Clinical profiles of patients with diabetic foot ulcer undergoing minor/major limb amputation at a tertiary care center

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Abstract

Background: Diabetic foot ulcers complications are the major cause of non-traumatic major limb amputation. We aimed at assessing the clinical profiles of diabetic foot ulcer patients undergoing minor/major limb amputation in the Surgical Department at R. L. Jalappa Hospital & Research centre, a tertiary care hospital in Kolar.

Methods: A retrospective hospital-based study was conducted from September 2020 through September 2021. Diabetic foot ulcers were graded according to the Meggitt-Wagner classification system. Hemoglobin and random blood glucose levels data were retrieved from patient files.

Statistical analysis: Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi-square test was used as test of significance for qualitative data. Continuous data was represented as mean and standard deviation.

Graphical representation of data

MS Excel and MS word was used to obtain various types of graphs such as bar diagram, Pie diagram.

p value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

Statistical software

MS Excel**,** SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyze data.

Results

A total of 86 patients were studied. More than two third of patients (63/86; 73.25%) were subjected to minor/major amputation. Of them, fifty-seven (66.27%) were males. 85 (98.83%) had type II diabetes. Nearly two-thirds (63/86; 73.25%) had duration of diabetes for

more than 5 years. The age group was between 37-90 years.

Introduction

Diabetes is a chronic metabolic disease characterized by elevated levels of blood glucose (or blood sugar) which leads over time to serious damage to the heart, blood vessels, eyes, kidneys and nerves as per WHO definition. It is a most common disease with chronic presentation and requires long term medical attention.

Diabetic foot (DF) is an infection, ulceration or destruction of tissues in the foot of a diabetic, either newly diagnosed or previously diagnosed. Diabetes foot ulcer is a dreadful complication of diabetes and about 8–20% of the diabetics experience a foot ulcer in their lifetime[1].

Diabetic foot ulcers cause morbidity, mortality, rise in cost of living, decrease in quality of daily activities and quality of life. Patients with long standing diabetes develops Charcot foot, peripheral neuropathy or peripheral arterial disease, which is the most important precursor for lower-extremity amputations. If proper care and glycemic control is not attained by individual with diabetic foot, risk of lower limb amputations increases, which contribute to nearly 40–70% of all non-traumatic amputations[2].

Though diabetes is most commonly seen systemic disease, still the factors which play major role in diabetic foot ulcer patients leading to amputations are unknown. The size of ulcer is directly proportional to requirement of amputation. Factors like younger age group with good glycemic control and hemoglobin levels, area of ulcer, duration of ulcer, depth and tissues which form base of the ulcer plays a very important role in healing.

In this study we document the clinical profiles of diabetic patients considering their age, sex, RBS, Hemoglobin,

Meggitt-Wagner grade of ulcer and incidence of amputations accordingly. This study provides awareness to surgeons, physicians and patients self and incidence of amputations can be reduced[3].

Objective of The Study

The objective of study is to document the clinical profiles of patients with diabetic foot ulcers who underwent major or minor limb amputations.

Materials And Method

This is an observational retrospective study, 86 patients presented to OPD of Department of General Surgery with complaints of diabetic foot over period of September 2020 to September 2021 in, R.L. Jalappa Hospital, Kolar were included

Characteristics like patients i.e. name, age, hemoglobin levels, diabetic status, Meggitt – Wagner grade distribution were noted.

Inclusion Criteria

All Patients presented to OPD of Department of General Surgery with complaints of diabetic foot from September 2020 to September 2021 in, R.L. Jalappa Hospital, Kolar.

Exclusion Criteria

Patients presenting with ulcers with no diabetic history

Statistical Analysis

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi-square test was used as test of significance for qualitative data. Continuous data was represented as mean and standard deviation.

Graphical representation of data

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Statistical software

MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyze data.

Results

Age range of 86 subjects of diabetic foot, under study in a period of one year in General surgery department of RLJH, Tamaka, A tertiary care centre was included in the study with maximum subjects falling in age group between -75 years i.e-36(41.86%)

However 4.65% of subjects i.e 4 in number are <35years of age, 30.23% of subjects i.e.26 in number are 35-50 years of age.

>75-90 years account to 23.25% i.e 20 subjects. (Table I).

In this study 33.72% of subjects i.e.,29 in number are females, 66.27% of subjects i.e., 57 in number are males (Table II).

70.93% of subjects i.e 61 in number had hemoglobin level of <12gm/dl and 16 subjects i.e 18.60% had hemoglobin level of 12-14gm/dl and 9 subjects i.e., 10.46% had hemoglobin level of >14gm/dl. (Table III).

