Incidence of Diabetes and Demographic Profile in Lower Limb Ulcers

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ABSTRACT

Introduction: Lower extremity ulcers associated with diabetes pose a significant threat for limb amputations and with improper treatment can increase the risk of mortality. The present study aimed to identify the incidence of diabetes in lower limb ulcers and the influence of demographic variables in those patients, in a tertiary care hospital in Visakhapatnam.

Material and methods: One hundred cases of lower limb ulcers were retrospectively studied from July 2016 to June 2017. Basic clinical-pathological and radiological examination were done in all relevant patients, and ulcers were classified accordingly. Emphasis was made on diabetics, their demographic profile, treatment status, the organisms isolated, treatment modalities and outcomes.

Results: In our study, people with diabetes were marginally more than non-diabetics (52:48). The age of presentation was 18 - 65 years, with an average of 46 years. Almost all the patients have type-II diabetes, and only one patient has Type-I diabetes. Venous ulcers and neuropathic ulcers were predominant in diabetics and the rest in non-diabetics. Prevalence of foot ulcers is more in the rural population (82%) while the incidence of diabetes is more in the urban population (83.3%). Amputation rates were more in non-diabetics (60%) whereas mortality was confined only to the diabetic population.

Conclusion: Diabetes is a significant risk factor for ulceration in the extremities, which possesses considerable mortality and morbidity. The sociodemographic variables play an essential role in diabetic foot ulceration. Early intervention, control of diabetes and compliance of the patient treatment are all necessary to reduce the rates of amputations and mortality in patients with diabetic foot ulcers.

Keywords: Diabetes, Lower Limb Ulcers, Diabetic Foot Ulcers, Incidence

INTRODUCTION

"An ulcer is a discontinuity in a bodily membrane that impedes the organ of which the membrane is a part of, from continuing its normal functions". Ulcers of lower extremities are debilitating to the patient directly and also have a high impact on the economy since significant resources are being spent every year to treat, prevent, or decelerate the progression of the disease. Closely linked with diabetic neuropathy, diabetic nerve pain and diabetes foot care, diabetic foot ulcers affect many people with diabetes. Ulcer types may differ in people with diabetes when compared to non-diabetics. Most of the diabetic patients have neuropathic ulcers, whereas non-diabetic patients are more likely to have venous, pressure or traumatic type ulcers. Diabetes is a significant risk factor for ulceration in the extremities, which possesses considerable mortality and morbidity. The present study aims to identify the incidence of diabetes in lower limb ulcers and the influence of demographic profile in of patients in a tertiary care hospital in Visakhapatnam with the objectives of detailed clinical examination of lower limb ulcers, assessment of the patients with diabetes in the study population and study of sociodemographic variables, clinical characteristics of ulcers and the treatment factors of all the patients in the study.

MATERIAL AND METHODS

A retrospective database containing 100 cases of lower limb ulcers from 2016 to 2017, who were in-patients of King George Hospital, Visakhapatnam were evaluated. 100 patients of lower limb ulcers were included in the study. Baseline clinical examination was done to classify the ulcers. Some parameters such as age, gender, duration, average stay, diabetic status and its treatment status, the diet of diabetic patients, type of ulcer, cultures, organisms and outcomes were studied. Cultures were sent every 3rd day. Treatment options like debridement, fasciotomy, split-skin grafting, minor and major amputations were considered.

A foot ulcer was defined as a full-thickness skin defect regardless of the duration. Diabetes was considered present when Fasting blood sugar value is more than 120mg/dl, the postprandial glucose level is more than 180mg/dl, or more importantly, HbA1C is >6.5%. A standard neurological examination was done to test the sensation to light touch, pain, vibration and tendon reflexes at the ankle. Peripheral neuropathy was considered present if three of the four were absent. When both the dorsalis pedis and posterior tibial pulses were absent in the affected limb, peripheral vascular disease (PVD) was considered present. Based on this, ulcers were classified as neuropathic, ischemic, or neuro-ischemic.

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Inclusion criteria
1. Patients with lower limb ulcers, including venous, arterial, traumatic, trophic, neurogenic ulcers.
2. Age ≥18 years.
3. Those who gave valid informed consent.

Exclusion criteria
1. Those who are not willing to participate in the study.
2. Patients below the age of 18 years.
3. Ulcers associated with osteomyelitis, tuberculosis.
4. Malignant ulcers
5. Seropositive cases

RESULTS
Among the 100 patients, 52% are diabetic, and 48% are non-diabetic. Male and female patients are 72% and 28% respectively. There is one NACO positive male case, who is non-diabetic. Diabetes presented from 18-65 years of age with an average of 46 years. Non-diabetes presented from 24-90 years of age with an average of 57 years. The age distribution is depicted in Table 1. The length of stay ranged from 3 days to 78 days in diabetics and 5 days to 90 days in non-diabetics. One male patient of 18 years had Type-I diabetes.

