# CLINICO-INVESTIGATIVE PROFILE OF PATIENTS WITH DIABETIC FOOT IN A RURAL TERTIARY CARE CENTRE OF MAHARASHTRA

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## ABSTRACT

**Introduction:** The present study was aimed to study clinic-investigative profile of foot lesions in diabetics in patients presenting in Pravara Rural Hospital, Loni. **Materials and Methods:** This prospective cross sectional study was undertaken in 50 patients carried out over a period of 2 years. Patients, irrespective of their age and gender, admitted in the inpatient department of surgery with Diabetes mellitus having foot problem and consenting for taking part in the study were included. All patients were evaluated by taking detailed history, clinical examination and necessary investigation done. **Results**: Most patients present with diabetic foot lesion were in 7th decade of life. females were more commonly affected with male to female ratio 1:1.5. Ulcer was the common lesion seen here which was present in 24 (48%) patients while abscess seen in 3 (6%) patients, was the least common lesion. There were many anaemic patients (74%) in current study. Staphylococcus aureus was the commonest grown organism form the pus sample of foot lesions. Of the 50 patients, only 24 (48%) were known diabetics. Also, 18 (36%) patients were known smokers, 12 (24%) were alcoholic. Most patients (35 i.e, 70%) walked bare foot while only 15(30%) patients were using footwear. Cardiovascular diseases were common (10 i.e, 20%) associated conditions. Peripheral neuropathy was present in 21 (42%) patients. On staging the patients according to Wagner staging, most of the patients belonged to stage III (23) and IV (14). Doppler study in select patients revealed that 8(16%) patients were detected as impaired blood flow in peripheral vessels, 3(6%) patients showed complete stenosis and 5(10%) patients showed partial stenosis. **Conclusion:** Diabetic foot lesions were common in elderly patients. The most common presentation of foot lesions was ulcer. The foot lesions were associated with poor blood sugar control, peripheral neuropathy, cardiovascular diseases, anemia, smoking and alcohol addiction. Most patients belonged to Wagner stages III and IV. *Staphylococcus aureus* was the commonest grown organism form the pus sample of foot lesions .

**KEYWORDS:** Foot lesions; Diabetes mellitus; Staphylococcus aureus; Cardiovascular diseases.

## INTRODUCTION

Diabetic patients form 9% of total population of India [1]. The lifetime risk of a person with diabetes developing a foot ulcer would be as high as 25% [2]. About 21.4% diabetic patients undergo lower extremity amputation [3]. The issue of Lancet [4] dedicated to the problems of the diabetic foot carried the dramatic message that “Every 30 seconds a lower limb is lost somewhere in the world as a consequence of diabetes”. Bell calculated that incidence of atherosclerotic gangrene is 53 times more common in diabetics than in non-diabetics [5].

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Despite the efforts of conservative therapy, there will always be a percentage of ulcers that necessitate hospitalization. These cases may require surgical debridement, resection of distal osseus and soft tissue structure, endovascular intervention, daily dressings, strict glycemic control, and intravenous antibiotic therapy for eradication of infection [6, 7].

It was of interest to study the clinical profile of diabetic patients with diabetic foot in a rural population of Maharashtra.

**Objective:** To study clinic-investigative profile of foot lesions in diabetics in patients presenting in Pravara Rural Hospital, Loni.

## MATERIALS AND METHODS

**Study design**: Descriptive Cross Sectional study.

**Ethical Issue**: The study protocol is approved by the institutional ethics committee.

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**Study location:** The present study was carried out in Department Of Surgery, RMC, Loni .

**Study period**: 2 years (2010 to 2011)

**Sample Size**: 50 cases.

**Study population**: Patients diagnosed of diabetes with foot lesions admitted in Pravara Rural Hospital, Loni and satisfying the inclusion and exclusion criteria were included in the study.

**Inclusion criteria:**

- Patients diagnosed of Diabetes mellitus with foot problem admitted in department of surgery, Pravara Rural Hospital, Loni.
- Patients of all ages and either gender.
- Patients consenting for taking part in the study.

**Exclusion criteria:**

- Patients with peripheral vascular disease except diabetic foot, i.e, Raynaud's disease.
- Patients not willing to participate in the study.

Methodology:

Patients with diabetic foot lesions were admitted in hospital were examined prospectively after taking their written informed consent. All patients were evaluated by taking detailed history including age, sex, duration of diabetes, coexisting morbidities, history of addiction, habit of wearing footwear. The patients were clinically examined for type and extent of foot lesion, presence of pulsations. The investigations like Blood sugar levels, Hemoglobulin levels, culture of foot lesion pus sample, X ray and Doppler study of leg of patients were done. The patients were followed for type of treatment given i.e, conservative or surgical.

