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Research Article

A PROSPECTIVE STUDY OF EPIDEMIOLOGICAL FACTORS AND OUTCOME IN PATIENTS OF DIABETIC FOOT WOUND ATTENDING J.A. GROUP OF HOSPITALS: A TERTIARY CARE CENTRE

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ABSTRACT

Objectives: To study about epidemiological factors related to diabetic foot wound such as age, sex, duration of diabetes, relation to ongoing retinopathy, and nephropathy.

Methods: After obtaining approval from ethical committee, the present study is to be conducted on 100 patients of diabetic foot in the Department of Surgery, JA Group of Hospitals and GR Medical College, Gwalior (MP) during January 2020 to June 2021 after getting written informed consent from the patients.

Results: In our study, out of 100 cases, most of the diabetic foot wound cases observed were in the 50–59 years age group with a mean age of 52.23 and a standard deviation of ±14.92. Out of 100 cases, 82 (61.%) were male and 29 (38.66%) were female. Therefore, male: female ratio was 4.5:1. In our study of 100 patients, 70 (70%) presented with ulcer with or without necrotic patch, gangrene and 30 (30%) with cellulitis with or without abscess. Among all patients of diabetic foot, wound 62 (62%) were associated with retinopathy and 47 (47%) were associated with diabetic nephropathy.

Conclusion: Diabetic foot wound is more common in men due to their increased susceptibility to trauma and occupation. Diabetic patients at risk for foot complication must be educated about risk factors and the importance of foot care, including the need for self-inspection and surveillance, monitoring, daily foot hygiene, use of proper footwear, good diabetes control, and prompt recognition and early standard treatment of newly discovered lesions.

Keywords: Diabetic foot wound, Epidemiological factors, Limb salvage, Diabetes mellitus.

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INTRODUCTION

Diabetes mellitus (DM), commonly recognized as diabetes, is a collection of metabolic disorders branded by a high blood sugar level over a prolonged period of time [1]. The symptoms often comprise frequent urination, increased thirst, and increased appetite [2]. If left untreated, diabetes can reason many complications [3]. In India, the prevalence of diabetic foot ulcers in the clinic population is 3.6% [4]. Sociocultural practices such as bare foot walking, religious practices like walking on fire, use of improper footwear, and lack of knowledge concerning foot care attributes toward increase of prevalence of foot complications in India [5]. Diabetes prevalence is increasing in emerging and developed countries worldwide. Diabetes complications are cumulative too in this pandemic, making diabetes a major global health problem in different republics. Among diabetes complications, handling diabetic foot remains as a major challenge for health-care systems. Main cause of more than half of nontraumatic lower limb amputations. About 15%–25% of patients with diabetes may grow foot ulcer. Wound bed preparation eventually broadened into a basic approach to chronic wound management that aimed to "stimulate the endogenous process of wound repair without the need for advanced therapies." Wound bed preparation is now established as a systematic approach for managing all types of chronic wounds, and wound care practitioners are broadening it further to adapt the principles for the management of acute wounds. Treatment for diabetic foot glitches varies according to the harshness of the condition. A range of surgical and nonsurgical options is available. Acute problems can include diabetic ketoacidosis, hyperosmolar hyperglycemic state, or death [6]. Serious long-term problems include cardiovascular disease, stroke, chronic kidney disease, foot ulcers, damage to the nerves, damage to the eyes, and cognitive impairment [7,8]. Research indicate that diabetes patients with foot ulcers encounter stigma, loss of social role, social isolation, and unemployment. Diabetic foot ulcer is a costly and debilitative disease with severe consequences in diabetic patients. Furthermore, mortality after lower extremity amputations in diabetes patients varies from 39% to 80% at 5 years. Additional than half of all nontraumatic lower limb eliminations are due to diabetes. Limb amputation causes distortion of body image, increase in dependency, loss of productivity, and increase in costs of treating diabetic foot ulcers. The present research proposes systematic research on clinical presentation, various epidemiological factors, risk factors, early diagnosis, inexpensive ways of tackling, and standard management of diabetic foot wound and Limb Salvage in G.R. Medical College, Gwalior, so that more could be learned about the clinical presentation, and prevent limb amputation and mortality in this geographic.

Objectives

To study about epidemiological factors related to diabetic foot wound such as age, sex, duration of diabetes, relation to ongoing retinopathy, and nephropathy.

METHODS

After obtaining approval from ethical committee, the present study is to be conducted on 100 patients of diabetic foot in the Department of Surgery, JA Group of Hospitals and GR Medical College, Gwalior (MP) during January 2020–June 2021 after getting written informed consent after the patients.

