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Original article

Clinico-pathological aspects of diabetic foot: A descriptive observational study from Maharashtra

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Abstract

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by increased glucose levels in the blood which contributes in the development of microvascular, macrovascular and neuropathic complications. Since the development of foot ulcers and amputations are preventable and this condition can greatly affect the quality of life of patients, prevention of this complication can relieve direct and indirect cost burdens on society. **Objectives:** To understand the Clinico-pathological aspects of diabetic foot. **Methodology:** The present descriptive observational study was carried out at Department of General Surgery involving 60 patients with diabetes mellitus suffering from foot ulcers and infections visiting to Department of General Surgery. Results: Mean age of the study population was 52.76±10.25 years. Majority of them were males i.e. 41(68.350 and remaining were females i.e. 19(31.7%). Males were predominant in our study with male to female ratio as 2.15:1. Ulcer was seen in 31 patients out of 60 cases i.e. 51.6%. We observed Neuro ischemic and Pure neuropathic type of ulcers in 9 patients each i.e. 15% followed by pure ischemic in 13.3% cases. **Conclusion:** Majority of the patients presented with ulcer i.e. 31(51.7%), 12(20%) had cellulitis, 9(15%) presented with abscess and 8 patients i.e. 13.3% had gangrene. Site of ulcer was on dorsum of foot in majority of the cases i.e. 17(28.3%) followed by ulcer on heels in 15 patients i.e. 25%.

Key words: Clinico-pathology, diabetic foot

Introduction

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by increased glucose levels in the blood which contributes in the development of microvascular, macrovascular and neuropathic complications. Diabetes is emerging as a major health problem which increases the rate of morbidity and mortality.[1] According to WHO estimation, the global prevalence of diabetes is increasing at a rate of more than 120%. In 1995 there were 135 million people affected with diabetes mellitus; in 2000 the number rose to 171 million. Worldwide the projected estimate of the people likely to get affected with diabetes by 2025 will be 300 million and by 2030 will be 366 million. In India it was 31.7 million in 2000 and will be increased as 79.4 million in 2030. [2] The diabetes epidemic and diabetes rates in South Asia vary from 3.3% in Nepal to 10% in India. [3]

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World health organization estimates 60% of diabetic population will be from developing countries of Asia by 2025. The highest regional prevalence is reported as 10.2% in North America followed by 6.7% in south Asia. The most important demographic change is the increase in the proportion of people >65 years of age prone to diabetes across the world. According to the 20th Annual World Diabetes Congress (AWDC), 50.8 million of individuals have diabetes in India. India is one of the top ten country for numbers of people aged 20-79 years with diabetes in 2010 and 2030. The prevalence of diabetes is increased due to change in lifestyle modification such as decreased physical activity and increased obesity. International diabetic federation estimates that diabetes represents the fourth leading cause of global deaths. [2]

According to the Lancet study, China, India and USA are the top three countries with a large number of diabetic populations. In 1980, 20.4 million in China was increased to 102.9 million in 2014, the rise has been equally dramatic in India from 11.9 million in 1980 to 64.5 million in India. Prevalence of diabetes has more than doubled for men in China and India (3.5 percent to 9.9 per cent in China and 3.7 per cent to 9.1 per cent in India). It has also increased by 50 per cent among women in China (5.0 per cent to 7.6 per cent) and 80 per cent among women in India (4.6 percent to 8.3 percent). The prevalence of type 2 diabetes is projected to rise from 246 million people to 380 million people by 2025 worldwide. It is representing as 7.1% of global adult population. [4]

Since the development of foot ulcers and amputations are preventable and this condition can greatly affect the quality of life of patients[5], prevention of this complication can relieve direct and indirect cost burdens on society.

Foot ulceration is preventable, and relatively simple interventions can reduce amputations by up to 80 percent. Though there is an obvious increase in diabetic foot care awareness, there are tremendous gaps in routine foot evaluations. To prevent the development of foot ulcer, early detection of the foot at risk should be afforded a high clinical priority. [6]

Hence the current study was planned in order to assess and understand the pathology of diabetic foot.