In this study 3.48% of subjects i.e 3 in number falls in group of random blood sugar <120mg/dl, 10.46% of subjects i.e 9 in number falls in group of RBS 120-200 mg/dl, 17.44% of subjects i.e 15 in number falls in group of RBS 150-200mg/dl (Table IV).

In this study 73.25% of subjects i.e 63 in number underwent amputation and 26.74% of subjects i.e 23 in number underwent debridement (Table V)

In this study total 86 subjects were included in which 63 underwent amputation, out of 63 subjects, 31subjects i/e 36.04% underwent Ray's amputation, 16 subjects i.e

18.60% underwent forefoot amputation, 27 subjects i.e.,31.39% underwent below knee amputation and 12 subjects i.e., 13.95% underwent above knee amputation (Table VI).

Total 86 subjects included in this study 4 subjects i.e 4.65% fall under Meggitt-Wagner Grade 1, 18 subjects i.e., 20.93% fall under Meggitt-Wagner Grade II, 22 subjects i.e., 25.58% fall under Meggitt-Wagner Grade III, 42 subjects i.e 48.83% fall under Meggitt-Wagner Grade >III.

(Table VII)

Total 42 patients who fall under Meggitt-Wagner Grade 3, 73.80% i.e., 31 subjects underwent amputations and 26.19% i.e 11 subjects underwent debridement (Table VIII).

Table 1: Distribution of Patients by Age N=86

AGE	No. of patients	Percentage
<35years	4	4.65%
35-50years	26	30.23%
50-75years	36	41.86%
75-90years	20	23.25

Fig 1: distribution of patients by age.
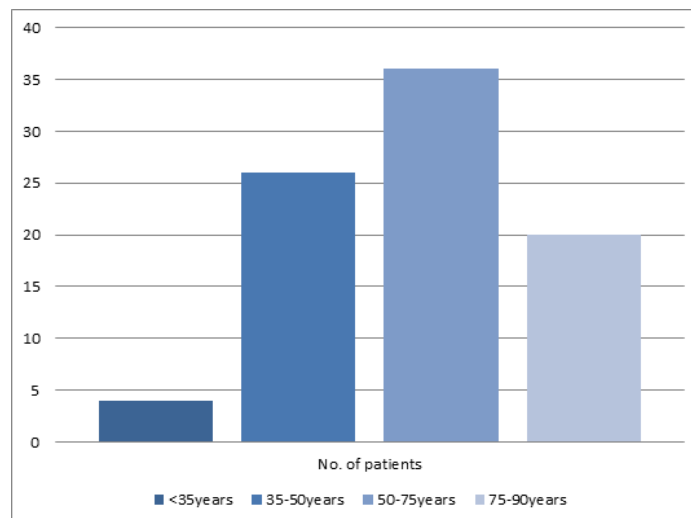
Table 2: Sex Distribution

Sex	Number	Percentage
Female	29	33.72%
Male	57	66.27%
Total	86	100%

Fig 2: sex distribution.

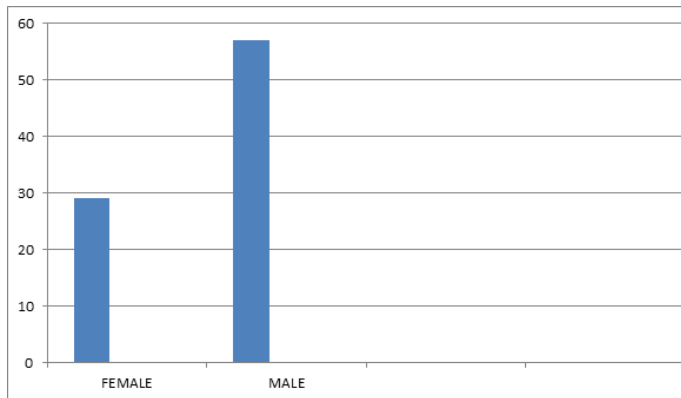
Table 3: Haemoglobin Distribution

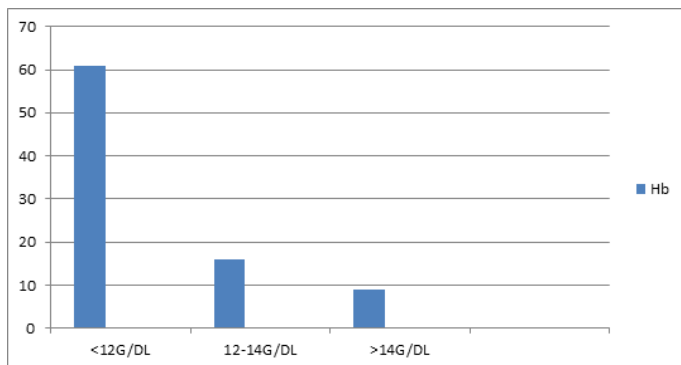| Hb	Number	Percentage
<12G/DL	61	70.93
12-14G/DL	16	18.60
>14G/DL	09	10.46

Fig 3: haemoglobin distribution.

