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Evaluation of Patients Undergoing Surgical Treatment for Diabetic Foot: An Institutional Based Study

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ABSTRACT

Background: Diabetic foot ulcer is a common complication of DM that has shown an increasing trend over previous decades. The present study was conducted to assess patients undergoing surgical treatment for diabetic foot.

Materials and Methods: A study was conducted including 180 patients with diabetic foot treated in Department of Surgery, Major SD Singh Medical College and Hospital, Farrukhabad, Uttar Pradesh, India. Two groups of patients were analyzed according to two treatment approaches: the first group included patients treated with classical method, and the second group included patients treated with multidisciplinary approach. An age distribution, gender, local changes in the extremities, results of microbiological analysis of wound swabs, and modalities of surgical treatment of diabetic foot were analyzed.

Results: The patients were divided in two groups. In the first group 90 patients were treated using radical surgical approach and in the second group 90 patients were treated with multidisciplinary approach. The gender ratio was 98 females (54.44%) and 82 males (45.55%). All patients had local changes in the foot. In the first group 33.33% patients had phlegmon, 24.44% had ulcers, 10% had both, 15.55% had ulcers with osteomyelitis and 16.66% had gangrene. In the second group 34.44% patients had phlegmon, 25.55% had ulcers, 12.22% had both, 10% had ulcers with osteomyelitis and 17.7% had gangrene. The first group included 90 patients who were treated with classical approach and only 6 patients were treated by conservative approach. The major amputation (crural and femoral) was performed in 46.66% and 34.44% patients respectively. The second group included 90 patients who were treated with multidisciplinary approach and 21 patients were treated by conservative approach. The major amputation (crural, femoral and foot) was performed in 24.44%, 17.77% and 17.77% patients respectively.

Conclusion: The present study concluded that multidisciplinary approach was the treatment of choice for diabetic foot.

KEYWORDS: Diabetic Foot, Radical Surgical Approach, Multidisciplinary Approach, Phlegmon.

INTRODUCTION

Diabetes mellitus is classified into four broad categories: type 1, type 2, gestational diabetes, and other specific types. All forms of diabetes increase the risk of long-term complications, but most of them come from type 1.[1-4] Diabetes mellitus (DM) is one of the main problems in health systems and a global public health threat that has increased dramatically. Patients with DM are prone to multiple complications such as diabetic foot ulcer (DFU). DFU is a common complication of DM that has shown an increasing trend over previous decades.[5-7] Foot ulcers are common in patients with diabetes mellitus with a prevalence as high as 25% and an annual incidence of 2%-3%.[8]Although cancer and trauma can result in amputations, chronic diabetic foot ulcers lead to more than 80% of nontraumatic amputations and account for 46% of the 162,000 hospital admissions for foot ulcers annually.[9] Risk factors that can lead to foot wounds in patients with diabetes include loss of

protective sensation due to neuropathy, prior ulcers or amputations, foot deformity leading to excess pressure, external trauma, infection, and the effects of chronic ischemia, typically due to peripheral artery disease. Patients with diabetes also have an increased risk for non-healing related to mechanical and cytogenic factors, as well as a high prevalence of peripheral artery disease.[10] The present study was conducted to assess patients undergoing surgical treatment for diabetic foot.

MATERIALS AND METHODS

A study was conducted including 180 patients with diabetic foot treated in Department of Surgery, Major SD Singh Medical College and Hospital, Farrukhabad, Uttar Pradesh (India) to examine two modalities of surgical treatment of diabetic foot, using two different approaches, classical based on the radical surgical approach and the new multidisciplinary approach based on a more conservative approach. The outcome was defined by reducing the number of amputations and preserved foot support. The patients were divided in two groups. The first group included 90 (retrospectively) patients treated with radical surgical approach. The second group included 90 (prospectively) patients treated with a doctrinal approach. The research was conducted with the approval of the Ethics Committee of the Institute. Patients with diabetes treated with insulin or oral antidiabetics, of different age and gender, with proven unilateral or bilateral diabetic foot were eligible for this study. Patients with diabetes treated with insulin or oral antidiabetics, of different age and gender, without evidence of diabetic foot and who died during the study were excluded from the study. All patients were followed to the complete wound healing. The surgical procedures treatment of diabetic foot had not been standardized. Local treatment of wound includes antiseptic (3% hydrogen peroxide) application and irrigation with sterile saline solution, partial necrectomy and wound debridement, and administration of antibiotics according to microbiological analysis and susceptibility testing. The decision on a modality of the treatment was based on the prevalence of infection and necrosis size, signs of vasculopathy and a lack of pulse in the arteries of the foot and neuropathic changes. All patients were followed until the complete wound healing. The results are presented in tables and expressed by relative values and mean value. The level of statistical significance was $p<0.05$.

Table 1: Local changes in patients with diabetic foot

Local changes	No. of patients (%)	
	Patient with radical surgical approach	Patient with multidisciplinary approach
Phlegmon	30(33.33%)	31(34.44%)
Ulcer	22(24.44%)	23(25.55%)
Phlegmon & Ulcer	9(10%)	11(12.22%)
Ulcer with osteomyelitis	14(15.55%)	9(10%)
Gangrene	15(16.66%)	16(17.77%)
Total	90(100%)	90(100%)

Table 2: Modalities of treatment of diabetic foot

Modality of treatment	No. of patients (%)	
	Patient with radical surgical approach	Patient with multidisciplinary approach
Femoral amputation	31(34.44%)	16(17.77%)
Crural amputation	42(46.66%)	22(24.44%)
Minor amputation	11(12.22%)	0(0%)
Finger amputation	0(0%)	15(16.66%)
Foot amputation	0(0%)	16(17.77%)
Conservative treatment	6(6.66%)	21(23.33%)
Total	90(100%)	90(100%)

RESULTS

This study included 180 patients with diabetic foot treated. The patients were divided in two groups. In the first group 90 patients were treated using radical surgical approach and in the second group 90 patients were treated with multidisciplinary approach. The gender ratio was 98 females (54.44%) and 82 males (45.55%). All patients had local changes in the foot. In the first group 33.33% patients had phlegmon, 24.44% had ulcers, 10% had both, 15.55% had ulcers with osteomyelitis and 16.66% had gangrene. In the second group 34.44% patients had phlegmon, 25.55% had ulcers, 12.22% had both, 10% had ulcers with osteomyelitis and 17.7% had gangrene. The first group included 90 patients who were treated with classical approach and only 6 patients were treated by conservative approach. The major amputation (crural and femoral) was performed in 46.66% and 34.44% patients respectively. The second group included 90 patients who were treated with multidisciplinary approach and 21 patients were treated by conservative approach. The major amputation (crural, femoral and foot) was performed in 24.44%, 17.77% and 17.77% patients respectively.

DISCUSSION

Long-term effects of DM on the microcirculation and on dermal collagen eventually result in skin disorders in almost all diabetic patients.[11] These skin disorders cause a full-thickness penetration of the dermis of the foot, infection and ulceration in people with DM.[12] Severity is classified using the Wagner's classification system, which grades it from 1 to 5. Grade-3 ulcers are deep ulcers with cellulitis or abscess formation, often complicated with osteomyelitis. Ulcers with localized gangrene are classified as Grade 4, and those with extensive gangrene involving the entire foot are classified as Grade 5.[13]

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Ramsey et al, reported amputation rates of 11.2% in patients with new-onset foot ulcers over a 4-year period.[14]

Amputations are frequently performed in patients with DFO after unsuccessful conventional treatments.[15,16]

CONCLUSION

The present study concluded that multidisciplinary approach was the treatment of choice for diabetic foot.

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