Objectives: To understand the Clinico-pathological aspects of diabetic foot.

Materials and Methods

Study setting: Department of General Surgery,

Study population: All patients with diabetes mellitus suffering from foot ulcers and infections visiting to Department of General Surgery

Study period: From January to August 2024

Study design: Descriptive observational study

Sample size:

Sampling technique: Simple Random sampling method

Inclusion criteria:

1) All patients with diabetes mellitus suffering from foot ulcers and infections are included in the study.
2) Patients with known past history of diabetes are also included.
3) Patients with gangrenous foot, complicated by diabetes are included in the study.

Exclusion criteria:

1) Patients with foot infections without diabetes mellitus are excluded.
2) Patients with gangrene foot of etiology other than infection of foot complicated by diabetes are excluded.
3) Patients whose treatment cannot be completed due to non-compliance will be excluded

Methods of data collection:

- Detailed history taking.
- Thorough physical examination.
- Routine investigations.
- Relevant special investigations.
- Choosing the appropriate line of treatment
- Detailed history and thorough clinical examination will be done in all cases. Documentation will be done using a stratified proforma which includes demographic data of the patients studied; all the details of necessary investigations carried out and the types of management and treatments provided to the patients enrolling in the study.
- Assessment of patients following treatment at regular intervals in comparison to his/her pre-treatment with regards to symptoms.
- For all patients, hematological, biochemical, microbiological and radiological investigations will be carried out as enumerated in the proforma using standard procedures.

Statistical analysis:

Data was collected by using a structure proforma. Data entered in MS excel sheet and analysed by using SPSS 24.0 version IBM USA. Qualitative data was expressed in terms of proportions. Quantitative data was expressed in terms of Mean and Standard deviation. Association between two qualitative variables was seen by using Chi square/ Fischer's exact test. A p value of <0.05 was considered as statistically significant whereas a p value <0.001 was considered as highly significant.

Results

Table 1: Distribution according to age group

	Frequency	Percent

Age group in years	< 30	3	5.0
	31-45	12	20.0
	46-60	34	56.7
	> 60	11	18.3
	Total	60	100.0

We included total 60 patients of diabetic foot in our study. Majority of them were from 46-60 years age group i.e. 34(56.7%) followed by 12 patients i.e. 20% from 31-45 years, 11(18.3%) from above 60 years. Mean age of the study population was 52.76±10.25 years.

Table 2: Distribution according to gender

		Frequency	Percent
Gender	Male	41	68.3
	Female	19	31.7
	Total	60	100.0

Majority of them were males i.e. 41(68.350 and remaining were females i.e. 19(31.7%). Males were predominant in our study with male to female ratio as 2.15:1

Table 6: Distribution according to clinical presentation

		Frequency	Percent
Clinical presentation	Abscess	9	15.0
	Cellulitis	12	20.0
	Gangrene	8	13.3
	Ulcer	31	51.7
	Total	60	100.0

Majority of the patients presented with ulcer i.e. 31(51.7%), 12(20%) had cellulitis, 9(15%) presented with abscess and 8 patients i.e. 13.3% had gangrene

Table 7: Distribution according to site of lesion

		Frequency	Percent
Site of lesion	Dorsum foot	17	28.3
	Heel	15	25.0
	Plantar foot	11	18.3
	Toes	6	10.0
	Whole fore foot	11	18.3
	Total	60	100.0

Site of ulcer was on dorsum of foot in majority of the cases i.e. 17(28.3%) followed by ulcer on heels in 15 patients i.e. 25%, plantar foot in 11(18.3%) cases, on whole fore foot in 11(18.3%) and on toes in 6 cases i.e. 10%

Table 9: Distribution according to type of ulcer

		Frequency	Percent
Type of ulcer	No ulcer	29	48.3
	Non classified	5	8.3
	Neuro ischemic	9	15.0
	Pure ischaemic	8	13.3
	Pure neuropathic	9	15.0
	Total	60	100.0

Ulcer was seen in 31 patients out of 60 cases i.e. 51.6%. We observed Neuro ischemic and Pure neuropathic type of ulcers in 9 patients each i.e. 15% followed by pure ischemic in 13.3% cases.

