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Original article:

Analysis of Diabetic Foot Patients Undergoing Surgical Treatment

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Abstract

Background: Foot ulceration, sepsis, and amputation are known and feared by almost every person who has diabetes diagnosed. Ulcers develop on the tips of the toes and on the plantar surfaces of the metatarsal heads and are often preceded by callus formation. Hence, the present study was conducted for assessing patients undergoing surgical treatment for diabetic foot.

Materials & Methods: A total of 100 diabetic patients who reported with diabetic foot ulcer were enrolled. Complete demographic and clinical details of all the patients were obtained. A Performa was made, and detailed clinical history was analyzed. Surgical planning was done and commenced. Subjects with history of any other systemic illness and any other known drug allergy were excluded from the present study. All the results were recorded and analyzed using SPSS software.

Results: Mean age of the patients was 41.8 years. 63 percent of the patients were males while the remaining were females. 58 percent of the patients were from rural residence. Debridement was done in 31 percent of the patients, while lower limb amputation was done in 53 percent of the patients. Skin grafting was done in 8 percent of the patients while incision and drainage was done in 6 percent of the patients. Sequestrectomy was done in 2 percent of the patients.

Conclusion: Diabetes-related foot ulcers are the primary cause of non-traumatic lower limb amputation and a significant cause of morbidity and death among diabetes mellitus patients.

Key words: Diabetic foot, Surgical.

INTRODUCTION

Foot ulceration, sepsis, and amputation are known and feared by almost every person who has diabetes diagnosed. Yet these are potentially the most preventable of all diabetic complications by the simplest techniques of education and care. If lesions do occur, the majority can be cured by immediate and energetic treatment, for which good provision must be made. Neuropathy and ischaemia are the principal disorders underlying foot problems. Patients confined to bed must have their heels elevated to avoid heel blisters and sepsis. Such wounds need weeks or months of treatment and sometimes require major amputation with consequent serious medicolegal implications. Ulcers develop on the tips of the toes and on the plantar surfaces of the metatarsal heads and are often preceded by callus formation. If the callus is not removed, then haemorrhage and tissue necrosis occur below the plaque of callus,

leading to ulceration.[1- 3] Sharp debridement is often appropriate, and because neuropathic patients feel little pain, it can often be performed in the office. Topical debriding agents, such as enzymes, can also be used. Occasionally, grafting or excision of the lesion is needed. The wound must be carefully tended with sterile wet-to-dry dressings. Patients who cannot do their own dressing changes require help from home health nurses. The fastest and best way to heal a serious ulceration on the plantar aspect of the foot is to completely take any weight-bearing activity off the foot, sometimes called "off-loading." This can be accomplished by having the patient use crutches, a walker, or a wheelchair. If the patient is unable or unwilling to do that, we use total-contact casting to redistribute weight across the plantar aspect of the foot. Unfortunately, these are also bulky devices and are not very popular with patients. Offloading should be used for prevention as well as management.[4- 6] Hence; the present study was conducted for assessing patients undergoing surgical treatment for diabetic foot.

MATERIALS & METHODS

The present study was conducted in the Department of General Surgery, Great Eastern Medical School and Hospital, Ragolu, Srikakulam, Andhra Pradesh (India) for assessing patients undergoing surgical treatment for diabetic foot. A total of 100 diabetic patients who reported with diabetic foot ulcer were enrolled. Complete demographic and clinical details of all the patients were obtained. A Performa was made, and detailed clinical history was analyzed. Surgical planning was done and commenced. Subjects with history of any other systemic illness and any other known drug allergy were excluded from the present study. All the results were recorded and analyzed using SPSS software.

RESULTS

The mean age of the patients was 41.8 years. 63 percent of the patients were males while the remaining were females. 58 percent of the patients were from rural residences. Debridement was done in 31 percent of the patients, while lower limb amputation was done in 53 percent of the patients. Skin grafting was done in 8 percent of the patients while incision and drainage was done in 6 percent of the patients. Sequestrectomy was done in 2 percent of the patients.

