

A PROSPECTIVE STUDY OF CLINICAL PROFILE AND MANAGEMENT OF DIABETIC FOOT IN A TERTIARY CARE HOSPITAL

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Abstract

Background: Diabetes mellitus is a metabolic disorder characterized by chronic hyperglycemia and about 150- 170 million people are suffering worldwide from this diseases, as per WHO reports the prevalence of diabetes will be double by 2025. Diabetes mellitus is a worldwide phenomenon, type 2 diabetes is the most common form of diabetes in developing countries like India, hence called diabetic capital of the world. In India prevalence of diabetes in rural population is about 2.4 %, and in urban population is about 4-11.6 %. **Materials and Methods:** This prospective observational study was conducted at the Department of Surgery, in a tertiary care hospital attached to a Danalaxmi Srinivasan Medical College and Hospital, Perambalur. 240 patients with diabetes attending general surgery ward for diabetic foot ulcer management at a tertiary care hospital, 240 patients were included during the study period from January 2022 to December 2022. Patients willing to participate in the study were enrolled. Socio-demographic and anthropological data age, marital status, literacy status, occupation, life style (sedentary/active), familial history (parents/siblings), reasons for stress, duration and severity of disease, etc. were collected from patients. **Results:** Out of 240 patients 144 were male and 96 were female. Most of patients affected in the age group were 51-60 years (86 patients) followed by 30-40 years (58 patients), 41-50 years (50 patients) and 61-70 years (46 patients). Most of the patients in the duration of diabetes were 6-10 years (98 patients) followed by <5 years were (72 patients), 11-15 years (36 patients) and 16-20 years (34 patients). 126 patients had 2-3 months duration of ulcer present followed by 50 had 1 month of ulcer, 40 had 3-5 month of ulcer and 24 had >5 months of ulcer. **Conclusion:** Patients with diabetic foot ulcers were mostly between the ages of 51 and 60. Males were more affected than females. The majority of individuals had diabetes mellitus for more than 6 years. Our study reveals that diabetic foot ulcers are more common in middle-aged men, emphasizing the necessity of screening diabetes patients for neuropathy and peripheral vascular disease.

INTRODUCTION

Diabetes mellitus is a metabolic ailment characterized by chronic hyperglycemia, and around 150- 170 million individuals worldwide suffer from this disease; according to WHO statistics, the prevalence of diabetes will more than double by 2025. Diabetes mellitus is a worldwide occurrence, with type 2 diabetes being the most frequent kind in developing nations such as India, which is known as the diabetic capital of the world.^[1] Diabetes affects approximately 2.4% of the rural population and 4-11.6% of the urban population in India. Diabetes complications include peripheral vascular disease, cardiovascular disease, nephropathy, retinopathy,

neurological problems, and infections. The most major risk factors for diabetic foot ulcers are uncontrolled hyperglycemia, atherosclerotic vascular disease, and sensory neuropathy.^[2]

The skin is the largest organ in the body, accounting for the bulk of tissue, along with the underlying soft tissue, which comprises the fat layers, fascia, and muscle. It serves as a strong, flexible structural barrier against invasion. Failure to do so results in a very high mortality rate (80 to 100%), and even with prompt detection and management, current mortality rates are around 30 to 50%.^[3]

Diabetes mellitus (DM) affects 9.9% of the population over the age of 40 in the United States, with 30% suffering from lower extremity problems.

The annual population-based incidence of a diabetic foot ulcer (DFU) is predicted to range from 1.0% to 4.1%. The lifetime prevalence could be as high as 25%.^[4]

Uncontrolled hyperglycemia, atherosclerotic vascular disease, sensory neuropathy are the most important risk factors developing diabetic foot ulcer.^[5]

MATERIALS AND METHODS

Study Design: This prospective observational study.
Study Location: Danalaxmi Srinivasan Medical College and Hospital, Perambalur
Study Duration: January 2022 to December 2022.

Sample Size: 240 patients

This prospective observational study was conducted at the Department of Surgery, in a tertiary care hospital attached to a Danalaxmi Srinivasan Medical College and Hospital, Perambalur. 240 patients with diabetes attending general surgery ward for diabetic foot ulcer management at a tertiary care hospital, 240 subjects were included during the study period from January 2022 to December 2022. Patients willing to participate in the study were enrolled.

Socio-demographic and anthropological data age, marital status, literacy status, occupation, life style (sedentary/active), familial history (parents/siblings), reasons for stress, duration and severity of disease, etc. were collected from patients.

Samples were collected from patients with diabetes having ulcers, surgical sites with infection and other wounds by needle aspirate method. In case of closed wounds, the skin or mucosal surface were disinfected with 2% chlorhexidine or 70% alcohol followed by iodine solution (1-2% tincture iodine or 10% solution of povidone-iodine). Prior to specimen collection, removal of iodine with alcohol was done. Tissue samples were obtained from depth of ulcers and transferred aseptically into labeled sampling vials with sterile saline and processed in the Microbiology laboratory in the institutional medical centre. Foot ulcers in diabetic patients were categorized into six grades (grade 0-5) based on Meggit Wagner classification system. Details regarding type of diabetes, its duration, treatment, compliance by the patient, awareness about complications, personal habits like smoking and alcohol consumption were recorded. Meticulous clinical examination was done. Neuropathy was assessed by the ability to sense touch with a 10 g

monofilament and tuning fork, ischemia by pulsations of dorsalis pedis and posterior tibial arteries, while osteomyelitis (to assess bone involvement) was diagnosed on X-rays. Cases with ulcer on the other foot also, were considered as separate cases.

