Assessment of Precipitating Factors and Treatment Modalities of the Patients Suffering from Diabetic Foot Ulcer

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ABSTRACT

Introduction: Foot disorders such as ulceration, infection or gangrene one of the leading causes of hospitalization in patients with diabetes mellitus. This variability is likely due to genetic, behavioral, and environmental factors. Diabetes mellitus prevalence also varies among different ethnic populations within a given country. The aim of the present study is to study various precipitating factors in the development of diabetic foot lesions and to assess the response of different modalities of treatment in diabetic foot ulcer patients.

Material and methods: The present study included 50 patients of diabetic foot ulcers were admitted in the Department of Surgery at Mahatma Gandhi medical college hospital Sitapura Jaipur from October 2016 to October 2017. History of diabetic status of patient was asked, whether patient was a undetected case or a known diabetic, if known the duration of the disease, whether patient was on regular or irregular treatment (diet/oral/drugs/insulin) was recorded. Cases of diabetic foot ulcer were managed both conservatively and by surgery. Skin grafting was done whenever required. All the patients were prescribed analgesics and antibiotics. Patients were followed up regularly and all the data was arranged in tabulated form and analyzed using SPSS software.

Result: The present study included 50 subjects. The mean age of the subjects was 45.76 +/- 4.22 years. Majority of subjects were between 41to 70 years of age. In 11(22%) patients duration was between 0 – 4 years, in 22(44%) patients duration was between 5 – 10 years. In the present series, pus either from abscess or from the floor of ulcer was sent for culture and sensitivity in 48 patients. In most patients more than one organism was grown on culture. There were 6% cases in whom only toes were amputated. In 4% cases, amputations were performed below the knee. In 2% cases amputation was done above the knee.

Conclusion: diabetic foot lesions commonly result from a combination of neuropathy and vascular disease in the lower extremity. Foot ulcers were the commonest type of presentation, where infection was present in all cases.

Keywords: Antibiotics, Diabetes, Ulceration.

INTRODUCTION

The term "Diabetic foot" implies that the pathophysiological processes of diabetes mellitus do something to foot, that puts at increased risk of tissue damage. Foot disorders such as ulceration, infection or gangrene one of the leading causes of hospitalization in patients with diabetes mellitus [(1)]15% of all those with diabetes during their lifetime develops an ulcer. Approximately 4/5th of foot ulcers are precipitated by external trauma, Up to 20% undergo an ipsilateral amputation within 12 months and 50% undergo a contralateral amputation within 1-3 years; 70% within 5 years.[2]The aim in managing diabetic foot is always to keep the patient at as low a stage as possible. At each stage of the diabetic foot, it is necessary to intervene early and take control of the foot to prevent further progression.[3]In 2000 the International Diabetes Federation endorsed the International Working on the Diabetic Foot as a Consultative Section on the Diabetic Foot. Together the organizations established goals for the future of diabetic foot care worldwide. [(3)] There is considerable geographic variation in the incidence of both type I and type II diabetes mellitus. This variability is likely due to genetic, behavioral, and environmental factors. Diabetes mellitus prevalence also varies among different ethnic populations within a given country. In 2000, the prevalence of diabetes mellitus in United States was 13% in African Americans, 10.2% in Hispanic Americans, 15.5% in Native Americans, and 7.8% in non-Hispanic whites.[(4)] The aim of the present study is to study various precipitating factors in the development of diabetic foot lesions and to assess the response of different modalities of treatment in diabetic foot ulcer patients.

MATERIAL AND METHODS

The present study included 50 patients of diabetic foot ulcers were admitted in the Department of Surgery at Mahatma Gandhi medical college hospital, Sitapura, Jaipur from October 2016 to October 2017. In all cases, a detailed history was taken and subjected for thorough clinical examination. In history patient's name, age, sex, occupation, level of education, date of admission and discharge to know total hospital stay, was recorded. History of trauma, thorn prick, shoe pressure, shoe bite and history of burns or application of chemical or herbal medicines was asked for. History of diabetic status of patient was asked, whether patient was a

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undetected case or a known diabetic, if known the duration of the disease, whether patient was on regular or irregular treatment (diet/oral/drugs/insulin) was recorded. Family history and history of ischemic heart disease was asked and recorded. In local symptoms, swelling, discoloration, non healing wound, pain and discharge was looked for and recorded. Patient's Hb%, TLC, DLC, ESR, blood urea, serum creatinine and blood sugar (random, fasting, postprandial) were routinely done. Urine sugar was done 3 times per day and when ketoacidosis was suspected, urine for ketone bodies was sent for examination. Whenever vascular insufficiency was detected in lower limbs, serum cholesterol ECG and Doppler was done. In all the diabetic foot patient's pus was sent for culture and sensitivity examination before starting antibiotics. X ray of the diabetic foot antero-posterior and oblique view was taken in all cases of non-healing ulcers to rule out bony changes due to diabetes and Osteomyelitis. Cases of diabetic foot ulcer were managed both conservatively and by surgery. Skin grafting was done whenever required. All the patients were prescribed analgesics and antibiotics.

