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Clinical Profile Analysis of Diabetic Foot

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Abstract

Introduction: Diabetic foot is one of the common problems encountered by surgeons in India. The surgeon would be better equipped to treat if data regarding the demographics, clinical presentation and factors leading to foot complications in diabetics is available along with the treatment and outcomes.

Materials and Methods: This study aims to describe the clinical profile of patients with diabetic foot. This is a retrospective study. The study material was obtained from the patient records from 2018 to 2019. A total of 40 patients were included in the study. The demographics, clinical features, treatment and outcomes were noted. Statistical analysis was done.

Results: Most common presentation was diabetic foot ulcers in 50% patients. Other presentations included cellulitis and gangrene. In 20% cases, diabetes was newly diagnosed. The mean duration of diabetes was 5 years. Treatment included regular dressings for 27.5% patients, debridement for 30%, incision and drainage in 15% and amputations in 15% patients. Empirical antibiotics given were amoxicillin-clavulanate and cephalosporins. The mean duration of hospital stay was 12.9 days. All patients improved with treatment.

Conclusion: Early treatment is effective and limb saving. This study suggests inadequate control of diabetes and infection as a major cause for diabetic foot which may progress to sepsis with/without gangrene in the presence of PAD or neuropathy.

Keywords: Diabetes; Diabetic Foot; Amputation.

INTRODUCTION

Diabetes mellitus is a global health problem with multiple complications. India with 77 million patients has the second highest number of diabetics in the world.[1] Among its many complications, diabetic foot is the most frequent reason for hospitalization.[2] Also, 85% of non traumatic lower limb amputations are due to diabetic foot.[3] Thus, diabetic foot is a major burden on patients as well as health care systems.[4] The aetiology or risk factors for diabetic foot are multi-factorial and as such the treatment is also varied. Hence, this study is undertaken to evaluate the clinical profile and presentation of diabetic foot patients at a teaching hospital in the coastal region of Karnataka.

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MATERIALS AND METHODS

The aim of this study was to prepare a clinical profile of diabetic foot patients and its management

and to assess the outcome of the surgical interventions. This was a retrospective study conducted at a tertiary care institute. Institutional Ethics Committee approval was obtained. Records of patients admitted in Surgery department from March 2108 to 2019 with Diabetic foot and aged more than 18yrs of age were analyzed. Incomplete patient records, foot conditions without diabetes and patients less than 18 years of age were excluded.

Patient details like age, gender, socio-economic status, presenting complaints, duration of diabetes, history of medication and any co-morbidities were obtained from the patient records. Also, examination findings of diabetic foot and associated conditions like peripheral neuropathy, ischemia and infection along with details of investigations done, treatment given including surgical procedure, if any, were noted. Finally, number of days of hospitalization and condition at time of discharge was obtained from the patient records. The details obtained were tabulated and analyzed statistically.

RESULTS

A total of 68 patient records were analysed. Twenty patients had foot ulcers but were not diabetics, 2 patients were less then 18 years of age and 6 patients were excluded as the case records were incomplete. Total 40 were patients included in the study. The mean age of presentation was 57.7 with the youngest patient aged 23 years and the oldest aged 89 years. Male predominance was noted with male to female ratio of 3:2 (Table 1) 65% of patients belonged to the lower socio-economic status. 42.5% patients presented with foot ulcers (DFU), 30% had cellulitis, 17.5% had gangrene and 10% presented with foot abscess. (Table 2). 20% were newly diagnosed diabetics. In the remaining patients the mean duration of diabetes was 5 years with the longest duration of diabetes being 15 years. 62.5% patients were on insulin treatment. Except for one patient who had undergone superficial femoral artery angioplasty, none of the patients had documented peripheral arterial disease or peripheral neuropathy. Hypertension was noted in 22.5% of patients. The mean haemoglobin level was 11.88 gm/dl with a low of 7.2 gm/dl and high of 16.7 gm/dl. 47.5% patients had elevated leucocyte counts more than 11000 cells/mm3 with 3 of them having counts more than 20000 cells/cumm. The mean fasting blood sugar was 201.81 mg/dl with a minimum of 89 mg/dl and a maximum of 500mg/dl. Empirical antibiotics were given to all patients in injectable form. Cephalosporins were the most commonly used antibiotic (Table 3). Treatment included regular dressings in 27.5%, debridement in 40%, incision and drainage in 12.5% and amputations

Table 1: Socio-demographic Characteristics

Patient characteristics	No. of patients	Percentage
Age (in years)		
< 40	4	10
40 – 50	5	12.5
50 - 60	13	32.5
60 – 70	13	32.5
> 70	5	12.5
Gender		
Males	24	60
Females	16	40

Table 2: Clinical Characteristics

Clinical characteristics	Frequency	Percentage
Duration of Diabetes (in years)		
Newly diagnosed	8	20
< 1	6	15
5-Jan	26	65
> 5	10	25
Duration of Diabetic Foot at presentation (in weeks)		
< 1 week	7	17.5
1-2 weeks	30	75
> 3 weeks	3	7.5
Type of Diabetes Mellitus		
Type I	1	
Type II	39	
Previous history of Diabetic Foot		
Yes	2	5
No	38	95
Previous history of amputation		
Yes	2	5
No	38	95
Presenting Complaints		
Cellulitis	12	30
Abscess	4	10
Ulcer	17	42.5
Gangrene	7	17.5

Table 3: Antibiotic Treatment

Antibiotic	Frequency	Percentage
Amoxicillin + Clavulanic acid	6	15
Cephalosporins	26	65
Fluroquinolones	5	12.5
Piperacillin + Tazobactum	3	7.5

in 20% patients. Minor amputations accounted for 87.5% and major amputation for 12.5% of the amputations (Table 4). The mean duration of hospital stay was 12.9 days with a maximum stay of 36 days and minimum stay of 3 days (Table 5). 3 patients got discharge against medical advice. The remaining 37 patients improved with treatment. There was no mortality.

