

Chronic Wounds:

Prevention and Management



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Chronic wounds are more prevalent as our population ages and they are becoming more difficult to treat. Estimates suggest there are 1.71 million people with leg ulcers in the US, with the average yearly cost of venous ulcers at \$10,000 per patient.¹ Physicians are not trained in basic wound care principles and there is a lack of standardized treatment. Therefore, there is increased morbidity and cost to healthcare systems from chronic wounds.

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Prevention of chronic wounds

Prevention begins with identifying those at risk. The first line for early identification is the FP—75% of diabetics receive care from their FP alone² and adequate glucose control prevents end-organ damage. Approximately 10% to 15% of diabetics develop foot ulcers which increases risk of amputation and death.³ All diabetics need education regarding foot care and daily examination. Regular callous paring decreases

Meet Peter

Peter is a 64-year-old diabetic male who has had a painful left foot ulceration for 6 weeks. He has had ceftriaxone injection for 3 weeks and was discharged from the hospital. A culture grew coagulase-negative staphylococcus (CNS). He was referred to a multidisciplinary wound clinic. The ulcers were located on the inferior medial malleolus, mid-foot and first metatarsal head and the foot was erythematous and warm (Figure 1).

Turn to page 18 for more on Peter.

risk of ulceration, or unmasks existing ulcers. Podiatrists can assist with foot care and offloading with orthotic shoes/inserts.

Pressure ulcer rates vary from 2.5% to 15% in hospitalized and nursing home patients;³ assessment with the Braden scale⁴ quantifies risk and allows early intervention. Occupational therapists can suggest offloading devices (mattresses, cushions) to prevent pressure ulcers. Diabetics, obese patients and those with poor nutrition require dietician referral for diet management. Patients with occupations requiring long hours standing or show early signs of venous stasis (pitting edema, hemosiderin deposits) should be advised to wear compression stockings. Those with signs of peripheral vascular disease (PVD) (dusky toes, diminished pulses, decreased hair, shiny skin) need vascular surgery evaluation.



Figure 1. Diabetic foot ulcers with osteomyelitis.



Figure 3. Diabetic foot ulcers healed at three months.



Figure 2. Improvement in erythema and ulcers after one month of treatment.

Approach to chronic wounds

A chronic wound demands a comprehensive history and physical exam. The history includes:

- precipitants (trauma, venous stasis),
- duration,
- treatments,
- patient compliance,
- infections and
- presence of pain, odour or drainage.

Past medical history should be documented for previous ulcers and treatment, comorbidities (diabetes, smoking, PVD, hyperlipidemia, hypertension), medications, allergies, previous surgeries (bypass, amputation, grafts). Performance and nutrition status are important factors in wound repair and treatment. Bedridden patients cannot offload pressure ulcers and often have decreased

protein intake, impairing healing. Examination includes assessment of the whole patient. BP, pulses, reflexes and neuropathy assessment are important. Foot exam is essential in neuropathic ulcers; feet need to be well moisturized and nails should be properly clipped to avoid pincer nails and paronychia. Tinea pedis and/or onychomycosis should be treated to prevent secondary infection. Patients should be evaluated for signs of PVD. Check shoes for proper fit and/or foreign objects causing repetitive trauma.

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Chronic wounds need to be measured and photographed. Descriptions must include:

- presence of slough,
- granulation,
- biofilm or exudates.

Wounds over bony prominences need probing to assess depth and rule out bone involvement. Probing demonstrates undermining (tracking underneath the skin), a sign of serious or infected wounds. Other clinical clues for etiology of wounds can be identified, such as hemosiderin deposits, edema and an “upside down champagne bottle” appearance to a leg (lipodermatosclerosis)

Table 1
Classification of dressings and usage for wound type and amount of exudate

