Original Article

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Evaluation of Diabetic foot treatment and complications: a clinical analysis in a Tertiary Care Teaching Hospital

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Abstract

Background: Over time, diabetes can affect your nerves and blood vessels. Diabetes-related nerve degeneration can lead to the amputation of a foot. Diabetes mellitus (DM) is only the tip of the iceberg when it comes to diabetes. It's a worldwide problem. Diabetes mellitus is becoming more common over the world. A diabetic patient's lifetime risk of developing a foot ulcer is between 12 and 25 percent. **Subjects and Methods:** In total, 76 cases were studied. A thorough history, clinical examination, wound or ulcer, and a pre-designed proforma were used to collect data. Wagner's classification, exam results, blood tests, a renal function test, a wound swab, an X-ray, and the treatment administered were all obtained. All patients are examined, and clinical results are documented on a case sheet. Data is analysed, relevant tests are run as necessary, and therapy is given. **Results:** The majority of diabetic patients with foot lesions in the 76 instances reviewed were between the ages of 55 and 65 (32.9%), followed by 65 and 75 (26.3%). The youngest patient, 33 years old, presented with an abscess on the (R) forefoot, whereas the oldest, 77 years old, was admitted for cellulitis of the entire forefoot. There were 58 (76.3%) male patients and 18 (23.7%) female patients in the study. The majority of the patients had diabetes for 7-10 years 21. (27.6 percent). **Conclusion:** In summary, ulcers were the most prevalent presenting lesion, followed by gangrene and cellulitis. The dorsum of the foot was the most commonly affected area, followed by the forefoot and toes.

Keywords: Complications, Diabetic foot, Neuropathy, Ischemia, Foot amputation.

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Introduction

Diabetes can harm your nerves and blood vessels over time. Diabetes-related nerve degeneration might result in the loss of a foot.[1] Diabetes mellitus (DM) is just the tip of the iceberg. It's an international issue. Globally, the prevalence of diabetes mellitus is rising.[2] A diabetic patient's lifetime chance of having a foot ulcer ranges from 12% to 25%.[3] The foot is the crossroads for numerous pathological processes in diabetes patients, including practically all components of the lower limb, from the skin, subcutaneous tissue, muscles, bones, and joints, to blood vessels and nerves. For those with diabetes, foot problems are a major source of morbidity and a primary cause of hospitalisation.[4] Eighty-five percent of diabetic major amputations begin with a foot ulcer, and infection entering the foot and leading to gangrene is the most common road to amputation. Diabetes is divided into four groups. Type 1, also known as insulin-dependent diabetes mellitus (IDDM), is an autoimmune pancreatic disease. Type 1 diabetics are prone to ketosis because they lack the ability to create endogenous insulin. Type 2, also known as non-insulin-dependent diabetes mellitus (NIDDM), accounts for 90 percent to 95 percent of all diabetes cases. Hyperglycemia in the presence of hyperinsulinemia due to peripheral insulin resistance characterises type 2 diabetes.[5] Other kinds of diabetes include gestational diabetes, genetic abnormalities, and endocrinopathies. Diabetes is linked to a slew of problems stemming from microvascular, macrovascular, and metabolic causes. Cerebrovascular, cardiovascular, and peripheral artery disease, as well as retinopathy, neuropathy, and nephropathy, are among them.[6] Cardiovascular problems are the leading cause of death in the United States today. One of the most common underlying causes of non-traumatic lower extremity amputations is diabetes (LEAs). Rest discomfort, ischemia that has ruined the foot, or an unstable Charcot joint will account for the remaining 15% of major amputations.[7] Every 30 seconds, a lower limb or a portion of a lower limb is lost due to diabetes somewhere on the planet. Patients with diabetes

account for up to 70% of all lower-limb amputations. A new diabetic foot ulcer affects about 4 million people every year. In developed countries, diabetes mellitus is the fourth to fifth largest cause of death.[8]

Subjects and Methods

This present study was carried out in the Department of General Surgery, World College of Medical Sciences Research and Hospital, Jhajjar, Haryana, India during the period from January, 2017 to December, 2019. The research covered 76 cases in all. Data was collected using a pre-designed proforma and a full history, clinical examination, wound or ulcer. Wagner's classification, examination findings, blood tests, a renal function test, a wound swab, an X-ray, and the treatment offered were all gathered. All patients are examined, and clinical findings are recorded on a proforma case sheet. Data is reviewed, and relevant tests are performed when needed, and treatment is administered. The predisposing variables, complications, therapy, and outcome are all investigated, examined, and discussed.