Inclusion criteria

1. Patients in the age group of 15–80 years with chronic non-healing diabetic foot ulcers
2. Patients with type 1 and type 2 DM
3. Ulcer ≥4 weeks duration
4. Hb ≥10 g%.

Exclusion criteria

1. Deranged coagulation profile (i.e. abnormal BT, CT)
2. Diabetic foot wound in paralyzed limbs
3. Life-threatening infection with severe systemic signs and symptoms, presence of unconscious/semicomatose patient, medical emergencies such as acute renal failure and diabetic ketoacidosis
4. Presence of comorbidities such as tuberculosis, CVA, ischemic heart disease, and severe anemia.

Methods

Nonprobabilistic convenience sampling to select the patients. The inclusion criteria and exclusion criteria as mentioned above. The procedure shall be described to all patients, and written informed consent signed by all of them at the first visit. A checklist including the following variables for all participants: age, sex, blood pressure, marital status, edifying level, body mass index, occupation, residency (rural/urban), smoking status, alcohol status, type of diabetes, diabetes duration, duration of hospital stay, type of diabetes treatment (medical or surgical intervention), diabetic retinopathy, diabetic nephropathy, past of DFU or amputation, present foot ulcer, preventive foot care, nail care, type of footwear, ill-fitting shoe, and patient training on feet. The examination involved the following: skin and nails, types of foot malformation, neurologic foot exams, and vascular foot exams. DFU was defined as a full-thickness skin defect at least Wagner stage 1. Loss of skill to detect the monofilament at even one site of examination was painstaking as distal neuropathy. For vascular scrutiny, dorsalispedis, tibialis posterior, popliteal, and femoral pulses were measured. Anklebrachial index (ABI) was measured by a handheld Doppler device (Huntleigh Diabetic Foot Kit) and calculated by the next formula: ABI=(maximum systolic heaviness of dorsalispedis artery or tibialis posterior)/(maximum systolic weight of brachial artery) separately for each leg. ABI=0.9–1.3 was considered as usual, ABI=0.4–0.9 as vascular illness, and ABI <0.4 as severe vascular disease. Dressings were done every day or as per wound status in both groups. Wounds were assessed for the need for surgical intervention by local and general examination. Glycemic control of the patient was carried out as per the instruction of the medicine department. The questionnaires were finished, and the clinical exams were performed by a trained general physician. Then, all the patients were shadowed up for new DFU as final outcome for 3 months. Obtained data were entered in suitable spreadsheet i.e., Excel, Epi info, or SPSS. Various tests were applied to compare two groups by the Chi-square test, unpaired t-test, and odds ratio by the statistical software.

OBSERVATION AND RESULTS

A total of 100 cases of diabetic foot wound were studied from a period of January 2020 to August 2021 in all surgical units of Department of Surgery JAH hospital and G.R. Medical College, Gwalior. The results observed in the study are as follows.

In our study, out of 100 cases, most of the diabetic foot wound cases observed were in the 50–59 years age group with a mean age of 52.23 and a standard deviation of ±14.92. The youngest patient was 19 years of age presenting with ulcer in the right foot and the oldest was 84 years of age presenting with left foot ulcer. Out of 100 cases, 82 (61.%) were male and 29 (38.66%) were female. Therefore, male: female ratio was 4.5:1. Out of 100 patients, 66 (66%) patients belonged to rural areas and 75% were illiterate. Most commonly effected patients are farmers (47%) and labors (29%) by occupation.

Table 1: Distribution of study participants according to the duration of diabetes mellitus

Duration of DM (years)	n (%)
≤10	56 (56)
11–20	35 (350
>20	9 (9)
Total	100 (100)
Mean±SD	11.01±7.27

DM: Diabetes mellitus, SD: Standard deviation

Table 2 : Distribution of presentation of diabetic foot (clinical presentation)

Presentation of ulcer	n (%)
Cellulitis	21 (21)
Abscess	9 (9)
Infected ulcer with dry gangrene	5 (5)
Infected ulcer with wet gangrene	6 (6)
Necrosis with ulcer	50 (50)
Necrotizing fascitis	9 (9)
Total	100 (100)

Table 3: Association between management and complications

Management	Complications				Total
	Nephropathy		Retinopathy		
	Yes	No	Yes	No	
Debridement with amputation	15	0	15	0	15
Antibiotics/conservative	9	17	3	23	26
Debridement without amputation	43	7	41	9	50
Incision and drainage	3	6	3	6	9
Total	70	30	62	38	100
p	<0.001		<0.001		

Table 4: Association between management and age

Management	Age				p
	<30 years	30–60 years	>60 years	Total	
Debridement with amputation	0	4	11	15	<0.001
Antibiotics/conservative	6	20	0	26	
Debridement without amputation	0	34	16	50	
Incision and drainage	2	5	2	9	
Total	8	63	29	100	

Table 5: Association between management and gender

Management	Gender			p
	Male	Female	Total	
Debridement with amputation	10	5	15	0.290
Antibiotics/conservative	21	5	26	
Debridement without amputation	44	6	50	
Incision and drainage	7	2	9	
Total	82	18	100	

Above table shows that out of 100 patients, 56 (56%) presented with <10 years history of DM on admission and 35 (35%) with 11–20 years duration of DM and 9 (9%) had >20 years of duration of diabetes on admission.