Table 4: Surgical procedure performed

Type of Procedure	Frequency	Percentage
Debridement	12	30
Incision and drainage	6	15
Toe amputation	7	17.5
Below knee amputation	1	2.5
Skin grafting	1	2.5

Table 5: Duration of Hospital Stay

Duration of Hospital Stay	Frequency	Percentage
< 1 week	14	35
1 – 2 weeks	16	40
2 – 3 weeks	05	12.5
3 – 4 weeks	02	5
> 4 weeks	03	7.5

DISCUSSION

The International Working Group on Diabetic Foot (IWGDF) Guidelines defines diabetic foot as infection, ulceration or destruction of tissues of the foot of a person with currently or previously diagnosed diabetes mellitus, usually accompanied by neuropathy and/or peripheral arterial disease in the lower extremity.[5] Only patients confirming to this definition of diabetic foot were included in this study. The results of our study show that 65% of patients were in the 50 to 70 years age group. Muduli *et al.*, Mehra *et al.* and Pankaj *et al.* in their studies had similar findings and they found diabetic foot to be more common in the age group of 51 to 70 years.[6,7,8] A male to female ratio was 3:2 with male predominance was seen which is similar to the findings of Mehra *et al.*[7] In 20% of patients, diabetes was newly diagnosed. In the remaining patients the mean duration of diabetes was 5 years with the longest duration of diabetes being 15 years. Similar observation was seen in the study by Mehra *et al.* with a mean duration of 4.2 years. Except for one patient who had undergone superficial femoral artery angioplasty, none of the patients had documented peripheral arterial disease or peripheral neuropathy. Khanolkar *et al.* in their paper state that some degree of diabetic neuropathy is present in more than 50% of patients aged over 60 years and also diabetes accelerates atherosclerosis.[9] Mehra *et al.* noted numbness in the foot. We did not have any such finding clinically. The use of filament test and Doppler may have helped in more objective assessment. Associated comorbidities such as hypertension in 27% patients and anaemia was noted in our study. Vijay *et al.* had a similar percentage of hypertensives in their study.[10] 47.5% patients had foot infection with three patients in sepsis. 83% of the patients had high blood sugar levels. This may be a predisposing factor for development of the infection. Surgical procedures done included debridements in 30%, minor amputations in 17.5% and major amputation in 2.5%. Our amputation rate is less compared to that of other studies with Seth *et al.* having minor amputation rate of 38.4% and major amputations at 7.69%.[11] This may be because of less associated peripheral vascular disease as noted on clinical examination or because of the shorter duration of diabetes. Cephalosporins were the most commonly used empirical antibiotic, followed by amoxicillin-clavulanate. Combination of two antibiotics either amoxicillin-clavulanic acid with metronidazole or cephalosporin with metronidazole was given for minimum 5 days and other antibiotics used included ciprofloxacin and piperacillin-tazobactum. All patients continued to receive antibiotics during the entire hospital stay. Culture sensitivity was not done as a routine in all patients. Antibiotics were administered empirically. This practice reduces the burden on health resources by selective use of investigations were necessary but at the same time there may be an argument for development of antibiotic resistance due to empirical and prolonged use of multiple antibiotics. McIntosh *et al.* in their study state that the optimum duration of antibiotics for moderate to severe infection is 1 to 4 weeks.[12] A study by Saseedharan S recommends, cefoperazone/sulbactam or piperacillin/tazobactam with clindamycin as the empiric antibiotic of choice for DFI while another study by V. Jyothylekshmy found fluroquinolones to be the most commonly used empiric antibiotic for DFI.[13,14] Choice of antibiotic may vary on surgeon preference, availability and response to the antibiotic. Majority of patients had high blood sugar levels at admission and 62.5% were on insulin treatment. Hyperglycaemia causes oxidative stress and impairs wound healing.[15] Also, hyperglycaemia increases susceptibility to infections.[16] Better

glycaemic control may reduce the risk of infection.[17] The average duration of hospital stay was 10 to 15 days with a maximum stay of 36 days. This is much less compared to the study by Chalya *et al.* in Tanzania and may be due to better health care facilities or early and less severe presentations.[18] All patients improved with treatment. No mortality was seen in the study group. Seth *et al.* study had a 3.08 % mortality. The zero mortality may be because of the better case mix in our study group. Chalya *et al.* had a mortality of 13.2% in their study group.

The limitations of this study include its retrospective nature. The number of cases are less and hence the results cannot be generalized. However, the study highlights the early presentation of diabetic foot within 5 years of onset of diabetes which may suggest factors other than ischemia and neuropathy as causative factors. The better outcome and zero mortality suggest a less severe presentation.

CONCLUSION

Diabetes and diabetic foot are major causes of concern because of rising incidence, cost of treatment and resultant burden on the country's healthcare system. The study suggests that diabetic foot complications are more likely to occur in diabetics more than 50 years of age, more likely in males. Early treatment is effective and limb saving. This study suggests that presentation of diabetic foot early in the course of diabetes mellitus maybe due to infection resulting from inadequate control of diabetes which may progress to sepsis with/without gangrene in the presence of PAD or neuropathy. Good glycaemic control and foot care knowledge may be helpful in reducing the incidence and prevalence of diabetic foot.

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