STATISTICAL ANALYSIS

Patients were followed up regularly and all the data was arranged in tabulated form and analysed using SPSS software using descriptive statistics.

RESULTS

The present study included 50 subjects. The mean age of the subjects was 45.76 +/- 4.22 years. Majority of subjects were between 41to 70 years of age. There were only 12% females rest 88% were males.

Table 1 shows the duration of diabetes. It shows that 12(24%) patients were undetected at the time of admission and 38(76%) patients were already detected with diabetes prior to admission. In 11(22%) patients duration was between 0 – 4 years, in 22(44%) patients duration was between 5 – 10 years, 3(6%) patients duration was 11 – 15 years, in 1(2%) patients duration was between 16 – 20 years, in 1(2%) patient duration was between 21- 25 years.

Table 2 shows the incidence of various types of lesions. The different types of lesions included cellulitis, abscess, ulcer and gangrene. Most of the patients present with more than one lesion. Only major lesion is considered here. Ulcer was the major lesion seen in present series being present in 39 patients. While abscess seen in 7 patients, was the least common lesion.

Table 3 shows the site of lesions. Only toes were included in 10% cases. Fore foot was involved in 28% cases. Whole foot was involved in 18 (36%) cases. Involvement of hind foot was seen in 6% cases. Foot and leg was involved in 20% (n=10) cases.

Figure 1 shows the causative organism that was isolated. In the present series, pus either from abscess or from the floor of ulcer was sent for culture and sensitivity in 48 patients. In most patients more than one organism was grown on culture. Staphylococci (28) were the commonest organism grown, while streptococci were the least commonly grown organisms. In 2% cases proteus mirabilis and klebsiella pneumonia were isolated respectively. In 16% cases E.coli cultures were positive. In 14% cases, pseudomonas was seen.

Table 4 shows the medical management of the subjects. Medical Management includes control of diabetes either with oral Hypoglycemics or insulin. Majority of patients i.e. 49 patients required insulin for control of diabetes. Infection was controlled by giving antibiotics. The condition was controlled by oral hypoglycemic in only 2% (n=1) subject. Antibiotics were given to 50% subjects.

Duration of diabetes (Years)	No. of Cases	Percentage
Undetected	12	24%
< 4 years	11	22%
5 – 10 years	22	44%
11 – 15 years	3	6%
16 – 20 years	1	2%
21 – 25 years	1	2%
Total	50	100%

Table-1: Showing duration of diabetes

Type of Foot Lesion	No. of cases	Percentage (%)
Cellulitis	25	50%
Abscess	7	14%
Ulcer	39	78%
Gangrene	13	26%

Table-2: Showing incidence of various types of lesions

Site of Lesion	No. of Cases	Percentage (%)
Toes only	5	10%
Fore Foot	14	28%
Whole Foot	18	36%
Hind Foot	3	6%
Foot and Leg	10	20%
Total	50	100%

Table-3: Showing the Site of Lesion

Type	No. of Cases	Percentage (%)
Oral Hypoglycemics	1	2%
Insulin	49	98%
Antibiotics	50	100%

Table-4: Showing incidence of use of medical treatment.

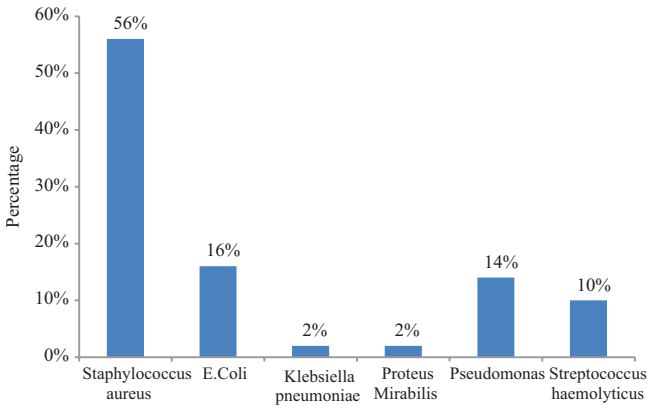

Figure-1: Shows the causative organism

Type	No. of Cases	Percentage (%)
Conservative	2	4%
Incision And Drainage	3	6%
Debridment	35	70%
Skin Grafting	20	40%
Amputations	6	12%

