

Original Article

Diabetic Septic Foot in Omdurman Teaching Hospital

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Abstract

Objective: To audit the management of diabetic septic foot [DSF] lesions in Omdurman Teaching Hospital, using Wagner classification.

Patients and methods: This is a retrospective study on 208 patients with DSF admitted to Omdurman Teaching Hospital, Sudan between June 2006 and May 2007. Data were analyzed manually

Results: The male to female ratio was 2:1. The mean age \pm SD was 56 ± 12.35 year. 16.8% patients were grade 1. 33 (15.9%) patients were grade 2. grades 3, 4, 5 patients were 66 (37 %), 38 (18.3%) and 36 (17.3%) respectively. Major lower limb amputation and mortality were 19.2%, and 6.7% respectively.

Conclusion: Preventive measures for patients at risk are highly needed as well early presentation is encouraged when ulcer develops in diabetic foot to avoid subsequent complications.

Key words: Diabetes Mellitus, Diabetic septic foot, amputation.

Approximately 15% of all diabetic patients are at risk of foot ulcerations during their life time, and 70% of their healed ulcers are estimated to recur within 5 years¹. Foot wounds are now the most common cause of diabetic-related hospitalization, and a frequent precursor to amputation. Individuals with diabetes have 30-fold higher life time risk of undergoing lower extremity amputation compared to those without diabetes². Foot wounds and infections are one of the leading causes of morbidity and mortality, especially in developing countries like Sudan. The number of cases and the problems associated with diabetic foot infections have dramatically increased in recent years. The main reason for this increase is the growing diabetic population in younger groups³

Diabetic septic foot [DSF] is a common disabling problem and frequently leads to amputation of the leg.

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Mortality is high, and ulcers often recur. Amputations rate is the indicator for quality of foot care⁴. The pathogenesis of foot ulceration is complex, clinical presentation is variable, and its management requires early expert assessment. Intervention should be directed for infection control, peripheral ischemia management, and abnormal pressure of loading, caused by peripheral neuropathy, and limited joint mobility^{4,5}. Based on the recent studies the incidence of developing DSF ranges from 1% to 4% and the prevalence ranges from 4% to 10% which suggests that the life time incidence may be as high as 25%^{6,7}.

Diabetic foot ulcers have negative effect on psychological well being, social functioning, employment, and quality of life. The cost of treating diabetic foot ulcers and their complications is high^{2,8}.

The aim of this study is to evaluate the management of different diabetic septic foot lesions, according to Wagner classification; this will help us to describe the lesion we treat, to compare the outcome with others, and to identify measures to decrease morbidity and mortality due to diabetic septic foot.

Patients and Methods

This is a retrospective study on patients with DSF admitted to Omdurman Teaching Hospital between June 2006 and May 2007.

The medical records were carefully reviewed and the following informations were gathered: Age, sex, type of diabetes and its duration. Length of hospital stay and comorbidity were carefully recorded.

All diabetic foot ulcers were classified and grouped according to Wagner's grouping system, in which, foot lesions are divided into six grades based on the depth of the wound and the extent of the tissue necrosis^{9, 10}.

The diagnosis of infection was based on the on International Working Group guidelines. This was based on the presence of purulent secretions / or at least two of the cardinal manifestations of inflammation^{2, 11}. Minor amputation was defined as any lower extremity amputation distal to the ankle joint. A major amputation was any lower extremity amputation through or proximal to the ankle¹¹.

Results

A total of 208 patients were studied retrospectively in a period of one year. The majority of the patients was males and constituted a percentage of 62.5%, with a male to female ratio of 2:1. The mean age \pm SD was 56 \pm 12 year. Non insulin dependent diabetes was found in 84% of our patients, 16% of the patients have involvement of contra lateral foot. Wound recurrence rate was 19%.

The grading, type of amputation and outcome of surgery were shown in table 1,2 and 3 respectively.