Of the total patients in the study, 82% belong to the rural background, and 18% came from urban areas. 70 of 82 patients from rural areas and four patients from the urban population were illiterates. 15 patients of urban population (83.3%) and 37 patients of rural population (45.1%) are diabetic.

The ulcer was present in the dorsum of foot and ankle region in 30 diabetics and 15 non-diabetics. It is present in the plantar aspect of the foot and toes in 18 diabetics and 17 non-diabetics. Ulcers were present in the lower part of the leg below the knee in 9 diabetics and 12 non-diabetics.

The size of the ulcer ranged from 3cm to 40cm in its greatest dimension, with an average being 12cm. The depth of the ulcer ranged from 0.5cm to 3cm, with an average of 1cm.

Cultures were sent/available in 90 cases, of which E. coli was isolated in 27 patients (18-D, 9-ND), Klebsiella in 24 patients (11-D, 13-ND), Pseudomonas in 20 patients (13-D, 7-ND), Staphylococcus in 4 (1-D, 3-ND) and Streptococcus in 1 (ND) patient. The culture was sterile in 14 (7-D, 7-ND) patients and was not sent/ not available in 10 patients (2-D, 8-ND). The culture report among diabetic patients is depicted in Fig. 1.

Duration of diabetes in our study is given in the Table 3. Most of the Diabetic patients (35) in our study were compliant with the diabetic diet. Thirteen patients were non-compliant with the diet, and four patients were having a regular diet and had no knowledge about the diabetic diet.

Anaemia (Hb <10%) was found in 38 diabetic patients, of which 23 are male, and 15 are female patients. It was found in 20 non-diabetic cases of which male and female are 15 and 5 respectively. Hypertension (B.P > 140/90mmHg) was another co-morbid condition found 32 in diabetic patients, of whom 25 were male, and 7 were females. It was found to be present in 24 non-diabetics, of which 18 were male, and 6 were female patients. Co-morbidity pattern in diabetics and non-diabetics is given in Fig. 2.

Regular debridement alone was satisfactory in 63% of the study group, whereas debridement, along with skin grafting, was required in 13% and fasciotomy in 6% of the patients. Minor amputations were carried out in 8% and major amputation in 10% of the study group. Above-knee amputation was required in 6 cases, of which only one patient had diabetes. Four patients underwent below-knee amputation, of which three patients had diabetes, which includes one death. Readmission was required in 21% of the study population.

There were a total of 5 deaths recorded, all of them having diabetes and belonging to the male sex. The mean age was
The results are depicted in Table 4. Therefore, we can say that in our study there is a significant association between diabetic status and the increased risk of morbidity and mortality.

**DISCUSSION**

In our study males were the predominant study subjects. The ratio of patients with and without diabetes is almost equal (52:48) in our study which differs from many national and international studies where people with diabetes predominate (71.8:28.2). On average, diabetic patients were younger than non-diabetics (average age 46y in diabetics, 57y in non-diabetics). Fifteen patients of urban population (83.3%) and 37 patients of the rural population (45.1%) have diabetes, indicating the influence of lifestyle in the pathogenesis of diabetes. The higher prevalence of foot ulcers in rural than urban population (82% vs 18%) may be attributed to barefoot walking, increased prevalence of smoking and lesser use of customised footwear.

The most common location of ulcer in our study was over the dorsum of foot and ankle region (45%) which varies with Pedras S et al. 2016 where toes were the most common location (63%). Venous ulcers and Neuropathic ulcers were predominant in diabetics, whereas other types of ulcers were seen more with non-diabetics population, which correlates with the literature. Poor diabetic control was found in 20 of 52 cases with diabetes. The incidence of Lower extremity amputations was less in people with diabetes (40%) which differs with Eskelinen et al. 2006 (51.3%). Though the number of major amputations was slightly more in non-diabetics in our study, a significant proportion of minor amputations being carried out in diabetics and the total death toll (5%) belonging only to diabetic population signifies the higher risk of mortality and morbidity associated with diabetes in lower limb ulcers. Diabetic foot infected with Pseudomonas carried higher morbidity (risk for toe or lower limb amputation) and increased mortality (Wahab WFA et al. 2013). The mortality appears to be independent of factors increasing the ulcer risk, i.e., neuropathy and PVD.

**CONCLUSION**

Diabetes has an increased risk of mortality and morbidity in patients with lower limb ulcers and also leads to significant impairment of quality of life. The sociodemographic
variables play an essential role in diabetic foot ulceration. Poor control of diabetes found in nearly half of the diabetic patients emphasises the need for specialised diabetic units. An aggressive multidisciplinary approach is required to manage foot problems in such patients and also to recognise and reduce the risk of death from other co-morbid conditions to save both limb and life. Emphasis should be made on educating people about diabetes, and its complications, about foot care and wound care. It helps to reduce the burden of lower limb ulcers and to improve the quality of life.

REFERENCES


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