The At-Risk Diabetic Foot: Time to Focus on Prevention

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As we approach the end of the coronavirus disease 2019 (COVID-19) pandemic, it has become clear that delayed care has had deleterious consequences for those with diabetes-related complications of the lower extremities. We have witnessed increasing numbers of patients presenting to emergency rooms with untreated diabetic foot ulcers (DFU), infections, and even gangrene, very often resulting from a delay in seeking care (1). Too many such patients consequently required urgent hospitalization and emergent surgery to control limb-threatening infections. While we recognize that foot-level amputations are often limb-sparing (and sometimes lifesaving) operations, we also know that many such outcomes can be prevented by early intervention. Furthermore, we also recognize that by preventing that initial or recurrent DFU, we can disrupt the causal pathway leading to limb loss (2). Accordingly, we must now focus on the prevention of such complications if we are going to reduce the global burden of diabetic lower extremity complications.

Recognizing the importance of preventing amputation in neuropathic individuals, the Health Resources and Services Administration (HRSA) developed their Lower Extremity Amputation Prevention (LEAP) program in 1992 (3). Although initially focused on people with Hansen disease, LEAP was also intended to apply to those with any condition that results in loss of protective sensation in the feet. Accordingly, the larger population of people with diabetes has become an important focus of this prevention program. The five-step LEAP program consists of *1*) annual foot screening, *2*) patient education, *3*) daily self-inspection, *4*) footwear selection, and *5*) management of simple (preulcerative) foot problems. Indeed, these important prevention components have long been embraced within diabetic foot guidelines put forth by several national and international organizations. These include the American Diabetes Association, the International Working Group on the Diabetic Foot, and many others. The Veterans Health Administration similarly incorporated the principles embodied in the LEAP program through their Preservation-Amputation Care and Treatment (PACT) program, first established in 1993. This was later renamed the Preventing Amputations in Veterans Everywhere (PAVE) program in 2012. A critical component of this program is the requirement for an annual foot examination for all patients with diabetes.

In its original position statement on preventive foot care, the ADA recommended annual foot screenings, including biomechanical, structural, dermatologic, neurologic, and vascular assessments, for all individuals with diabetes. This was further expanded upon in the 2008 publication that stressed the importance of a comprehensive foot examination and commensurate risk assessment (4). The introduction of "smart" technologies, where plantar foot temperatures and pressures can be monitored and feedback provided in real time via audio and visual alerts, is indeed promising. It represents not only a paradigm shift in DFU risk screening and monitoring, but, crucially, it also transforms foot care education. The saying that "a picture is worth 1,000 words" is particularly relevant to this patient population, for whom symptoms and signs cannot be relied on when conveying messages about DFU risk. By allowing people to visualize their personal DFU risk, digital technologies are likely to enhance patients' active participation in DFU prevention (5).

While we have made great strides in healing DFU, our progress in preventing them is debatable. As noted above, we have long had guidelines directing appropriate prevention recommendations as well technologies allowing for remote patient monitoring. It is therefore incumbent upon all practitioners managing patients with diabetes to focus on preventative protocols as much as on treatment protocols when considering diabetic foot disorders. While not as glamorous or financially rewarding as treating extant diabetic foot complications, our efforts must indeed be redirected toward preventing such complications.

Just as recommended retinal examinations have decreased the incidence of diabetes-related blindness over the last several decades, we propose that the requirement for annual comprehensive diabetic foot examinations be implemented as a measure of good clinical practice. The Healthcare Effectiveness Data and

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Information Set (HEDIS) measures, commonly used to ensure appropriate evaluations of insured individuals and with commensurate rewarding for good clinical practices, currently track parameters for retinal examinations and measurement of HbA_{1c}, blood pressure, etc. However, there are currently no established HEDIS guidelines for annual comprehensive diabetic foot examinations. We believe that the growing incidence of diabetic foot disorders in our populations and their associated morbidities dictate the need for greater attention to such complications of diabetes. We therefore recommend and propose that a formal HEDIS measure for annual comprehensive diabetic foot examination, according to the principles embodied in the original LEAP initiative, be widely implemented in global health care systems. By focusing on early detection of risk factors and/or early onset of diabetic foot lesions, we can more effectively reduce the incidence of potentially life-changing lower extremity complications of diabetes.

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