Table [1] Severity of ulcer on admission based on Wagner's classification

Grade	Frequency	Percent
Grade 0	0	0%
Grade 1	35	16.8%
Grade 2	33	15.9%
Grade 3	66	31.7%
Grade 4	38	18.3%
Grade 5	36	17.3%
Total	208	100.0%

Table [2] Amputations in patients with DSF

Amputation	Frequency	Percent
Minor	83	40%
Major	40	19.2%
no amputation	85	40.8%
Total	208	100.0%

Table [3] Outcome of patients with DSF

Outcome	Frequency	Percent
Cured	30	14.4%
Improved	164	78.8%
Died	14	6.7%
Total	208	100.0%

Discussion

Diabetes affects approximately 3.9% of urban population in Sudan¹². Diabetic patients comprise about 3.3% of the surgical load in our Hospital. It is well known that diabetes carries significant rate of morbidities and increases the cost of management both for the individual patients and the health authorities.

Foot complications, especially foot ulcer constitute a major public health problem for diabetic patient in sub-Saharan Africa, and are important causes for prolonged hospital admission, and more frequent precursor to amputation, and death of patients from this part of the continent¹³. More than half of all limb amputations are carried out in patients with diabetes mellitus. Amputation is preceded by a foot ulcer progressing to deep gangrenous infection; most of these ulcers are caused by minor trauma, frequently as a result of poorly fitting foot wear or inadequate foot care².

In our study DSF is more common in males with a percentage of 62.5%, as had been noted as well in other similar studies^{14, 15}.

According to Wagner's classification our patients were in the severe forms as grades III, IV, and V constituted 66% collectively, and this is similar to what has been reported in other studies with an incidence range from 42% to 68%, but still less than the 74% in western Sudan study^{14- 17}. This percentage of

the severe form of infection in our study can be explained by the late presentation of our patients with gross infection, because some attempt treatment at dispensary level and others were treated with traditional healers. Many of our patients are of low socioeconomic status, and probably had little access to relevant education regarding the importance of general foot care, the significance of diabetes and its complications¹³.

In this study 40% of our patients underwent minor amputation, the majority being of toe disarticulation or Ray's excision. While in other studies it ranges from 28.5 – 37%^{14, 15}. The rate of major amputation was found to be 19.2% in our study, which is comparable with a rate of 9- 24% in the literature. But even a higher rate was found in Algeria (30%) and Burkina Faso (45%)^{18, 19}. This high amputation rate could be attributed to the severity of infection on presentation. Especially patients with Wagner's grade IV and V. It has been calculated that almost 20% of all the hospitalization and cost of patients with diabetes are related to foot ulceration and/or amputation⁴.

The incidence of diabetic foot infection and amputation may be reduced using a multidisciplinary approach, with a team that is preferably consisting of vascular, orthopedic surgeons, internist, podiatrist, rehabilitation physician, orthopaedic shoemaker, and diabetic specialist nurse. This is not the set up in our hospital. Using such an approach a 50-85% reduction in amputation has been described in some studies^{20, 21}. Once the diabetic septic leg had a major amputation, within 3 years 30-50% of patients will undergo an amputation of the contra lateral leg. Even the life expectancy is influenced by amputation⁴.

The mortality in our study was found to be 6.7%, mainly in patients with severe sepsis presented as Wagner's Grade IV and V, which is comparable to studies in Western Sudan and other countries,^{15, 16} but less than the 21.1 % mortality rate reported 23 years back in Khartoum Teaching Hospital²². This high mortality rate can be explained by the fact

that, some of the patients were admitted in our hospital with advance DSF and septicemia, leading to multiple organ failure and death.

Key preconditions for improving the prognosis of diabetics with foot lesions are regular screening of diabetic for impaired nerve function, and inadequate circulation, problem centered patient education, regular foot care and the supply of protective foot wear to those affected. Despite treatment, ulcers readily become chronic wounds³. Early recognition of lesions and prompt initiation of the appropriate antibiotic therapy, as well as aggressive surgical debridement of necrotic tissue and bones, and modification of host factors i.e. hyperglycaemia, concomitant arterial insufficiencies are all equally important for successful outcome³.

Conclusion

It is clearly evident from our study that more than two third of our patients presented with high grade sepsis "grade 3-5" which resulted in the high rate of amputation. Preventive measures for patients at risk are highly needed as well early presentation is encouraged when ulcer develops in diabetic foot to avoid subsequent complications. To reduce diabetic foot related morbidity and mortality, these patients are best managed in specialized diabetic septic foot centers.

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