## RESULTS

50 patients were included in the study.

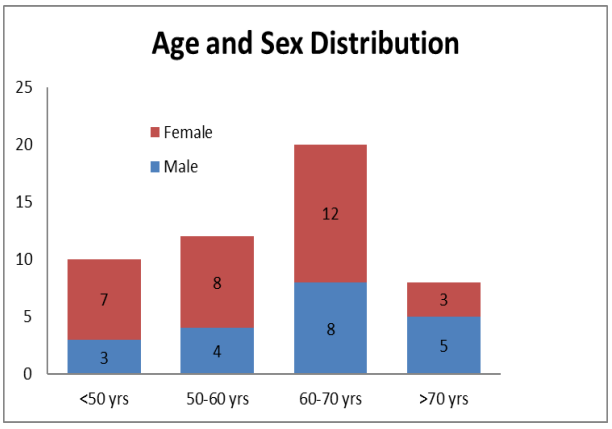


**Fig 1. Age wise distribution of diabetic patients with foot lesions**

In present study, maximum number of patients belongs to 60-70 years age group. The number of males in present study was 20(40%) and that of females was 30 (60%).

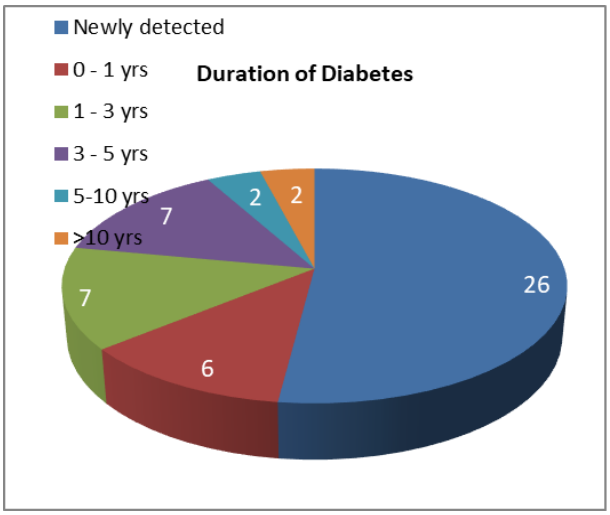


**Fig 2. Distribution of patients according to duration of diabetes**

In present study of 50 patients, 24 (48%) patients were known diabetics at the time of admission. Maximum number of patients i.e. 14 (28%) patients had diabetes for 1-5 years in past. In present series, 26 (52%) patients were detected as diabetic at the time of admission.

**Table 1. Complication v/s smoking and alcohol**

| Complications | No Of Smokers / Alcoholics With Complications | | Total No Of Patients With Complications. |
|---|---|---|---|
| | Smokers | Alcoholics | |
| Vascular | 10 | 9 | 26 |
| Neuropathy | 6 | 5 | 18 |

In the present study, 18 (36%) patients were known smokers, 12 (24%) were alcoholic. Smokers and alcoholics were observed for vascular and neuropathic complications. 10 smokers and 9 alcoholics were found to have vascular complications. 6 smokers and 5 alcoholics were having neuropathic complications

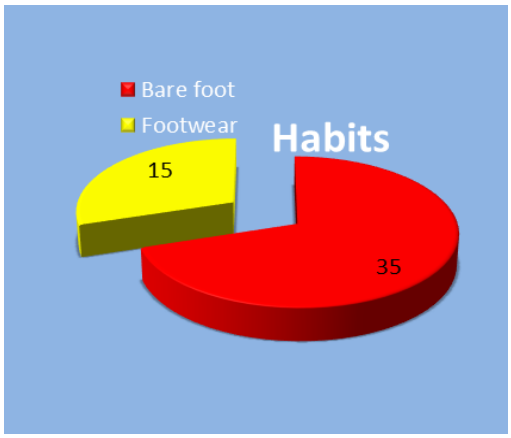


**Fig 3. Habit of wearing footwear in patients with diabetic foot.**

In the present study, 35 (70%) patients walked bare foot and 15(30%) patients were using footwear.

**Table 2. distribution of patients according to Control of blood sugar level**

| Control (Blood Sugar Level concentration) | Number of patients | Amputations |
|---|---|---|
| Good (<200 mg/dl) | 10 | 1 (2%) |
| Fair (200-300 mg/dl) | 13 | 3 (6%) |
| Poor (>300 mg/dl) | 27 | 12 (24%) |

Diabetic foot lesions were more common in patients with poor blood glucose control. 27(54%) Patients with poor blood glucose control (>300 mgl dl) were vulnerable for amputations.