Discussion

<u>Demographic information</u>

We included total 60 patients of diabetic foot in our study. Majority of them were from 46-60 years age group i.e. 34(56.7%) followed by 12 patients i.e. 20% from 31-45 years, 11(18.3%) from above 60 years. Mean age of the study population was 52.76±10.25 years. Majority of them were males i.e. 41(68.3%) and remaining were females i.e. 19(31.7%). Males were predominant in our study with male to female ratio as 2.15:1. 88.3% were of type 2 diabetes and 11.7% were of type 1 diabetes. Majority of the patients i.e. 41(68.3%) were on Human Mixtard, 14(23.3%) were on Human Actaprid and remaining i.e. 5(8.3%) were taking OHAs

Dhanraj M. et al[7] reported in his study that out of 100 cases studied, most of the diabetic patients with foot lesions were in the age group of 61-70 (32%) followed by 51-60 (24%) (Table 1). The youngest was 31 years, came with complaints of abscess over the (R) forefoot and the oldest was 80 years admitted for cellulitis of (R) the whole forefoot. 78 (78%) were male patients and 22 cases female patients. The ratio of male: female is 3.54:1. Most of the patients had diabetes duration for about 6-10 years (28%). These findings are consistent with our findings. **Ved Prakash et al**[8] in his study reported that 46.3 ± 16.4 years were the mean age of the patients and 96% were having type 2 diabetes. 61% were males and 39% were females which is consistent with our study findings. 37% of the patients were on insulin and 27% were on both oral and insulin combined treatment. **Vasanthan K et al**[9] included 253 patients with diabetes mellitus presenting with wound infection, 169 males and 84 females. Most of the patients were in the age group of 51–70 years. The present study depicts the mean age of the study population was 57.57 years with more than 70% cases were above the age of 50 years

Ulcer presentation

In our study, majority of the patients presented with ulcer i.e. 31(51.7%), 12(20%) had cellulitis, 9(15%) presented with abscess and 8 patients i.e. 13.3% had gangrene.

In our study, Site of ulcer was on dorsum of foot in majority of the cases i.e. 17(28.3%) followed by ulcer on heels in 15 patients i.e. 25%, plantar foot in 11(18.3%) cases, on whole fore foot in 11(18.3%) and on toes in 6 cases i.e. 10%.

Dhanraj M. et al[7] reported in his study that out of 100 SG cases, 22 (44%) cases presented with ulcers, 10 (20%) cases with cellulitis 16 (16%) of cases abscess, 24 (24%) of cases gangrene and (4%) of cases neuropathic ulcer. **Dhanraj M. et al**[7] reported in his study that the most common site of lesion in the diabetic foot was the dorsum of the foot which was in about 32 patients (32%). Then the whole forefoot comprised about 14 cases (28%). The least was heel which was about 4 (4%) patients. Out of the 100 cases studied 60 patients (60%) not had a history of trauma and 40 patients (40%) not had a history of trauma.

Conclusion

- Majority of the patients presented with ulcer i.e. 31(51.7%), 12(20%) had cellulitis, 9(15%) presented with abscess and 8 patients i.e. 13.3% had gangrene
- Site of ulcer was on dorsum of foot in majority of the cases i.e. 17(28.3%) followed by ulcer on heels in 15 patients i.e. 25%
- We observed Neuro ischemic and Pure neuropathic type of ulcers in 9 patients each i.e. 15% followed by pure ischemic in 13.3% cases.

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