Table 4: RBS Distribution

RBS	Number	Percentage
<120MG/DL	3	3.48%
120-150MG/DL	9	10.46%
150-200MG/DL	15	17.44%
>200MG/DL	59	68.60%

Fig 4: Rbs distribution.
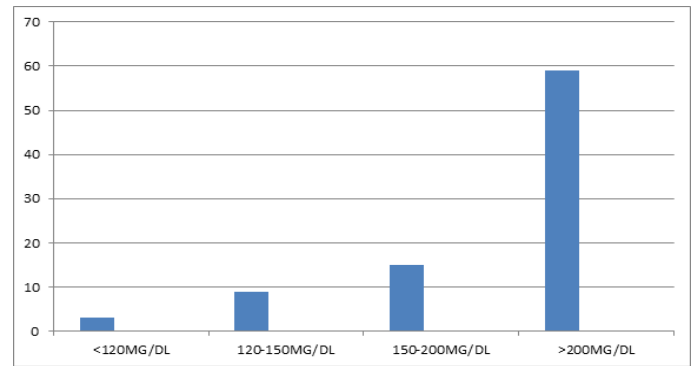
Table 5: no. Of patients who underwent amputations

Procedure	Number(n=86)	Percentage
Amputation	63	73.25%
Debridement	23	26.74%

Fig 5: no. Of patients who underwent amputations.
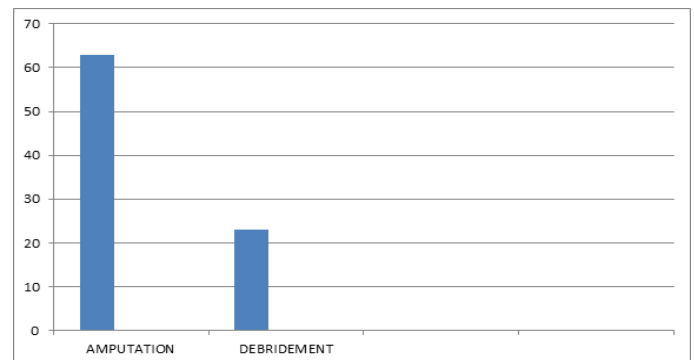
Table 6: types of amputations

Type of amputation	Number	Percentage
Rays	31	36.04
Forefoot	16	18.60
Bka	27	31.39
Aka	12	13.95

Fig 6: types of amputation
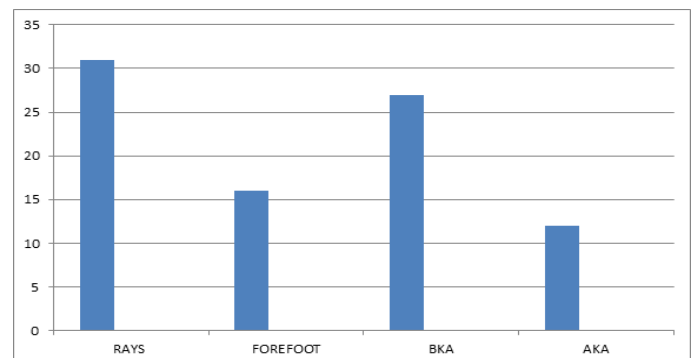
Table 7: Meggitt – Wagner grade distribution

Grade(n=86)	Number	Percentage
1	4	4.65
2	18	20.93
3	22	25.58
>3	42	48.83

Fig 7: Meggitt – Wagner grade distribution
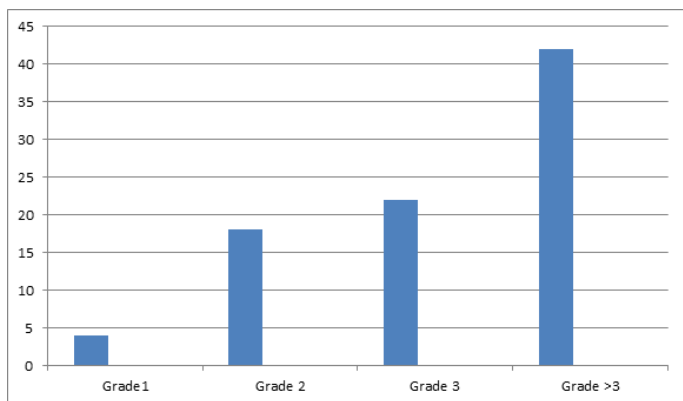
Table 8: no of amputations in Meggitt – Wagner grade 3

