

OBSERVATIONS

Characteristics and Outcomes of Subjects With Diabetic Foot Ulceration

Foot ulcers are a major cause of morbidity and hospitalization in patients with diabetes. The incidence of diabetic foot ulceration is higher in developing countries because of various sociocultural factors. The majority of amputations in patients with diabetes are preceded by foot ulceration; hence it is important to identify patients at risk for this complication.

Studies show that the prevalence of diabetic foot ulceration is between 4 and 10% in Pakistan (1), and the amputation rate following foot ulceration is 8–21% (1,2), depending on the methodology used for treating foot ulceration. We identified diabetic patients at risk for ulceration and compared the clinical and metabolic characteristics of patients with and without foot ulceration together with an analysis of outcomes following ulceration.

We included 8,989 patients with diabetes attending the Baqai Institute of Diabetology and Endocrinology, a tertiary care center in Karachi, Pakistan, from January 2004 to December 2009. Patients were categorized into three groups: normal feet, feet at risk, and foot ulceration. The factors identified for feet at risk were diabetic neuropathy, previous history of foot ulceration or amputation, presence of peripheral vascular disease, foot deformity, and presence of corn or callus. Patients with foot ulceration were classified according to the University of Texas classification system. Patients with foot ulceration were followed for their final outcome (i.e., complete healing or lower extremity amputation).

Nearly 10% of patients were identified as feet at risk. They were older (age 55.7 ± 11.1 vs. 49.2 ± 12.3 years, $P < 0.000$), had a longer duration of diabetes (14.1 ± 8.2 vs. 9.9 ± 6.9 years, $P < 0.000$), and had greater prevalence of hypertension (81.54 vs. 78.33%,

$P < 0.027$). About 20% presented with foot ulcers. Male sex, longer duration of diabetes (>10 years), presence of neuropathy, retinopathy, and nephropathy ($P < 0.000$) were risk factors for foot ulceration. Sixty-two percent of patients had neuropathic ulcers, 36.6% had neuroischemic ulcers, and 1.1% had pure ischemic ulcers. Of 1,044 patients with foot ulcers, 740 (70.8%) completely healed, 142 (13.6%) underwent amputation, and 58 (5.5%) died.

Many factors have been suggested to contribute to this unacceptably high rate of lower extremity amputation, such as severity of disease at presentation, increasing age, poor socioeconomic conditions, and lack of diabetes care in primary setup with late referral to the secondary and tertiary care units (3,4).

Preventive foot care practices were followed by only 19.02%. Reasons for this are multifactorial, including lack of awareness regarding foot care, use of improper foot wear, and barefoot walking.

The major limitation of our study is that it is not population based and represents patients referred to a tertiary care center. The main strength is the size of the study, with accurate characterization and grading of ulceration and a high follow-up rate.

We conclude that all patients with diabetes should be screened to identify those at risk for foot ulceration because this is the most important step in preventing foot complications. This is more important in a resource-constrained society such as Pakistan because the economic and psychological impact of diabetic foot ulceration and amputation is considerable (5).

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