Inclusion criteria

The study included all patients with diabetes who had foot ulcers or infections. The study included people of all ages. Patients who have a history of diabetes were also included in the study. The study comprised patients who had a gangrenous foot that was exacerbated by diabetes.

Exclusion criteria

Patients with foot infections who did not have diabetes mellitus were excluded. Patients with gangrene foot due to causes other than infection of the foot aggravated by diabetes were not included in the study. Patients who were unable to complete their treatment due to noncompliance were also omitted. Patients who were diagnosed with diabetes by chance on admission were also eliminated.

Statistical analysis

The statistical software for the social sciences system, version SPSS 22, was used to conduct the tests (SPSS Inc., Chicago, USA). A p0.05 will be used to signify a significant difference in all statistical tests. The statistical procedures described above were carried out using IBM SPSS statistics. In the two tail condition, p values less than 0.05 (p0.05) were considered significant.

Results

The majority of diabetic patients with foot lesions in the 76 instances reviewed were between the ages of 55 and 65 (32.9%), followed by 65 and 75 (26.3%). [Figure 1]. The youngest patient, 33 years old, presented with an abscess on the (R) forefoot, whereas the oldest, 77 years old, was admitted for cellulitis of the entire forefoot. There were 58 (76.3%) male patients and 18 (23.7%) female patients in the study. The majority of the patients had diabetes for 7-10 years 21. (27.6 percent).

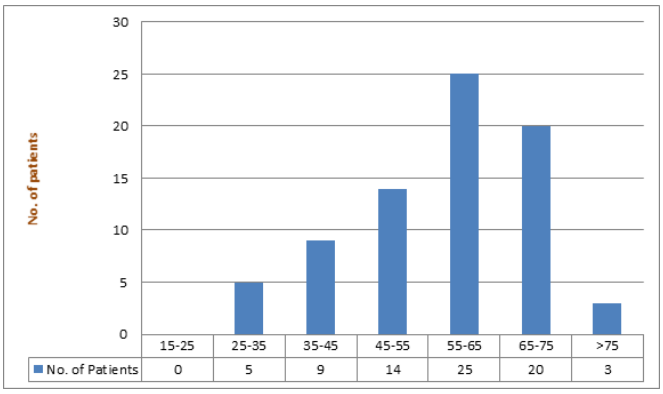

Figure 1: Shows the distribution of subjects a/c age group.

34 (44.7 percent) of the 76 SG cases had ulcers, and 15 (19.7%) of the cases had cellulitis. 6 (7.9%) of the cases had an abscess, 18 (23.7%) had gangrene, and 3 (3.94%) had a neuropathic ulcer [Figure 2].

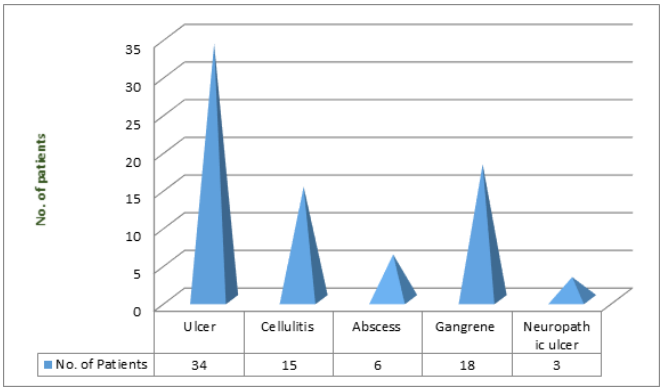

Figure 2: Shows the clinical presentation of subjects.

The dorsum of the foot was the most common site of lesion in diabetic feet, accounting for roughly 23 individuals (30.3 percent) [Figure 3]. Then there were roughly 20 cases in the entire forefoot (26.3 percent). The least common complaint was heel pain, which accounted for roughly 3 (3.94 percent) of all patients. In the 76 instances analysed, 46 patients (60.5%) did not have a history of trauma, while 30 patients (39.5%) did not have a history of trauma.

Neuropathy was detected in 40 (52.6%) of the participants in this research [Figure 4]. Ischemia was observed in 62

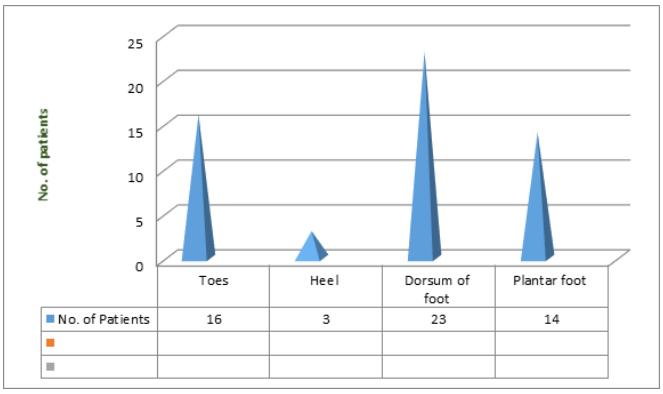

Figure 3: Shows the site of lesions.

individuals, while infection was found in 81.6. [Table 1] shows how a single diabetic foot patient might have several problems.

