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Assessment of frequency of below knee amputation after conservative management in tertiary care hospital of Pakistan.

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ABSTRACT… Objective: To determine the frequency of patients who need below knee amputation after conservative management presenting in the tertiary care hospital of Pakistan. **Study Design:** Observational Cross-sectional study. **Setting:** Azra Naheed Medical College/CMA Teaching and Research Hospital Lahore Pakistan. **Period:** One year from 31st March 2022 to 28th February 2023. **Methods:** After approval from the Institutional review board of Azra Naheed medical College, the sample was raised using non-convenience probability sampling. Sample size of 145 cases is calculated. Patients were diagnosed as diabetic patients if their random blood sugar was more than 200 mg/dl on initial presentation. All patients underwent surgical examination by a senior consultant surgeon. Conservative patients were assessed on weekly and monthly basis in OPD. The data was entered and analyzed through SPSS version 24. **Results:** The minimum age of patient underwent BKA was 38 years old, and the maximum age was 64 years old, resulting in a mean age of 52.41 + 6.88 years. that most of the amputations were done in group of 41 to 50 years of age (33.3%) while age groups of 30 to 40 years and 51 to 60 were managed conservatively (72.2%) and (72.8%) respectively. **Conclusion:** Frequency of need for below knee amputation in patients presenting with diabetic foot in our tertiary care hospital managed conservatively is not very high and in agreement with local studies, however, the variation of magnitude still exists due to various effect modifiers.

Key words: Amputation, Infection, Diabetes, Gangrene.

INTRODUCTION

Patients with diabetes often get foot infections. Almost every foot infection requires a mix of surgery and medication. Throughout their lives, 10% of diabetics get foot ulcers.[1] Individuals with diabetes are more likely to suffer lower-extremity amputations, and the primary cause of this is diabetic peripheral vascular disease, which is exacerbated by high blood glucose levels directly damaging blood vessels and nerves. Collagen synthesis is also compromised, which hinders wound healing.[2]

The incidence and danger of death from uncontrolled infection will grow with age and length of the disease, among other factors. Patients with diabetes mellitus may be more susceptible to infections of all kinds, many of which are serious.[3] Diabetic foot ulcers are a result of diabetes, not the cause. All infections start out small and can spread to deep tissues, joints, or bones if left untreated. The pathological representation of diabetic foot is complicated by the infection. According to a study on diabetic foot ulcers, people with infections had a 50% higher chance of losing a lower limb than those without infections.[4] One of the worst outcomes for diabetic foot patients with infected foot ulcers is lower limb amputation, which accounts for about 60% of cases.

Surgical debridement, dressings to promote a moist wound environment and regulate exudate, wound off-loading, vascular evaluation, infection and glucose control are routine methods in the care of diabetic foot ulcers.[5] It is best to have a multidisciplinary diabetic foot wound clinic oversee these procedures.

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The results of Diabetic Foot ulcers (DFU) can still be improved, even with an all-encompassing strategy. Numerous adjuvant therapy has been investigated to lower the incidence of amputation and DFU recovery timeframes.[6]

This study's goal was to determine how frequently patients with diabetic foot who report to a tertiary care hospital and are treated conservatively require below-knee amputations.