Amount of exudate and type of wound						
Classification of dressings	Types	Heavy > 5 ml/day	Moderate 3-5 ml/day	Light 1-2 ml/day	None	Protection
Wound hydration	Hydrogels Hydrocolloids			Burns Stage II pressure ulcer	Dry eschar	
Moisture retentive	Transparents				Laceration Minor burns	IV sites
Absorbent	Foams Hydrofiber Alginates Hypertonic saline gauze	Infected wounds Pressure Diabetic Venous Surgical		Arterial ulcers		
Odour specific	Charcoal			Malignant Foul smelling		
Antimicrobials	Silver Iodine paste Benzoyl peroxide			Diabetic ulcers Arterial ulcers Venous ulcers Necrotic eschar		
Compression therapies	Elastic Inelastic	Venous ulcers				
Biologic therapies	PDGF* Collagen/ cellulose			Diabetic ulcers Arterial ulcers		
Other	Vacuum assisted closure	Pressure ulcers Diabetic ulcers				

*Platelet-derived growth factor

in venous insufficiency, or signs of connective tissue disease (livedo reticularis, vasculitic lesions).

Investigation of chronic wounds

Culture of a critically colonized (non-healing with biofilm) or infected wound should be performed. Noninvasive vascular studies (ankle brachial index [ABI], toe pressures) are necessary prior to compression in venous disease or suspected PVD. An ABI of > 0.9 suggests PVD. Falsely elevated ABIs are present in edema and calcified diabetic arteries. Plain films are useful in detecting chronic osteomyelitis. Bone/gallium scans are less specific. Biopsies are indicated in

a non-healing optimally treated wound to rule out malignancy.

Treatment of chronic wounds

The first principle of wound care is to treat the cause. Compression therapy to control edema is the mainstay of treatment for venous ulcers. Compression is available as stockings and elastic and inelastic compression bandages (two to four layers), ranging from 23 mmHg to 40 mmHg. Neuropathic and pressure ulcers need offloading. Arterial ulcers may require revascularization.

Debridement is necessary to remove eschar, debris, or biofilm. Wounds need moisture to promote healing. Dressings are tailored to the



Peter's case cont'd

- He was treated with IV vancomycin 1 g b.i.d. for 2 weeks for suspected CNS osteomyelitis.
- His wounds were treated with a hydrofiber and silver dressing, with non-adhesive foam.
- Five days later, erythema was reduced and 2 of the 3 ulcers were practically closed. Bone and gallium scans confirmed osteomyelitis (Figure 2).
- One week later, erythema was resolved. Peter was switched to oral ciprofloxacin and metronidazole for 6 weeks and placed in an offloading walking boot. He healed in 3 months and began wearing orthotic shoes and having regular foot care (Figure 3).

problem and the patient (Table 1). Cost is an important issue to consider as it impacts compliance. Infected wounds may require long-term antibiotics. Treatment includes appropriate referrals. Infected diabetic ulcers may require debridement by a surgeon. Plastic surgeons may graft chronic pressure ulcers in selected patients. Amputations are required for wet gangrene or severely necrotic, painful arterial wounds.

While the goal of treatment is to heal chronic wounds, it is not always successful. Sometimes success is gauged in stabilizing wounds and preventing infection. Malignant wounds do not heal. Patients and caregivers benefit from control of pain, odour and drainage. If PVD is not amenable to surgery, keeping an arterial ulcer dry

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Take-home message

- FPs are in a unique position to prevent chronic wounds by identifying those at risk and managing comorbidities
- Treatment of wounds follows basic wound care principles such as treatment of underlying cause, debridement, wound hydration and control of edema, drainage, pain and infection
- Tailor treatment to the type of wound and patient
- Not all chronic wounds will heal. Keeping them stable is an acceptable goal
- Appropriate referrals should be made as necessary

is the best option (bridine three times per week). It is those patients who cannot, or will not offload pressure whose ulcers are unlikely to improve. Both patients and healthcare teams must have realistic expectations.

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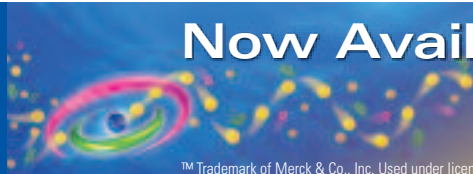
Resources

1. Olin JW, Beusterien KM, Childs MB, et al: Medical Costs of Treating Venous Stasis Ulcers: Evidence from a Retrospective Cohort Study. *Vasc Med* 1999; 4(1):1-7.
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