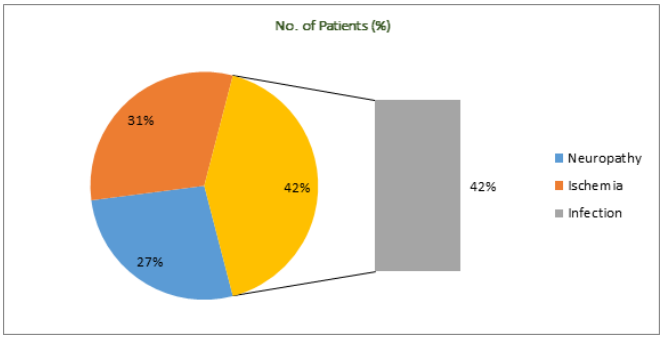

Figure 4: Shows the complications of the subjects.

Staphylococcus aureus was the most common bacteria grew on the pus culture in 23 (30.3%) of patients, followed by Pseudomonas 13 (17.1%), Streptococcus 11 (14.5%), E. coli 8 (10.5%), Klebsiella 7 (8.9%), and Proteus 5 (6.6%). [Figure 5]. There was no growth on culture in 9 (11.8 percent) of the patients, and some cultures yielded more than one type of bacterium.

9 (11.8%) of the 76 patients treated were managed conservatively, with slough excision and daily dressing, as well as antibiotics and diabetes management [Figure 6]. 21 (27.6%) patients had wound debridement, 7 (9.2%) patients had SSG, 5 (6.6%) patients had I and D for abscess, 5 (10%) patients had J fasciotomy, and 8 (10.5%) patients had gangrene of the toes and phalanges were M treated with disarticulation. Three patients (3.94%) had their legs amputated below the knee, while 11 (14.5%) had their legs amputated above the knee. In most cases, cautious therapy and minor modifications were enough to save the limb.

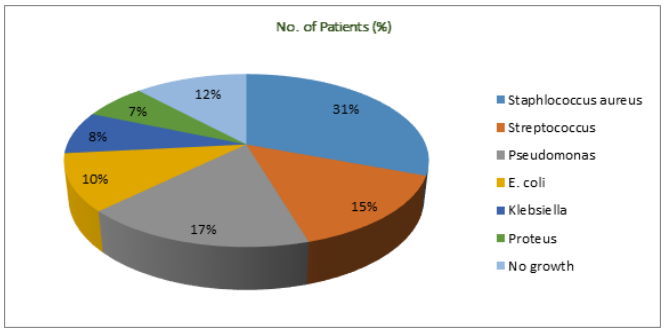

Figure 5: Shows the culture and sensitivity.

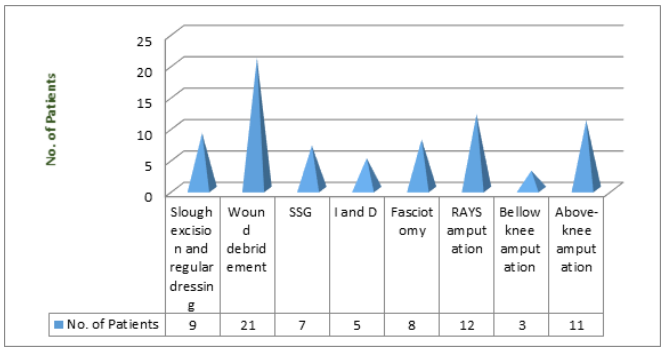

Figure 6: Shows the treatment of the subjects.

Table 1: Wagner's classification of diabetic foot ulcers.

Ulcer Grading	Description
Grade 0	No ulcer but high risk foot
Grade 1	Superficial ulcer
Grade 2	Deep ulcer, no bony involvement or abscess
Grade 3	Abscess with bony involvement
Grade 4	Localized gangrene eg. toe, heel, etc
Grade 5	Extensive gangrene involving the whole foot

The minimum hospital stay in this study was 10 days, while the maximum was 100 days [Figure 7]. The most typical length of stay in the hospital was 20-39 days 27. (35.5 percent). This prolonged hospitalisation can be explained by the fact that the lesions are resistant to treatment due to a lack of body resistance, hyperglycemia, prepared hormonal defence systems, and organism resistance to antibiotic treatments.