METHODS

It was an observational cross-sectional study done at department of orthopedics of CMA teaching and research hospital Lahore which is teaching hospital of Azra Naheed medical college/Superior University Lahore Pakistan. The duration of study was one year from 31st march 2022 to 28th February 2023. Sample size of 145 cases is calculated with 95% confidence level, 5% margin of error and taking expected percentage of amputation i.e., 10.5% in patients presenting with diabetic foot.[7] After approval from the Institutional review board of Azra Naheed medical College (IRB/ANMC/2024/24), the sample was raised using non-convenience probability sampling from among those admitted through the surgical and orthopedic outpatient and emergency department (OPD) of CMA teaching and research hospital Lahore. Inclusion criteria of patients include age more than 30 years, of either gender presenting with diabetic foot for more than 1 month duration and <50% foot area and managed conservatively. All these patients were diagnosed with diabetes for at least one year. Exclusion criteria include Patients with traumatic amputation and amputations in non-diabetic patients (on medical record) and Patients already requiring amputation the time of presentation. 145 cases fulfilling the inclusion criteria were enrolled in the study. Informed consent was obtained demographic profile (name, age, gender, duration of diabetes, duration of diabetic foot and size of ulcer at presentation) was noted. Then all patients underwent surgical examination by a senior consultant surgeon having at least 4 years post-graduation experience with assistance of researcher. Patients were advised to control diabetes and were referred to endocrinologist for control of diabetes. Diabetes medications were also revised. Infection was managed by drainage and antibiotic therapy for 1 month. At weekly intervals foot was reexamined and if patient requires BKA, amputation was done. All amputates were done by same surgeon under spinal anesthesia. All this information was recorded on proforma. Patients were diagnosed as diabetic patients if their random blood sugar was more than 200 mg/dl on initial presentation. It is defined as presence of infection (presence of pus, redness, swelling, bacterium >10/HPF in pus discharge on culture test), diabetic foot ulcer and neuropathy i.e., reduced sensory perception assessed by pin prick test. Patients presenting first time with diabetic foot were included. Ulcers <50% surface area of foot was included. Patients of diabetic foot that are given treatment with broad spectrum antibiotics. Conservative patients were assessed on weekly and monthly basis in OPD. Below knee amputation was done when the foot becomes gangrenous (black in color) and when the infection did not respond to drainage and antibiotic therapy.

The data was entered and analyzed through SPSS version 20. Mean and standard deviation was calculated for the quantitative variables like age, duration of diabetes, duration of diabetic foot and size of ulcer at presentation. Frequency and percentage was calculated for the qualitative variables like gender and need for below knee amputation. The data was stratified for age, gender, duration of diabetes, duration of diabetic foot and size of ulcer at presentation. Post-stratification, chi-square test was applied to compare each stratum for amputation. P value <0.05 was considered as significant.

RESULTS

The age distribution of the patients reveals that 46.21% (n=67) were between 61 and 80 years of age, while 53.79% (n=78) were between 40 and 60 years of age. The minimum age of patient underwent BKA was 38 years old, and the maximum age was 64 years old, resulting in a mean age of 52.41 + 6.88 years. According to gender breakdown, there were 51.03% of men (n = 74) and 48.97% of women (n = 71). Detailed

description of patients according to age group and gender is present in Table-I.

Table-II showing number and percentages and patients in different age groups, gender with duration of diabetes and duration of diabetic foot. The number of below knee amputations and number of patients with conservative management are also shown against each category. It is clear from the table that most of the amputations were done in group of 41 to 50 years of age (33.3%) while age groups of 30 to 40 years and 51 to 60 were managed conservatively (72.2%) and (72.8%) respectively.

Age Groups	Gender Number With Percentage	Total Number With Percentage
30 to 40 years	Male = 13 (72.2%)	18 (12.4%)
	Females = 5 (27.7%)	
41 to 50 years	Male = 24 (61.5%)	39 (26.8%)
	Females = 15 (28.4%)	
51 to 60 years	Male =28 (47.4%)	59 (40.6%)
	Females = 31 (52.5%)	
60 to 70 years	Male = 9 (31.03%)	29 (20%)
	Females = 20 (68.9%)	
Total	Male = 74 (51.0%)	145 (100%)
Total	Female = 71 (48.9%)	

Table-I. Showing number and percentages of patients in different age groups which are further divided into gender.

DISCUSSION

Patients with diabetes account for five out of six lower limb amputations; this is a higher rate of amputations than in non-diabetics. According to statistics, foot lesions account for 25% of diabetic hospital admissions, and 40% of patients with diabetes foot require amputation. Diabetics account for 50–70% of all non-traumatic amputations.[8]

In our study, smoking, obesity, and hypertension were revealed to be significant risk factors, although male sex and age were not. Two important risk variables were a family history of diabetes and a history of trauma. Ten patients underwent below-knee amputations, which are suggested for severe infection, tissue damage, and intractable rest discomfort.[9]

Patients with diabetes account for five out of six lower limb amputations; this is a higher rate of amputations than in non-diabetics. According to statistics, foot lesions account for 25% of diabetic hospital admissions, and 40% of patients with diabetes foot require amputation.[10] Diabetics account for 50–70% of all non-traumatic amputations. Because the literature presents conflicting data regarding the severity of the issue in the local population, the aim of this study was to determine the frequency of below-knee amputation among patients presenting with diabetic foot in a tertiary care hospital. We therefore intended to carry out this study to verify the facts regarding the prevalence of amputations among the local community among patients receiving treatment at tertiary care hospitals.