**Table 3. Distribution of co-morbidities in patients**

| Disease | Number of patients |
|---|---|
| Atherosclerosis | 05 (10%) |
| Myocardial Infarction | 02 (4%) |
| Hypertension | 03 (6%) |
| Nephropathy | 04 (8%) |
| Respiratory | 01 (2%) |
| Cerebro vascular accident | 01 (2%) |
| Retinopathy | 01 (2%) |
| Urinary tract infection | 01 (2%) |
| HIV | 01 (2%) |

Cardiovascular diseases were common associated conditions i.e, 10 (20%) patients were suffering from various cardiovascular ailments, 4 (8%) patients presented with nephropathy.

On local examination, 6(12%) dorsalis pedis artery and 6 (12%) tibial artery were commonly involved and one patient had absent poplitial pulsation.

Peripheral neuropathy was present in 21 (42%) patients, 9 (18%) patients showed sensory, 7 (14%) autonomic and 5 (10%) motor neuropathy.

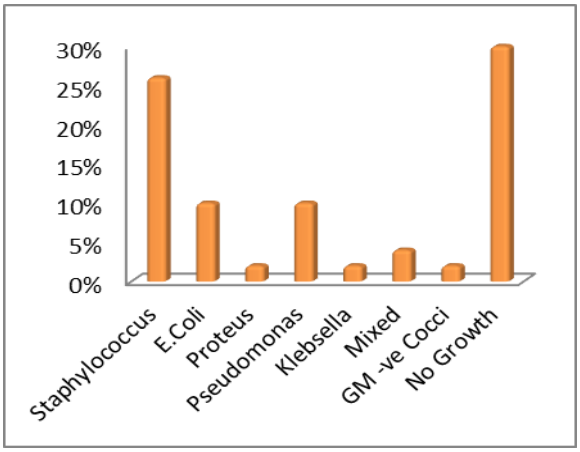


**Fig 4. Distribution of organism grown on culture**

In this series, pus, either from abscess or from the floor of ulcer, was sent for culture in all patients. In most patients, more than one organism was grown on culture. *Staphylococci* (26%) were the commonest organism.

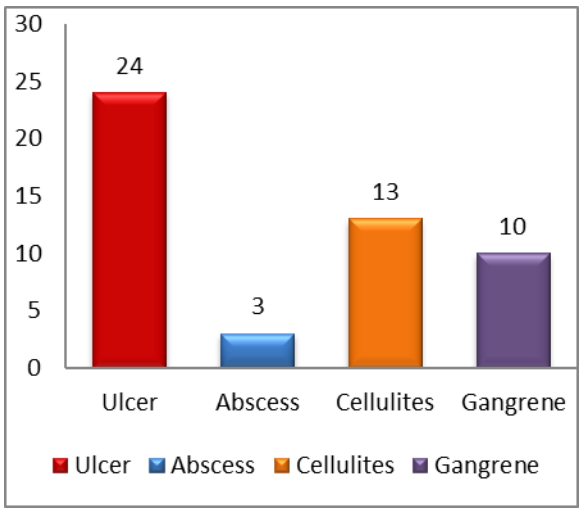


**Fig 5. Distribution of patients according to type of foot lesion.**

In the present series, a large number of patients (74%) were anaemic with Hb% of less than 10 gm%, 11 (22%) patients having Hb% between 10-12 gm% and only two (4%) patient had Hb % more than 12 gm%.

In majority of patients (58%), the x-ray findings of foot were within normal limit. Soft tissue swelling was seen in 7 (14%) patients and osteomyelitis in 14 (28%) patients.

After performing Doppler study in select patients, 8 (16%) patients were detected as impaired blood flow in peripheral vessels. 3(6%) patients showed complete stenosis and 5(10%) patients showed partial stenosis.

**Table 4: Finding of Doppler study of leg in patients**

| Nature of findings of Doppler study | No. of patients |
|---|---|
| Complete Stenosis | 03(6%) |
| Partial Stenosis | 05(10%) |
| Within Normal Limits | 12(24%) |
| Not Done | 30(60%) |

## DISCUSSION

Fifty cases of diabetic foot were studied from May 2010 to December 2011. In the present series the maximum incidence of foot lesion was in the 6$^{th}$ decade. Baddiley and Fulford [8] recorded a maximum incidence in the 7$^{th}$ dacade while Oakley [9] found that the maximum incidence was in the 8$^{th}$ decade. Otto kahn and William Wagner found the average age was 59.5 years [10].