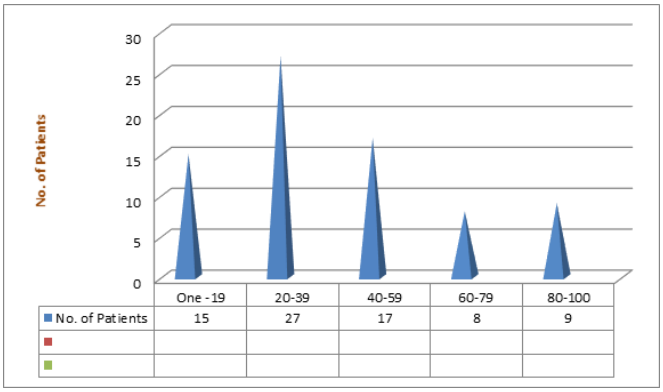

Figure 7: Shows the duration of hospital stay.

Discussion

Globally, the prevalence of diabetes mellitus is rising. With a current incidence rate of 14 percent in the population, India is developing as the epicentre of diabetes today. Diabetes patients have a 12 to 25% lifetime risk of having a foot ulcer.[9] Foot ulcers have emerged as a serious and growing public health issue, attracting the attention of health policymakers because to the associated morbidities, deterioration of patients' quality of life, and management expenses.[10] Despite their growing relevance, foot ulcer treatment is frequently insufficient, resulting in delayed healing and the danger of amputation. In the next two decades, developing countries are expected to see the biggest increase in the prevalence of type 2 diabetes.[11] As a result, residents of these nations may face a higher risk of developing foot ulcers.[12] Trauma was the most common cause of diabetes foot in 60.5 percent of the participants in our study, with the remaining diabetic foot complications.[13] In our study, we discovered that 59.2 percent of diabetic foot cases occurred in those who walked barefoot, 35.5 percent in those who wore only slippers or chappals, and only 5.3 percent in those who used shoes. This study discovered that being prone to accidents increased the likelihood of diabetic foot lesions (p0.01).[14] The overall likelihood of local or major amputation in Wagner's grades 2 through 5 is believed to be roughly 60%. In this study, individuals with diabetic foot complications included abscess (7.9%), cellulitis (19.7%), ulcer (44.7%), and gangrene (44.7%). (23.7 percent). The ulcer pattern varied from 94 percent in grade 2 to 20 percent in grade 3, 36 percent in grade 4, and 3% in grade 5.[15] Similarly, Chung KT et al. from a Mexican hospital reported that 23% of their diabetes patients had grade 2 ulcers and 21% had grade 3 ulcers.[16] The utilisation of appropriate tissue and bone cultures can help guide antibiotic therapy. Gram-positive bacteria cause the bulk of infections, however Methicillin-resistant S. aureus has grown increasingly common in recent years.[17] Although gram-positive organisms predominate in chronic diabetic ulcers, the polymicrobial nature of bacterial development should not be overlooked in management planning, especially in impoverished countries, according to Reed et al.[18] While 73 percent of patients were infected with a single gram-positive bacterium, 18 percent of cases had polymicrobial infections, according to the findings of this study. Jacobsen SM and Proteus were the most common bacteria found in these samples.[19] Chronic ulcers often coexist with fungal infections of the foot, and it has been suggested that a fungal infection may promote a bacterial infection.[20] In a study of 13,271 diabetic patients conducted in Korea in 2003, Schadewaldt et al discovered that 78.4 percent have a fungal infection of the feet. Tinea pedis infections account for 70.8 percent of these illnesses. As a result, the researchers believe that fungal infection is a risk factor for foot ulcers.[21] As a result, it appears that a limb salvage programme in diabetic ulcers combined with early debridement could greatly reduce the need for amputations.

Conclusion

In summary, ulcers were the most prevalent presenting lesion, followed by gangrene and cellulitis. The dorsum of the foot was the most commonly affected area, followed by the forefoot and toes. S. aureus was the most prevalent bacteria cultivated from the lesion culture, followed by Pseudomonas. Glargine insulin, combined with suitable oral or intravenous antibiotics, was shown to be successful in the majority of instances. Ulceration, infection, gangrene, and lower extremity amputation are all common consequences in diabetic individuals. Extensive morbidity, recurrent hospitalizations, and fatality are common outcomes of these problems.

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