Table 6: Association between management and duration of diabetes

Management	Duration of diabetes				p
	<10 years	10–20 years	>20 years	Total	
Debridement with amputation	1	6	8	15	<0.001
Antibiotics/conservative	23	3	0	26	
Debridement without amputation	25	24	1	50	
Incision and drainage	7	2	0	9	
Total	56	35	9	100	

Table 7: Association between management and duration of hospital stay

Management	Duration of hospital stay			p
	<2 weeks	>2 weeks	Total	
Debridement with amputation	0	15	15	<0.001
Antibiotics/conservative	26	0	26	
Debridement without amputation	14	36	50	
Incision and drainage	6	3	9	
Total	46	54	100	

Out of 100 patients, most of the patients presented with 50% necrosis with ulcer.

The above-mentioned table shows that patients with nephropathy and retinopathy are more prone for surgical debridement and amputations.

The above-mentioned table shows that patients in the age group of 30–60 years are prone for diabetic foot wound and surgical debridement and amputations.

The above mentioned table shows that male patients have more prevalence for diabetic foot wound then females and more lead to complications which leads to more extreme surgical debridement and amputations.

This table shows that patients with less duration of diabetes have better prognosis as compared to those with longer duration of DM.

This table shows that patients with less complications less duration of hospital has better prognosis as compared to those with longer duration of DM.

DISCUSSION

Most diabetic foot patients were in 50–59 years' age group with a mean age 52.23±14.92. Widatalla *et al*. [9] in their study also found the most common age group 51–60 years with mean age 56.6±11.6 comparable to our study. The present study had Male: Female ratio as 4.5:1. Widatalla *et al*. [9] in their study also reported male preponderance. The incidence is more among males probably as they are mostly working outdoor, which makes them more vulnerable for trauma and sequelae.

In a study by Pittet *et al*. [10] most cases had a history of 10–20 years duration of diabetes. In our study 56% of patients presented with diabetic foot wound with a history of diabetes <10 years of duration. Most of the patients were from rural areas (66%) and had foot complications early because of not taking proper precautions, care and treatment, barefoot walking practice coupled with poor foot hygiene, and lack of patient education.

In our study, 70 (70%) patients presented as ulcer (non healing, trophic ulcer, with or without gangrene, and with necrotic patch) and 30 (30%) presented with cellulitis (with or without abscess, necrotic patch) as compared to Pittet *et al*. [10] In our study, 47% developed diabetic nephropathy and 41% developed diabetic retinopathy which is high as compared to Singh *et al.* 2012 [11], it was 14.3% and 44%, respectively. In this study, out of 100 cases, 65 (65%) had a history of foot trauma before the onset of the lesion. In Mayfield *et al*. [12], 44% percentage of cases had prior history of trauma.

In our study, those patients who where literate and well educated about there disease and its complications, shorter duration of DM and less duration of hospital stay, took proper precautions and treatment, regular follow-up and early diagnosis and treatment have better prognosis than patients who are from rural areas, illiterate, delayed presentation and not taking proper precautions and treatment, uncontrolled blood sugar, not educated about their disease and prognosis developed complications and had longer duration of hospital stay, more morbidity and mortality. However, the results obtained in this study do not match with the opinion. This may be attributed to the geographical differences, differences in preoperative and post-operative care set up, and small sample size.

CONCLUSION

There is risk of developing diabetic foot wound with increasing duration of diabetes and, more among in uncontrolled diabetic patient and family history of DM. More common in patients with positive family history, illiterate patients, belonging to rural areas. Diabetic Foot Wound is more common in patients who are farmer and labor by occupation and more associated with smoking. Diabetic patients at risk for foot complication must be educated about risk factors and the importance of foot care, including the need for self-inspection and surveillance, monitoring, daily foot hygiene, use of proper footwear, good diabetes control, and prompt recognition and early standard treatment of newly discovered lesions. Not all diabetic foot complications can be prevented, but it is possible to reduce their incidence through appropriate management. The multidisciplinary team approach of diabetic foot disorders has been demonstrated as the top method to achieve favorable rates of limb salvage in high-risk diabetic patients.

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CONFLICT OF INTEREST

None declared.

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ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee of Gajraraja Medical College, Gwalior (MP).

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