Lower-limb wound evaluation and care in the vascular surgery patient

Introduction

This issue of Seminars in Vascular Surgery is devoted to the evaluation and management of lower-limb wounds in the vascular surgery patient. In-depth discussions of common clinical conditions are presented on the topics of venous ulcer, diabetic foot infection, peripheral arterial disease (PAD) with tissue loss, and surgical site infection (SSI). The first article by Scalise et al discusses the role of bacterial biofilms and the wound microenvironment on healing. The treatment of surface bacterial biofilms is critical to the treatment of all lower-limb wounds and for the prevention of SSI. When a chronic lower-limb wound is encountered, its evaluation and management require a multifaceted approach that addresses the complex factors involved in the healing process of cellular proliferation and angiogenesis. These authors detail the biofilm-based strategies that should be considered for healing lower-limb wounds caused by trauma (diabetic foot ulcer), venous insufficiency, and PAD.

In their article on the management of venous ulcer, Cooper et al detail the disability of this common vascular condition, including its associated decreased quality of life, reduced mobility, and social isolation. Treatment of this vascular lower-limb wound requires wound debridement, treatment of biofilm infection, compression therapy, and a wound environment conducive for healing. These authors emphasize that collagen and antimicrobial dressings can accelerate ulcer healing. Current vascular surgery practice is to eliminate venous duplex ultrasound–documented truncal superficial (great and small saphenous, perforator) vein reflux when ulcer healing has not been achieved within a 3-month period of compression therapy and wound care.

The evaluation of patients with diabetic foot ulcers is addressed in two articles. The health-related quality of life in these patients is detailed in the article by Sekhar et al, with emphasis on both the physical and mental health aspects. The presence of a foot ulcer in a diabetic patient is a limb-threatening condition and requires the health care team to provide patient-specific education and wound care. In a companion article by Nteleki et al, the contemporary treatment of diabetic foot ulcer is detailed. This podiatry group reports their experience using dynamic phototherapy to accelerate ulcer healing as an adjunct to off-loading, wound care, and control of local infection. The patients receiving phototherapy demonstrated a high rate of healing at 8 weeks and fewer wound-site complications.

The next three articles discuss lower-limb wound healing in patients with PAD. The vascular group from Loma Linda, CA (Possagnoli et al) detail an intent-to-treat strategy based on measurement of systolic ankle-brachial pressure index and tissue oxygenation concentration. Stratification of the PAD patients based on vascular perfusion testing reduced the number of initial revascularizations when the ankle-brachial pressure index was ≥0.9 and TcpO₂ > 30 mm Hg. The majority (80%) of these limbs achieved successful wound healing without revascularization, but the incidence of ulcer recurrence was high, and indicates long-term follow-up of these patients is important. The article by Samies et al introduces the use of fluorescence angiography for the assessment of lower-limb wounds in the PAD patient. These authors believe that this diagnostic technique can predict the likelihood of wound healing before and after revascularization, and can be a useful adjunct in selecting patient who may benefit from hyperbaric oxygen therapy. The last article on lower-limb PAD wound healing by Massara et al describes the clinical application of topical autologous platelet-rich plasma treatments to enhance wound healing after revascularization. This outpatient procedure, which uses 90 mL of patient blood obtained by venipuncture, can provide important growth factors to stimulate the wound-healing process. The logistics of this therapy are discussed and the preliminary observations of this Italian vascular group are presented.

In the last article of this issue, Tazo Inui and I discuss the risk factors and preventive measures involved in vascular SSI. This topic is updated from a prior 2008 article to emphasize the changing epidemiology of lower-limb SSIs. Antimicrobial-resistant pathogens, including methicillin-resistant Staphylococcus aureus, are increasing involved in vascular SSI. A program of patient surveillance for nasal carriage for
methicillin-resistant \textit{S. aureus}, nasal and skin decolonization, preventing transmission to other patients, thoughtful antibiotic prophylaxis usage, and postoperative wound care is an effective strategy to reduce SSI and the attendant morbidity and cost of the adverse event. The entire surgical team must participate in institutional efforts to control nosocomial infections and antimicrobial resistance of bacteria sp in order to minimize the SSI rate.

The goal of this issue on wound care in the vascular surgery patient was to provide the reader with contemporary information that is not readily available in textbooks, and to complement recent \textit{Seminars in Vascular Surgery} issues on critical limb ischemia (March 2014) and venous insufficiency (March 2015). The content of these articles should allow interested clinicians to enhance their evaluation skills and treatment algorithms in patients with lower-limb wounds.

Guest Editor
Dennis F. Bandyk, MD
Division of Vascular and Endovascular Surgery, University of California, San Diego, School of Medicine, La Jolla, CA