Bell E.T. found gangrene 156 times more common in the diabetic than nondiabetic in 5th decade, 85 times more common in 6th decade, 53 times more common in 7th decade [5].

Male female ratio in diabetic foot in the present series was 1:1.5. Bell [5] has reported an incidence of 2:1. However Otto Kahn [10] reports a higher incidence in females than males. Martin J. Silverstein and Lawrence Kadish found higher incidence in men than women 1.2:1 [11].

The duration of diabetes could not be well correlated in our series due to the fact that more than 50% of our patients were diagnosed as diabetes when they presented with foot lesion. Patients do not attend hospital unless they are truly incapacitated. Baddiley and Fulford [8] and Catterall [12] reported that duration of diabetes has no definite correlation with foot lesion.

In our series 10 out of 50 patients had associated cardiac problems & one had history of transient ischemic attack. In Martin Silverstein & Lawrence Kadish study of 320 patients, 2.8% had a myocardial infarction [11].

Otto Kahn et al reports an incidence of 63% of cardiovascular disease in 'diabetic foot'[10]. Samuel Silbert and Henry Hemovici reported the incidence of cardiovascular complication as 7% (8/127 patients) [13]. These associated risk factors account for increased morbidity & mortality in diabetic patients.

Patients with complicated diabetes foot lesions were also found to have advanced diabetic retinopathy. This may be because duration & degree of glycemic control are the most important risk factors for retinopathy as well as formation of foot lesions.

In our series of 50 cases none had absent femoral artery pulse. Only 1 patient had absent popliteal arterial pulsations & 6 patients had absent dorsalis pedis arterial pulsation& 6 patients had absent posterior tibial arterial pulsation.

In our series 21 patients had neuropathy, 9 had sensory, 5 had motor & none had autonomic neuropathy and 7 had autonomic neuropathy.

Out of 21 patients who were detected to have neuropathy, all were uncontrolled diabetics. This indicates that neuropathy is more common in uncontrolled diabetes. This view is also supported Ward J. D., Baker R. W. K. & Greenbaum D [13]. The relative insensitivity of skin of the foot leads to local skin damage from rubbing or pressure. The autonomic nerves are also involved resulting in an auto sympathectomy. So that skin of the feet & toes becomes dry & tends to crack.

In our series, Staphylococcus aureus (40%) was the most common organism isolated from lesions of "diabetic foot", which were comparable with Jones et al [15] & Lipsky et al [16]. Also the series of Otto Kahn & Wiliam Wagner study, organisms isolated were consistent with our series [10]. In majority of the lesion mixed flora was seen. This may be due to surface contamination of the wounds by other organisms.

In the present study, patients were presented when there was significant ulceration (48%), abscess formation (06%), cellulitis (26%) and gangrene (20%), thus unless there was breach in continuity of skin surface or infection, which interferes with the function of foot, patients were reluctant to attend hospital and take proper treatments. It was mainly due to ignorance and illiteracy. The custom of walking barefoot also increases the susceptibility to trauma with further progress in lesion.

In this study, finding of x-ray foot were as follow - Normal (58%),Soft tissue swelling (14%) Osteomyelitis (28%). Kao Hsiung et al [17] found osteomyelitis in 7.5% cases while, in this study we found 18% patients having osteomyelitis [18]. In our study, percentage of osteomyelitis was more might be due to late presentation of diabetic foot with ulcers.

Doppler was done only in cases with clinically absent peripheral pulsations. In 5 (10%) patients complete stenosis of dorsalis pedis & posterior tibial artery and in 8 (16%) patients partial stenosis of dorsalis pedis & posterior tibial artery. Total 13 (26%) patients had decreased blood flow in posterior tibial and dorsalis pedis artery.

These findings varied with the different studies A. L. Bahl (29.0%), D. K. Rastogi (44.3%), A. K. Ramani et al (49.35%) [19-21].

## CONCLUSION

Diabetic foot lesions were common in elderly patients. The most common presentation of foot lesions was ulcer. The foot lesions were associated with poor blood sugar control, peripheral neuropathy, cardiovascular diseases, anemia, smoking and alcohol addiction. Most patients belonged to Wagner stages III and IV. *Staphylococcus aureus* was the commonest grown organism form the pus sample of foot lesions. Proper evaluation and control of risk factors like habits of walking barefoot, smoking, alcohol, poor blood glucose control, anemia and lack of preventive foot care lead the forthcoming complications.

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