Procedure	Number (n=42)	Percentage
Amputations	31	73.80%
Debridement	11	26.19%

Fig 8: no of amputations in Meggitt - Wagner grade 3
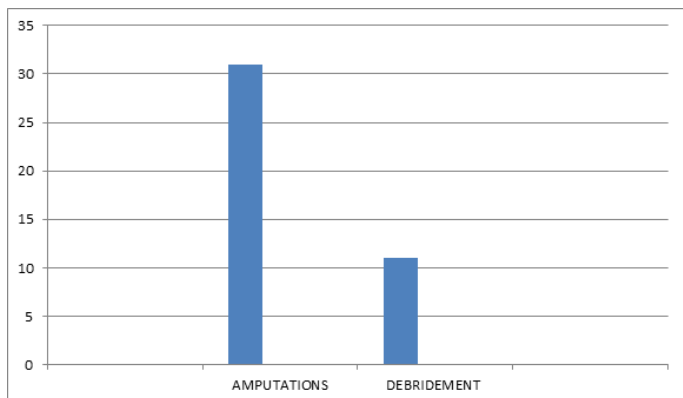
Discussion

The main aim of this study is to identify the predictors of amputations in diabetic foot ulcers admitted in surgical wards of RLJH, Tamaka, Kolar. In our study population age at presentation, sex, anemia, poor glycemic control and Meggitt-Wagner's ulcer grade 3 and above were considered as main predicting factors for major limb amputation. In Our study maximum subjects fall in age group between 50-75 years i.e(41.86%) and 4.65% of subjects are <35years of age, 30.23% of subjects in number are 35-50 years of age and >75-90 years account to 23.25% [4].

In this study 33.72% of subjects are females, 66.27% of subjects are males.

70.93% of subjects had hemoglobin level of <12gm/dl and 18.60% had hemoglobin level of 12-14gm/dl and 10.46% had hemoglobin level of >14gm/dl which is consistent with the study by Salman IN et.al [3,5].

There is more evidence for a strong association between anaemia and amputation according to Gezawa ID et al study.

Xiang J et al. study shows the incidence of amputations is more in patients with high glucose levels which is similar to this study as 3.48% of subjects had random blood sugar <120mg/dl, 10.46% of subjects had RBS 120-200 mg/dl and 17.44% of subjects had RBS 150-200mg/dl[4,5].

In this study 73.25% of subjects underwent amputation and 26.74% of subjects underwent debridement which is consistent with findings of Dutra LMA et al study[6].

In this study total 86 subjects were included in which 63 underwent amputation, out of 63 subjects, 31subjects i/e 36.04% underwent Ray's amputation, 16 subjects i.e 18.60% underwent forefoot amputation, 27 subjects i.e.,31.39% underwent below knee amputation and 12 subjects i.e., 13.95% underwent above knee amputation[7,8].

4.65% fall under Meggitt-Wagner Grade 1, 20.93% fall under Meggitt-Wagner Grade II, 25.58% fall under Meggitt-Wagner Grade III, 48.83% fall under Meggitt-Wagner Grade >III which is similar to results of Praveena DL et al study[8,9].

Wagner Meggitt classification

Grade	Lesion
0	No open lesion
1	Superfcial ulcer
2	Deep ulcer to tendon or joint capsule
3	Deep ulcer with abscess, osteomyelitis, or joint sepsis
4	Local gangrene – forefoot or heel
5	Gangrene of entire foot

In this classification grade 0–3 is mainly based on neuropathy with grade 4–5 representing ischaemic lesions. It was used in this study due to its predictive value of treatment outcome. It has been observed that Meggitt-Wagner grading of diabetic foot ulcer affects and predicts the outcome and the increased risk of amputation[9].

Conclusion

In our study, the patients suffering from diabetic foot ulcers treated in a tertiary care center in Kolar, the likelihood of amputation significantly correlated with the initial grade of the Meggitt-Wagner ulcer classification, High blood glucose levels and anemia which seem to be important risk factors and also main predictors for amputation. Besides the daily care, special attention should be given for patients having advanced grades of diabetes foot ulcers.

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