US Skin Disease Assessment: Ulcer and Wound Care

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KEYWORDS

• Chronic ulcers • Venous leg ulcers • Pressure ulcers
• Diabetic neuropathic foot ulcers

Chronic ulcers are a growing cause of patient morbidity and contribute significantly to the cost of health care in the United States.[1,2] Chronic ulcers or wounds are breaks in the skin of greater than 6 weeks or with frequent recurrence. The most common etiologies of chronic ulcers include venous leg ulcers (VLUs), pressure ulcers (PrUs), diabetic neuropathic foot ulcers (DFUs), and leg ulcers of arterial insufficiency. From the etiologic classification alone, comorbid conditions are identified that have significant impact on patient morbidity and mortality. Beyond that, however, the specific issues surrounding an open skin ulcer create problems related to drainage, odor, and often ambulatory function. Chronic wounds account for an estimated $6 to $15 billion annually in US health care costs. It is difficult to get accurate measurements on this, however, because these patients are often seen in a variety of settings or simply fail to access the health care system.[1,2] A detailed analysis published in 2004 noted that skin ulcer and wound care incurred approximately $9.5 billion in total direct health care costs in the United States (**Table 1**), making this a potential target for significant savings if improvements can be made in prevention and treatment.[3]

VLU

VLUs are the most frequent type of chronic ulcer in the ambulatory care setting. VLUs are classically on the lower leg and often show signs of venous insufficiency including varicose veins and red–brown hemosiderin discoloration in the surrounding skin. By definition, unless considered a mixed-type ulcer, these patients have an adequately functioning lower limb arterial system (ankle–brachial pressure index [ABI] >0.80 and/or presence of palpable distal limb pulse).[4] While it is difficult to get accurate and current estimates of incidence and prevalence, data demonstrate that VLUs affect about 1% of adults and make up 40% to 70% of all chronic leg ulcers.[5,6] Based on data from a 25-year period in Minnesota and 1990 US population data, it was estimated that that 21,000 new patients were diagnosed with a venous ulcer annually.[5] With increasing population and people living longer, that number would be expected to be higher today. The venous leg ulcer overall age- and sex-adjusted incidence is 18.0 cases per 100,000 person–years. The age-adjusted incidence from 1984 to 2001 was higher among women than men (20.4 cases vs 14.6 cases per 100,000 person–years).[5] This incidence increases with age, with VLUs as the most common wounds among ambulatory elderly.[7] Health care costs directly resulting from VLUs have been estimated to range from $150 million to over $1 billion per year in the United States and over $40,000 per patient over a lifetime.[5,8–10]

Prevention and Treatment

Patients with a previous VLU have twenty-fold higher risk of a recurrence.[11] Additional VLU predictors include advanced age, decubitus ulceration, diabetes, rheumatoid arthritis, falls, and

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Table 1
United States annual direct cost of skin ulcers and wounds in 2004

Annual Direct Cost	($ millions)
Hospital inpatient	$7931.9
Office visits	$497.6
Hospital emergency room	$243.3
Prescription drugs	$222.3
Hospital Outpatient Department	$149.9

Data from Bickers DR, Lim HW, Margolis D, et al. The burden of skin diseases: 2004 a joint project of the American Academy of Dermatology Association and the Society for Investigative Dermatology. J Am Acad Dermatol 2006;55(3):490–500.

cataracts. Morbidities associated with lower extremity ulcers include complications of wound infection such as sepsis, gas gangrene, osteomyelitis, necrotizing fasciitis, and death.

VLUs have healing rates of 57% and 75% after 10 weeks and 16 weeks, respectively.[12] Local ulcer care is a tenet of appropriate management in venous ulcers. Standard venous ulcer care consists of compression and simple wound dressing. High-level compression greater than 25 mm Hg[4,13] shows a significant benefit over low compression. Patient compliance with compression treatment is a critical component of successful wound care. Compression treatment prolongs the mean time to ulcer recurrence from 18.7 months in noncompliant patients to 53.0 months in compliant patients. Certain wound dressings are thought to improve the proportion of ulcer healed, as well as the duration of time to heal when compared with the standard protocol. However, a Cochrane review of 42 randomized–controlled trials revealed no benefit of one dressing over another, suggesting that the dressing beneath the compression is less important than the compression for ulcer healing. Ulcer recurrence may sometimes be decreased with superficial vein surgery to correct venous reflux. Unlike the diabetic and arterial foot ulcer, VLU generally does not result in amputation; instead it becomes a chronic, malodorous wound that substantially impairs the patient's quality of life, although comorbid conditions increase the risk of complications from infection that subsequently lead to cellulitis, sepsis, and death. The management team must consider various prognostic factors in treating VLUs and should recognize patients who are candidates for standard therapies and those who qualify for adjuvant interventions to increase the probability of wound healing and decrease likelihood for ulcer recurrence. Wound size (>10 cm^2) and age (>12 months) have been shown to be of significant prognostic value in selecting a treatment.[14] Health care providers should be encouraged to use adjuvant therapies earlier in the treatment course for those patients with such increased wound size and duration.

Other Considerations

Compression bandaging for VLUs requires additional time and expertise and is sometimes inadequately reimbursed.[15] Less than 20% of VLU patients were reported to receive adequate compression.[1] The current health care model may not incentivize physicians to deliver basic wound care using gold standards of treatment for VLUs, and patients who cannot afford additional dressings and treatments for more aggressive compression are less likely to comply with recommended therapies.

DFU

DFUs result from structural deformities due to diabetic peripheral motor neuropathy that weakens intrinsic muscles of the feet.[13] Coupled with sensory neuropathy, the feet of diabetics are at increased risk for wound development secondary to mechanical stress and tissue breakdown.[13] The prevalence of diabetes and its complications is increasing, with current estimates that 8.3% of the US population is affected. DFUs have an annual incidence rate of 1% to 4% in the United States, and diabetic patients have a 15% to 25% lifetime risk of acquiring these ulcers.[16] Patients with DFUs have a mean age of 69 years, and nearly 60% of patients are men. DFU prevalence was 6.5 cases per 1000 diabetics aged younger than 44 years of age, rising progressively to 10.3 cases per 1000 diabetics over age 75.[17] Average DFU episode duration was 87 plus or minus 83 days.[18] Ulcer progression may lead to osteomyelitis in 15% of DFU patients, and lower limb amputations in 16% of patients, with at least 80% of amputations preceded by an ulcer.[17] DFU patients also experience decreased survival when compared with non-DFU diabetics.[16,17] Furthermore, patients with neuropathic and ischemic DFUs have 45% and 55% 5-year mortality, respectively. Patients with unhealed DFUs experience a significant reduction in quality of life scores, in addition to frustration, anxiety, and limited activities of daily living (ADL). Patients with DFUs average more outpatient visits (35.08 visits verus 13.05), emergency department visits (0.42 visits vs 0.18), hospital admissions, and longer length of stays (6.03 vs 1.46