Table-5: Showing incidence of various surgical procedures done

Result	No. of Cases	Percentage (%)
Recovery	48	96.0
Death	2	4.0
Total	50	100.0

Table-6: Shows the outcome of the study

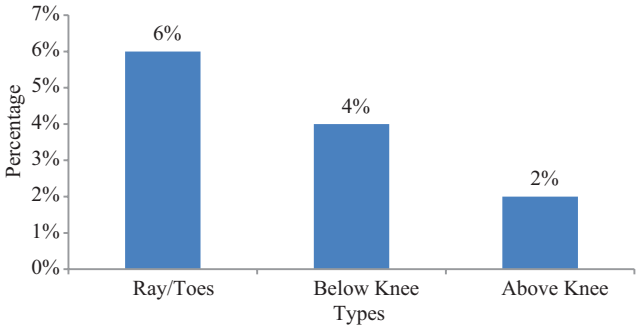

Figure-2: Shows the type of amputations

Table 5 shows the incidence of various surgical procedures performed. Surgical Management included procedures like incision and drainage, debridement, skin grafting and amputation. 2 patients were treated conservatively. Commonest surgical intervention was debridement which was carried out in about 35 patients. Skin grafting was done in 40% (n=20) subjects. Amputation was done in 6 patients. Incision and drainage was performed amongst 6% (n=3) subjects.

Figure 2 shows the type of amputations done. There were 6% cases in whom only toes were amputated. In 4% cases, amputations were performed below the knee. In 2% cases amputation was done above the knee.

Table 6 shows the outcome of the study. In the present series 48 patients recovered from their lesions after treatment, while the remaining 2 patients died due to various complications.

DISCUSSION

Diabetic mellitus has reached epidemic properties worldwide as we enter the new millennium. The world health organization has commented there is “an apparent epidemic Over the next decade the projected number will exceed 200 million.[5] Diabetic foot is a serious complication of diabetes mellitus when compared with people without diabetes. Foot ulcers are significant complications of diabetes mellitus and often proceed lower extremity amputation. Recurrence of the foot infection was common among India diabetic patients about 52%.[6] Infection and gangrene of the lower extremities are the most common lesions requiring hospitalization in diabetes and are a major cause of morbidity. [7] In the present study, majority of patients of diabetic foot belonged to the age group of 41-70(86%) years of age. Our study correlated with study done by Nancy S lone study, the average age of diabetic patient was 40- 59 year.[8] In present series 88% were males and 12% were females. In C. Anand study among 107 patients, 70 were males and 37 were females. It suggests that our country is a male predominant country. It may be due to a result of occupational and recreational activities that put more stress on the feet, mainly for men as it affected more than females. [9] In the present study of diabetic foot patients, duration was between 0 – 4 years in 22% of patients and 22(44%) patients duration was between 5-10 years, 3(6%) 11-15 years, 1(2%) 16-20 years and 1(2%) duration was between 21-25 years. In Ramachandra et al study among 613 samples, the average diabetes duration until the onset of foot lesion was 12 years in India. [10] In our study, the most common site was foot. Because most of our patients present late to the hospital, by that time infection spreads from toes to the foot. Also barefoot walking predisposes to foot trauma. In western study, lesions in toes are the commonest presentation may be because of early presentation and closed variety of foot wear. In a study conducted by Boston [12] and Kao Hsiung etal (199) [11] foot was the most common presentation.

In our study Staphylococcus aureus (56%), E.Coli (16%). Klebsiella pneumonia (2%), Proteus spices (2%), Pseudomonas species (14%) and streptococcus hemolyticus (10%) were the commonly isolated organisms. In a study conducted at Adan teaching hospital by Abdul razak Aet al, Staphylococcus aureus was the most common isolate, being recovered from 38.4% of cases.[13] In another study conducted by El-Tahaway A T[14] Staphylococcus aureus was the commonest isolate being recovered from 28% of cases, including methicillin resistant staphylococcus aureus in patient wounds. In the study of Jeffcoate WJ, Chipchase SY[15] of the ulcers, 55.0% and 65.7% healed without amputation by 6 and 12 months, respectively. Median (range) time to healing was 78 (7-364) days.[16-18]

CONCLUSION

To conclude, diabetic foot lesions commonly result from a combination of neuropathy and vascular disease in the lower extremity. Foot ulcers were the commonest type of presentation, where infection was present in all cases. Patients present to us in the late stage of the disease may be because of illiteracy and poor knowledge about diabetic foot complications. Mortality is mainly because of uncontrolled diabetes with ketoacidosis or septicemia at the time of presentation.

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