		Amputations (N, %)	Conservative Management (N, %)
Age groups	30 to 40 years (N=18,12.4%)	5 (27.7%)	13 (72.2%)
	41 to 50 years (N=39,26.8%)	13 (33.3%)	26 (66.6%)
	51 to 60 years (N=59,40.6%)	16 (27.1%)	43 (72.8%)
	60 to 70 years (N=29,20%)	4 (13.79%)	25 (86.20%)
Gender	Male (N=74,51.0%)	19 (25.6%)	55 (74.3%)
	Female (N=71,48.9%)	19 (26.7%)	52 (73.2%)
Duration of Diabetes	< 10 years (N=120,82.7%)	6 (24%)	19 (76%)
	> 10 years (N=25,17.2%)	32 (26.6%)	88 (73.3%)
Duration of diabetic foot	< 2 years (N=88,60.6%)	16 (28%)	41 (71.9%)
	> 2 years (N=57,39.3%)	22 (25%)	66 (75%)
Total Number		38 (26.2%)	107 (73.7%)

Table-II. Showing number and percentages and patients in different age groups, gender with duration of diabetes and duration of diabetic foot. The number of below knee amputations and number of patients with conservative management are also shown against each category.

In order to enhance the quality of life for such delicate and important patients in the future through the planning of preventive and improved management procedures.

A local study from Pakistan that revealed that 25% of patients presenting with diabetic foot had below-knee amputations, which is consistent with our findings.[10] Similar to our findings, another Iranian study found that in patients presenting with diabetic foot, the frequency of below knee amputation was 28.8%.[11] On the other hand, an Indian study found that patients with diabetic foot had a lower frequency of below-knee amputations (10.5%), which is lower than the results of our study.[12]

We discovered that patients with diabetes for more than 10 years had a considerably greater number of amputations. Our findings differ from those of Mizouri et al., who discovered no relationship (p=0.24) between the severity of the diabetic foot and the length of diabetes.[13] Neuropathy and the length of diabetes were found to be related in multicenter research involving 6487 diabetic patients. Eight papers were included in a systematic review that found a favorable correlation between DFP and the length of diabetes.[14]

Given the greater variance shown in the literature, a number of diabetic foot complications are preventable. Good glucose control and patient education are a couple of them. The clinical severity of the infection is the primary factor that determines whether diabetic foot infection patients require hospitalization.[15] Endovascular operations are the way of the future for treating diabetic peripheral artery disease and, consequently, diabetic foot, because they involve less surgical stress and have some therapeutic effects. A vascular surgeon should ideally evaluate diabetic feet because it's important to always think about revascularization and choose the right subgroup for amputation. Using multidisciplinary teams and providing guideline-based treatment for diabetic foot infections may enhance outcomes and reduce the need for amputations.[16]

There are some limitations to this study. First it was a single center study and secondly sample size is not large enough. More multinational studies are required with a large sample size on this topic to ascertain the best role and outcomes of conservative management of diabetic foot ulcers.

CONCLUSION

We concluded that the frequency of need for below knee amputation in patients presenting with diabetic foot in our tertiary care hospital managed conservatively is not very high and in agreement with local studies, however, the variation of magnitude still exists due to various effect modifiers. More studies should be done to create awareness in general public for avoidance of limb amputation.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Furukh Abbas	1,2,3 Substantial contribution to the design of the work, revising it critically for important intettlectual content, final approval of the version to be published and agreement to be accountable for al laspects of the work in ensuring that question related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.	
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