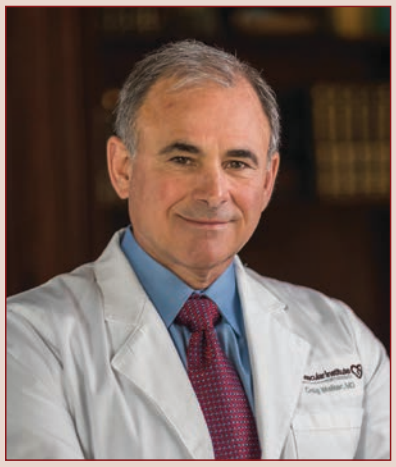
Diabetic Foot Ulcers: A Multispecialty Approach Is Fundamental for Reducing Morbidity and Mortality



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As healthcare providers we must do a better job in preventing diabetic foot ulceration. We must be proactive and change the standard paradigm of treatment if we are to succeed in dramatically reducing amputations with their associated costs, morbidity, and mortality.

Hello and welcome to the May 2021 issue of *Vascular Disease Management*. I have chosen to comment on Dr. Sandra Vincente and colleague's article "Descriptive Study of Ulcers Treated in a Diabetic Foot Unit" from Hospital de Alcorcon in Madrid.

I have chosen to comment on this article as it describes the process that was utilized at their hospital to improve outcomes and decrease costs in patients presenting with the commonly encountered problem of diabetic foot ulcers. It describes the comprehensive evaluation and treatment of diabetic foot ulcers via a multispecialty team of physicians. The care encompasses wound assessment, infection control, neurological evaluation, diabetic control, revascularization via surgical or interventional techniques, evaluation of biomechanical function, and follow-up of patients that is required to ideally treat these individuals. Limitation of the extent of amputation and the importance of limiting the extent is also discussed. The article describes the outcomes of the patients and demonstrates superiority over most historical reported outcomes in patients presenting with diabetic foot ulcers.

Diabetic foot ulcers are highly prevalent—between 15-25% of diabetics will develop a foot ulcer during their lifetime and the incidence of diabetes mellitus is increasing worldwide. Once a diabetic foot ulcer heals up to 70% will develop a new ulcer within 5 years and many of these will require a minor or major amputation. Within 5 years approximately 50% of patients will require an amputation of the contralateral limb. Survival 3 years following a major amputation is only approximately 50 per cent. Direct costs of these ulcers is estimated to exceed 29 billion dollars annually in the United States alone, with significant indirect costs such as rehabilitation, prosthetics, home modification, and nursing home care not included in this figure. The worldwide costs are of course far greater.

Most major non-traumatic amputations are preceded by diabetic foot ulceration. Major amputations are associated with higher morbidity, mortality, and costs, than cases where limb salvage is achieved. The authors utilize the term neuro-ischemic ulcers. This implies that there is an element of ischemia and an element of neuropathy with loss of sensation secondary to diabetes resulting in loss of protective pain sensation. Charcot foot with its associated biomechanical abnormalities and increased pressure points also contributes to the formation of ulcers. Once ulceration occurs there is a portal of entry for bacteria resulting in infection of soft tissues and possibly of the underlying bones with ensuing bony destruction and sepsis. At this point minor or major amputation may be required as a life-saving measure.

Foot ulceration is typically the product of inadequate vascular supply coupled with pressure necrosis secondary to loss of protective sensation or bony deformity. The vascular pathology resulting in foot ulceration amongst diabetics is typically multi-level or diffuse infra-popliteal. Often standard angiography fails to disclose patent foot vessels to serve as runoff conduits.

Many patients have no assessment of the vascular status prior to minor or major amputation. Minor amputations may

then be followed by failure to heal the wound secondary to inadequate blood supply resulting in additional amputation or amputations. Advanced interventional and surgical procedures including pedal loop reconstruction, direct venous arterialization, drug-eluting interventional technologies, improved interventional crossing techniques and devices, and distal bypass can restore blood supply to the foot in the vast majority of patients presenting with diabetic foot ulcers. Restoration of flow to the foot, however, is only one step in the treatment of diabetic foot ulcers.

Ulcer healing requires control of infection, debridement to remove biofilm, and wound healing techniques including utilization of tissues applied over the ulcers to facilitate healing.

Once blood flow has been restored, it is crucial to cushion the foot to avoid pressure points. This is known as "unloading the foot" amongst podiatrists. This is an important point in healing ulcers and in preventing future ulceration. This may require external casts or bony reconstruction procedures.

As healthcare providers we must do a better job in preventing diabetic foot ulceration. When foot ulcers occur, we must evaluate and treat the patient before infection occurs. Prevention of ulceration and subsequent risk of amputation includes evaluation of diabetic neuropathy with institution of foot unloading and cushioning, aggressive control of cardiovascular risk factors such as smoking, hyperlipidemia, hypertension, glycemic control, and vascular screening procedures with restoration of blood supply when appropriate. It is paramount that we reach these patients long before there is extensive gangrene and deep infection where the prognosis is poor.

We must be proactive and change the standard paradigm of treatment if we are to succeed in dramatically reducing amputations with their associated costs, morbidity, and mortality. We must reach these patients before there are advanced gangrenous changes or deep-seated infections with resistant bacterial strains that may be impossible to eradicate, particularly in the setting of diminished vascular supply. I believe that limb salvage and prevention teams will be the keys to success. Amputation without thorough assessment of vascular status and infection control should not be the standard of care for individuals presenting with diabetic foot ulcers.