



EVALUATION AND MANAGEMENT OF DIABETIC FOOT ULCERS IN MULTI-SPECIALITY HOSPITALS – A PROSPECTIVE OBSERVATIONAL STUDY

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ABSTRACT

Background: Diabetic foot ulcers are major public health problem, especially in developing countries. Still now management of diabetic foot ulcer is the major challenge for surgeons.

Objective- To describe the surgical management of Diabetic foot ulcers and to determine various risk factors associated with DFUs.

Methods: A prospective study was done at Multi- speciality hospitals, Gwalior, Madhya Pradesh, India; from February 2017 to January 2019. All the collected data was analyzed by the Epi-info 7 software.

Results: A total of 100 DFUs patients was included in this study. Among all of them 77.14% were male and 22.86% were female. Most common age group with DFUs was 40-60 years. All the patients had type 2 diabetes mellitus. 8% patients had previous history of DFUs and 8% had previous amputation. The forefoot was commonly affected in 48% of cases. Lower limb amputation was the most common surgical procedure performed in 62% of cases. Most of the microorganisms isolated showed multi drug resistance to commonly used antibiotics except for Carbapenems group drugs (sensitivity 100%). Mortality rate was 9.4%.

Conclusions: Diabetic foot ulcer is the major reason of morbidity and mortality among patients with diabetes mellitus. An appropriate education on foot care and suitable foot ware, good sugar level control and early surgical intervention is needed to diminish the morbidity and mortality among diabetic foot ulcer patients.

KEYWORDS : Type 2 diabetes, Diabetic foot ulcers (DFUs), Prevalence, Surgical management.

INTRODUCTION-

Diabetic foot is one of the major problems of diabetes; with ulceration of foot that is associated with neuropathy in a patient with diabetes. Diabetic foot ulcers cause major public health problem worldwide with high morbidity and mortality among diabetes patients.^{1,2} 15-20% of diabetic patients will develop foot ulcers at some point of life and many of them preserved by surgical procedures.³ Lower limb amputations are more shared in diabetic foot ulcer patients in developing countries. The mainstream of diabetic foot ulcers will heal but 10-15% of cases remain non-healing and will lead to limb amputation.⁴ Diabetic foot ulceration is still chief problem for developing countries due to inaccessibility of proper diagnosis and treatment. Most of the diabetic foot ulcer patients admitted to the hospital with advanced foot ulcers which is the major disadvantage to manage these cases.⁵ The late admission of DFUs in hospital is due to poor knowledge of diabetes healthcare, socio-cultural reasons and poor economic status. Several studies have shown that surgical procedures for DFUs with gangrene may be too late to prevent death. Therefore, it is necessary early demonstration by patients and proper surgical procedures should apply during primary stages of ulcer, which may improve quality of life in patients and reduce mortality rate.^{6,7} Management of DFUs involve multidisciplinary approach, therefore the rationale behind the study was to describe surgical management of DFUs, various risk factors associated with it.

MATERIAL AND METHODS-

Study Settings- Multi- speciality hospitals, Gwalior, Madhya Pradesh, India

Study Design- Prospective Observational Study.

Study Duration- 2 year from February 2017 to January 2019.

Sampling Technique- Purposive sampling technique

Sample size- All the patients with diabetic foot ulcer attended the hospital were taken as separate sampling unit and were considered as total sample size of the study which was found to be 100.

Inclusion Criteria- The patients with diabetic foot ulcers attended in hospital were included in this study.

Exclusion Criteria- Diabetic patients but no foot ulcer was excluded. Consent Type- Written informed consent

METHODOLOGY-

The detailed history of the patients was recorded. Proper clinical diagnosis was done for each patient such as; duration of diabetes, types of diabetes (type I or II), duration of foot ulcer and patient's awareness,

anti-diabetic treatment, type of DFUs various co-morbid conditions, Type of operative procedures and outcome was recorded. Various clinical laboratory investigations were done for each patient.

STATISTICAL ANALYSIS-

Data will be consolidated and entered a Microsoft Excel spreadsheet and then transferred to Epi info version (7.1.3.0. centre for disease control and prevention, Atlanta, Georgia, USA, 2013) software for analysis. Frequency tables are in the form of percentages. Chi- square and unpaired t- test were used for analysis.

