the slough was debriding (Figure 3). However, the exudate was still causing excoriation to the skin as it was not fully controlled. A third layer of the multi-layer system was added (K-Plus® [Urgo Medical]), and Viscopaste™ PB7 (Smith & Nephew) paste bandages were used to protect the surrounding tissues. The Cutimed Sorbact gauze was discontinued as the *Pseudomonas* was resolved (there was a small recurrence of *Pseudomonas* after this and Cutimed Sorbact was reintroduced for a week).

K-Plus 3b bandage was applied to increase the support to the lower limbs.

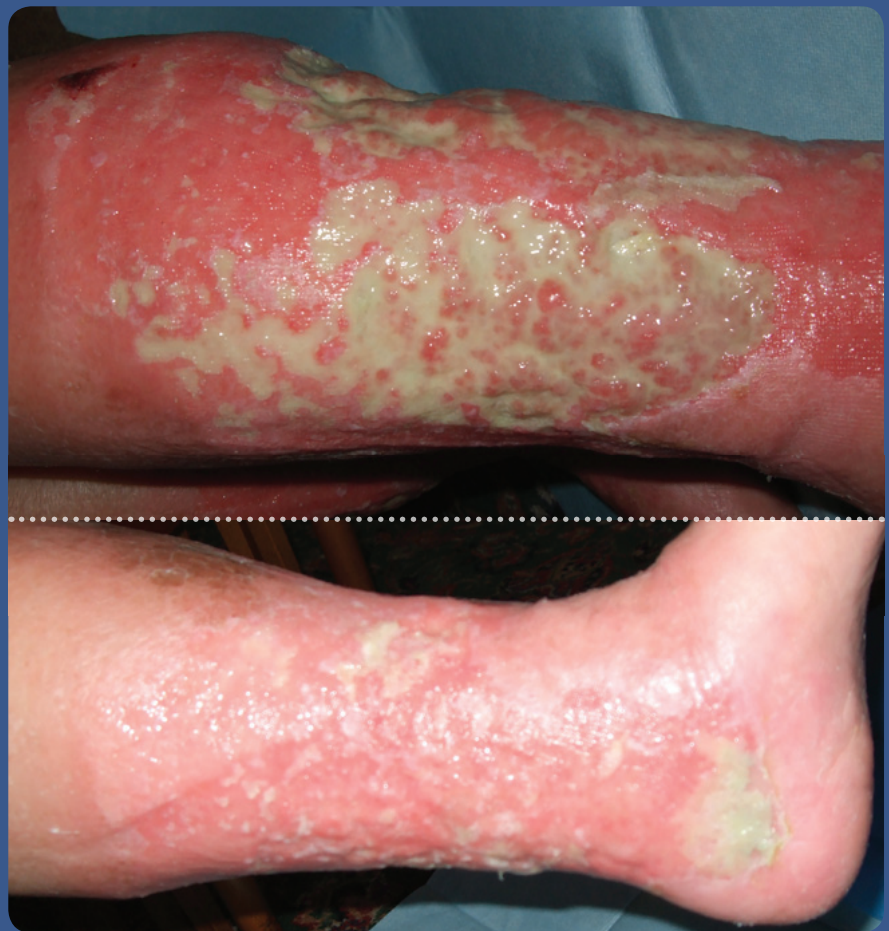


Figure 2. Leg ulcer on the left leg at assessment in March 2009.

3b bandage is the classification given to a moderate compression bandage (18–24mmHg) on a regular sized ankle (19–25cm). As Ms T had a large ankle circumference of 28cm, the amount of compression applied was more likely to give Ms T light compression of about 14–17mmHg.

Eight weeks later there was a dramatic improvement — the wounds were healing and a reduction in ulcer size and exudate was evident (Figure 4). The surrounding tissues of both legs had started to recover. Ms T's pain was also much improved (on a scale of 0–10 she now rated it as 4).

Ms T's mobility had also improved, which helped her blood flow and

reduced oedema in the limbs. An added bonus was that she was able to sleep in bed for much of the night.

After 12 weeks the ulcers had healed (Figure 5), although there was weeping eczema on the forefoot of both feet. To combat this a potent steroid cream was used, which resolved the problem after two weeks.

The total healing time was 14 weeks. Ms T's ankle circumference was also reduced to 24cm on both legs, demonstrating the extent of the oedema reduction.