Table 1: Demographic data

Variable	Number	Percentage
Mean age (years)	41.8	
Males	63	63
Females	37	37
Rural residence	58	58
Urban residence	42	42

Table 2: Types of surgical treatment

Types of surgical treatment		Number	Percentage
Debridement		31	31
Lower limb amputation	**Minor amputation**	47	47
	Major amputation	6	6
Skin grafting		8	8
Incision and drainage		6	6
Sequestrectomy		2	2

DISCUSSION

Diabetic foot infections range from local fungal infections of the nails to necrotizing limb- or life-threatening infections. The term diabetic foot infection comprises many different entities that span a continuum of infectious processes. Poor nail hygiene and fungal nail infections frequently serve as portals of entry for bacterial infection; however, diabetics are no more prone to fungal nail infections than non-diabetics (grade C). Cellulitis and minor web-space infections may progress more rapidly in diabetics due to the combination of immune dysfunction and delayed detection secondary to diabetic neuropathy and retinopathy. Clinical signs of infection (elevated WBC and ESR, fever, etc.) may not manifest until the infection is advanced (grade C). Autonomic neuropathy leads to arteriovenous shunting and anhidrosis resulting in decreased capillary-bed perfusion, dry and thickened skin, which is prone to cracking thereby permitting bacteria to breach the skin's protective barrier. Motor neuropathy results in claw-toe deformity, intrinsic muscle wasting and distortion of the foot's normal weight-bearing surface, predisposing the foot to focal pressure necrosis and ulceration. One prospective study found a 70% 5-year recurrence rate among diabetics who primarily healed a foot ulcer (grade C). Hospitalized diabetics are 2.8 times more likely to die in the hospital and their length-of-stay is twice that of non-diabetic patients. Mortality data for each Wagner grade are not available, however lower extremity amputation carries a 5-year survival of only 40%.[7- 10] Hence; the present study was conducted for assessing patients undergoing surgical treatment for diabetic foot.

In the present study, the mean age of the patients was 41.8 years. 63 percent of the patients were males while the remaining were females. 58 percent of the patients were of rural residence. Debridement was done in 31 percent of the patients, while lower limb amputation was done in 53 percent of the patients. Skin grafting was done in 8 percent of the patients while incision and drainage was done in 6 percent of the patients. Sequestrectomy was done in 2 percent of the patients. At least 60% of non-traumatic lower limb amputations occur among people with diabetes. In one study, 16% of all patients with foot ulcers (n=514) and 36% of those who also had osteomyelitis (n=79) had a lower extremity amputation during the follow-up period. Other studies have shown that patients who have had one amputation have a 68% risk of having another in the next 5 years and have a 50% mortality rate in the 5 years following the initial amputation. Thus, it is not surprising that lower extremity amputation is considered to be one of the most serious consequences of diabetes.[7-10] Fard AS et al presented a comprehensive assessment and the treatment of DFUs. They conducted this study on DFU on the basis of: pathogenesis and risk factors, assessment and physical

examination, paraclinic assessment, treatment, cost and mortality and prevention. Approximately 20% of hospital admissions among diabetic patients are the result of foot problems. Diabetic foot assessment should include dermatological, vascular, neurological and musculoskeletal systems. There are three basic treatments for management of DFU: (i) debridement; (ii) antibiotics and (iii) revascularization. The cost to treat one simple ulcer is $5000 to $8000. Awareness of physicians about foot problems in diabetic patients, clinical examination and paraclinical assessment, regular foot examination, patient education, simple hygienic practices and provision of appropriate footwear combined with prompt treatment of minor injuries can decrease ulcer occurrence by 50%.[11] Armstrong DG et al abstracted medical records from 180 patients with diabetes, 76·1% male, aged 57·8 ± 11·2 years, falling equally into four classes of a previously reported diabetic foot surgery classification system. These classes included class 1 (elective), class 2 (prophylactic), class 3 (curative) and class 4 (emergency). There was a significant trend towards increasing risk of ulceration/reulceration ($\chi 2$ trend= 17·8, P= 0·0001), peri-postoperative infection ($\chi 2$ trend= 96·9, P= 0·0001), all-level amputation ($\chi 2$ trend= 41·7 P= 0·001) and major amputation ($\chi 2$ trend= 8·6, P= 0·003), with increasing class of foot surgery. The results of this study suggested that a non-vascular foot surgery classification system including variables such as the presence or absence of neuropathy, an open wound and acute infection may be predictive of peri- and postoperative complications.[12]

CONCLUSION

Diabetes-related foot ulcers are the primary cause of non-traumatic lower limb amputation and a significant cause of morbidity and death among diabetes mellitus patients.

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