RESULTS-

Table 1- Clinical Characteristics of Diabetic Foot ulcers patients

Characteristics	Number	%
Type of Diabetes		
Type 1	0	0
Type 2	100	100
Duration of Diabetes		
Old cases	76	76
New cases	24	24
Duration of DFUs		
1-4 weeks	20	20
4-8 weeks	32	32
>8 weeks	48	48
Previous history of DFU		
Yes	8	8
No	92	92
Previous history of amputation		
Yes	8	8
No	92	92
Type of ulcer		
Neuropathic	68	68
Ischemic	30	30
Neuro-ischemic	2	2
Anatomical site		
Toe	36	36
Fore foot	48	48
Foot sole	16	16

As per table 1 all the patients of DFUs were belonged to type 2 diabetes mellitus. Most of them are mainly old cases (76%). Duration of DFUs were more than 8 weeks commonly in 48% cases. 92 % has no previous history of DFUs and no amputation. 68% of ulcers were neuropathic and the most common anatomical site was found to be fore foot in 48%.

Table 2- Surgical Procedures performed

Procedure	Number (N=77)	%
Lower Limb Amputation	60	78
Debridement	12	16
Skin grafting	3	4
Incision and drainage	2	2

In table 2 The majority of cases surgically (77%) and remaining 23% were treated with daily dressings and antibiotics. Out of 77 cases, 78% patients were treated by lower limb amputations. Skin grafting, incision and drainage was done for 4% and 2% patients respectively (P value 0.012)

Table 3- Post-Operative complications

Complications	Number (N=50)	%
Surgical site infection	20	40
Gangrene	10	20
Phantom pain	7	15
Wound haematoma	5	10
Anemia	5	10
Skin grafting failure	3	5

After the surgical procedure the most common post -operative complication was found to be Surgical Site infection in 40% cases followed by gangrene in 20%. Phantom pain was seen in 15% cases while anemia and wound haematoma were seen in 10% cases.

Table 4- Bacterial Growth pattern in Diabetic foot ulcers

Isolated organism	Number (N=20)	%
Staphylococcus aureus	12	60
E.coli	4	20
Kleibisella spp	2	10
Proteus	1	5
Pseudomonas	1	5

15 out of 24 (62.5%) cultured specimens had positive bacterial growth after 48 hours of aerobic incubation. 9 cultures had polymicrobial (60%) growth and 40% had pure growth. The most common bacterial isolates were staphylococcus aureus in 12 cases, followed by e.coli in 4 cases.

DISCUSSION-

Diabetic foot ulcer is the major problem in worldwide, most common in developing countries than developed one. In the present study, males were more affected than females, which is similar with other studies.^{8,9} Most of the patients were belongs to age group of 40-60 years. These findings were comparable with other studies. Majority of patients were belonging to rural background with 76.86%, similarly reported by other studies.^{8,9} Males were more affected may be due to their smoking and alcoholic habits which were reported as 22.3% and 52.3% respectively.¹⁰ Smoking and drinking alcohol are the two major risk factors to develop diabetic foot ulcer.¹¹ According to the present study duration of diabetes was much longer in patients with diabetes foot ulcer that may be due to the loss of proper diabetic care. Similar findings were reported by other authors.^{12,13,14} The majority of patients in the present study presented to the surgical department between 4 weeks and 32 weeks of onset of an ulcer. Similar data was showed by other studies.^{8,9} According to Alnour AM et al and Mahboob G et al showed comparatively higher incidence range from 42% to 68%.^{12,13} High percentages of advanced foot ulcer also reported by Doumi A, constituted 74%.⁸ In the present study 52.86% DFUs patients were gone through surgical interventions. Among these the rate of lower limb amputation was done in 60% patients, which is higher than the other study reports.^{6,8} The higher amputation rate in the present study could be due to the late presentation and severity of the infection.^{8,9} The microbiological findings showed 60% polymicrobial bacterial isolates with Staphylococcus aureus and Escherichia coli predominating. Similarly reported by other studies.⁸ The bacterial isolates in the present study showed multi- drug resistance, except carbapenems group drug showed 100% sensitive to all isolates. Present findings were comparable with another study done by Sade R et al.¹⁴ The multi-drug resistance bacterial isolates from DFUs required immediate surgical intervention.

CONCLUSION-

Diabetic foot ulcer is the chief source of morbidity and mortality

among diabetes patients. The management is the major challenge for surgeon. A good glycemetic control, foot care with appropriate foot ware, educate people regarding diabetes control, infection control with proper surgical intervention is needed to reduce the morbidity and mortality rate among diabetic foot ulcer patients.

Conflict of Interest- None declared

Source of Funding- None

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