**Ongoing care**

Once the ulceration and skin problems had been resolved, it was important to

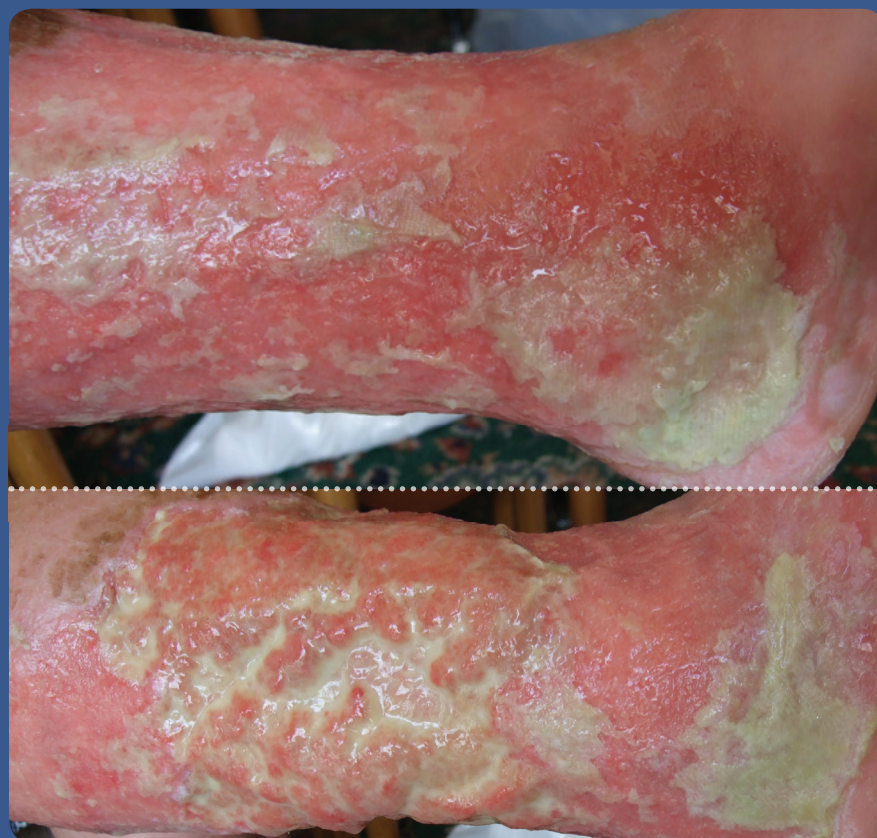


Figure 3. After four weeks of treatment. Top photograph shows the inner aspect of the left leg; bottom photograph outer aspect of right leg. The ulceration was clearing up and becoming less deep.



Figure 4. Right (above) and left (below) legs in June 2009.

ensure that Ms T's skin integrity was maintained and any reoccurrences minimised. Compression hosiery was not advocated due to Ms T's compromised blood flow. Therefore, a 10mmHg hose liner (Activa Healthcare) was introduced to prevent any fluid build-up in her lower limbs (Figure 6). There was concern that the hose liners may be too elastic and not robust enough. However, they proved to be a good choice when allied with a regular skin care regimen.

Ms T managed to increase her mobility and was eventually able to leave the house. She started wearing shoes and attending dentist, GP and hairdressing appointments.

The last review found Ms T in good spirits and still carrying out a skin care

regimen consisting of emollients and hose liners — the only change needed was to re-order sand-coloured liners instead of white so that they would look more like 'pop socks'.

Ms T's bed was now back upstairs and she was sleeping with no pain in her legs at all. The only concern was that Ms T was smoking again. Smoking is the dominant modifiable risk factor in PAD and evidence supports the relationship between smoking and severity (Fowler et al, 2002; Hirsh et al, 2006).

### Discussion

A comprehensive patient assessment is vital to ensure that the aetiology of leg ulceration is established. This was carried out in the vascular department by an arteriogram, as Ms T's resting ABPI was low.

Moving from one GP practice to another with the resultant delay in medical information can leave nurses ill-prepared which may hinder appropriate care planning, especially if they are unsure about leg ulcer care and management.

It is important that the cause of ulceration is established and, if possible, rectified. Assessment should begin with the clinical signs and symptoms (Table 1). Good pain assessment and management are also vital to assist with patient concordance.

Explaining how the nurses are going to alleviate the symptoms with products and pain control measures is also necessary. This type of information will reassure the patient that everything possible is being done to improve the clinical outcome. Patients often want to know what they can do to help themselves and leaflets/verbal education can reinforce information about exercise and diet.





Figure 5. Right and left legs in July, 2009.



Figure 6. August 2009. Healing maintained with 10mmHg hose liners, which were renewed every 12 weeks.

Smoking and its relationship with leg ulceration should be fully explored with the patient so that they can make an informed choice about cessation.

Although healing was not the original goal in this case, once the pain and exudate had been controlled, healing followed. This was much to the delight of the patient and nurses and improved the patient's quality of life, allowing her to regain some normality.

### Conclusion

Good clinical assessment and reassessment is vital to ensure that optimum care is provided. It is important to work with the patient so that the care plan is understood.

Working in partnership with other healthcare professionals, such as district nurses, occupational therapists, physiotherapists and resettlement services helps to achieve the optimal outcome. **WUK**

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