Inclusion Criteria

The inclusion criteria of the study included patients those were those men and women of age group 30-70 years; diabetic patients, grade 1 and 2 Wagner's foot ulcers; those with duration of foot ulcers more than 4-6 weeks; and with good glycemic control and neuropathic ulcers.

Exclusion Criteria

The exclusion criteria of the study included uncontrolled DM, Wagner's grade 3, 4, 5 ulcers, severely infected wounds and gangrene, neuroischemic ulcers, traumatic ulcers, peripheral vascular disease, coronary artery disease, varicose veins, deep venous thrombosis, malignancy and pacemakers.

Statistical Analysis

Data was analyzed using student paired t test p value<0.05 was considered statistically significant. Statistical software SPSS version 22.0 used for analysis.

RESULTS

Out of 240 patients 144 were male and 96 were female. Most of patients affected in the age group were 51-60 years (86 patients) followed by 30-40 years (58 patients), 41-50 years (50 patients) and 61-70 years (46 patients).

Most of the patients in the duration of diabetes were 6-10 years (98 patients) followed by <5 years were (72 patients), 11-15 years (36 patients) and 16-20 years (34 patients). 126 patients had 2-3 months duration of ulcer present followed by 50 had 1 month of ulcer, 40 had 3-5 month of ulcer and 24 had >5 months of ulcer.

Out of 240 patients Wagner's classification shows type I were 128 patients and type 2 were 92 patients. Out of 144 male patients 130 had single ulcer and 14 had multiple ulcer. Out of 96 female patients 88 had single ulcer and 8 had multiple ulcer. In total 240 patients 218 had single ulcer and 22 had multiple ulcer. Out of 240 patients, 168 show the isolated pathogens. In which mostly presented in Pseudomonas aeruginosa (54.8%), 28.6% present in Klebisella and 16.7% present in E. coli.

Table 1: Age Distribution

S.No	Age group	N (%)
1	30-40	58 (24.65%)
2	41-50	50 (20.83%)
3	51-60	86 (35.83%)
4	61-70	46 (19.16%)
5	Total	240 (100%)

Table 2: Gender Distribution

S.No	Gender	N (%)
1	Male	144 (60%)
2	Female	96 (40%)
3	Total	240 (100%)

Table 3: Duration of DM among the study population

Duration in years	N	%
<5	72	30
6-10	98	40
11-15	36	15
16-20	34	14
Total	240	100

Table 4: Duration of ulcer (months)

Duration in months	N
1	50
2-3	126
3-5	40
>5	24
Total	240

Table 5: Wagner's classification

Wagner's classification	N
Type I	148
Type II	96
Total	240

Table 6: Types of ulcers

Ulcer	N
Single	80
Multiple	97

Table 7: Demographic data and base line data

Wagner's classification	N
Mean age (years)	52.3±2.10
Age range (years)	30-70
Mean duration of diabetes (years)	8.90±1.90
Mean ulcer duration (months)	2.41±0.73

Table 7: Prevalence of pathogens in the clinical specimens

Isolated pathogens	N	%
Klebisella	44	28.6%
Pseudomonas aerugionsa	92	54.8%
Escherichia coli	28	16.7%
Total	168	100

DISCUSSION

According to our findings, approximately 40.83% of DM patients have had the disease for 6-10 years. In comparison to other studies, the duration of DM has a higher significance during a 10-year period, with 154 patients out of 216 patients accounting for 71.2%. The duration of the ulcer in our study was 1 month (50 patients), 2-3 months (126 patients), 3-5 months (40 patients), and >5 months (24 patients).⁶ In our study Wagner's classification shows type I were 148 patients and type 2 were 92 patients. Other study Amareswari et al shows 16 were type I and 14 were type II. The patient's demographic data shows that the study group included 120 patients with mean age of 51.4±3.16 years. The mean duration of Diabetes is 8.92±1.97 years and the mean duration of ulcer is 2.42±0.82 months. Other study Amareswari et al shows thirty patients with mean

age of 55.06±5.01 years. The mean duration of diabetes is 7.8±1.47 years and the mean duration of ulcer is 4.9±1.2 months.¹⁷

Our finding is mostly isolated pathogen in our study is Pseudomonas, but previous studies reported by Mottola et al. S. aureus is one of the most important micro-organisms that cause clinical problems resulting high-resistance to different antimicrobial agents.¹⁸ Diabetic foot ulcer is one of the most common devastating complications of diabetes mellitus and the leading cause of agonizing amputation throughout the world. These infections may be colonized by pathogenic and anti-microbial resistant bacteria, harbouring several virulence factors that could impair its successful treatment.¹⁹ Moreover, recent studies from less developed countries, especially in hot, humid climates, report that even with standard microbiological methods

aerobic gram-negative bacilli, especially *Pseudomonas aeruginosa* more often cause DFIs.^[10]

CONCLUSION

Patients with diabetic foot ulcers were mostly between the ages of 51 and 60. Males were more affected than females. The majority of individuals had diabetes mellitus for more than 6 years. Our study reveals that diabetic foot ulcers are more common in middle-aged men, emphasizing the necessity of screening diabetes patients for neuropathy and peripheral vascular disease.

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