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A retrospective of management of diabetic foot according to wagener's classification

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Abstract

Diabetes mellitus, a chronic metabolic disease, has a global prevalence of 5%–6%, projected to reach 438 million by 2030. Patients with diabetes are at a doubled risk of peripheral arterial disease and a 15%–25% lifetime risk of diabetic foot ulcers (DFUs), leading to 85% of non-trauma amputations. Peripheral neuropathy and angiopathy contribute to ulcer development, with factors like age, diabetic duration, smoking, obesity, hypertension, poor ankle-brachial index (ABI), and high neutrophil/lymphocyte ratio exacerbating risks. DFU infections prolong treatment, increase hospital stays, and raise healthcare costs, estimated at $4 billion annually in the US. Prompt diagnosis using classification systems like Wagner's can aid in appropriate management, potentially reducing DFU incidence and complications.

The study aims to assess diabetic foot lesions using Wagner's classification, analyse the bacteriological profile of septic diabetic foot, explore various management options, compare outcomes, and suggest measures to reduce morbidity. Wagner's classification is chosen as a simple and widely accepted tool for this evaluation.

Keywords: Diabetic Foot**,** Wagner's Classification**,** Retrospective Study**,** Management**,** Lesions**,** Bacteriological Profile**,** Morbidity**,** Treatment Outcomes Foot Ulcers**,** Neuropathy**,** Vascular Complications**,** Infection**,** Foot Care**,** Diabetes Mellitus

Introduction

In the 21st century, diabetes has become a pandemic, with rising prevalence worldwide and elevated priority in public health agendas globally. India holds the highest prevalence of diabetes globally, with approximately 1/6 of diabetic patients originating from the country. In 2017, the global diabetic population reached 425 million, nearly doubling since 1980. Type 2 diabetes constitutes about 90% of cases, with increasing rates linked to factors such as urbanization, sedentary lifestyles, and dietary shifts towards energy-dense, nutrient-poor foods.

Diabetic foot complications affect 10%-25% of all diabetics, ranging from calluses to severe abscesses and osteomyelitis, imposing significant burdens on healthcare systems and families. Wagner's classification is widely adopted for grading and managing diabetic foot ulceration, with grades ranging from high-risk foot (Grade 0) to gangrene of the entire foot (Grade 5).

Standard treatment according to Wagner's classification includes preventive measures for Grade 0, antibiotics and glycemic control for Grade 1, surgical intervention for Grade 2, and incision, drainage, debridement, and amputation as necessary for Grades 3, 4, and 5.

Materials and Methods

Study Design: A retrospective analysis was conducted from July 2018 to February 2021, utilizing data from tertiary care hospital records. Information pertaining to the history, physical examination, investigations, treatment, and follow-up at discharge of 45 diabetic foot patients was extracted for analysis.

Sampling Technique: Random sample technique was employed to select the study participants.

Hypothesis: The study hypothesizes that classifying diabetic foot cases according to Wagner's classification facilitates the implementation of appropriate treatment regimens and improves outcomes.

Methodology: This study encompasses 45 cases of diabetic foot patients, examining the efficacy of management protocols based on Wagner's classification. Data from hospital records, including patient history, physical examinations, routine blood investigations, and radiological imaging, were collected retrospectively. Treatment modalities administered to each patient were documented, with dressings performed in accordance with unit protocols. The collected data were tabulated and analyzed to evaluate outcomes.

Result

In a study involving 45 cases of diabetic foot lesions, the predominant age group was 51-60 years, with 30 patients (67%) being male and 15 patients (33%) female. Clinical presentations varied, with 16 cases (36%) presenting with gangrene, 9 cases (20%) with ulcers, 2 cases (4%) with cellulitis, 2 cases (4%) with abscess, and 16 cases (36%) with mixed features. The most common anatomical site of lesions was the dorsum of the foot in 28 patients (61%), followed by 17 patients with lesions on the toes.

A history of trauma was reported in 27 cases (60%), emphasizing the significance of previous trauma history and the need for preventive measures. Additionally, 17 patients (39%) had a previous history of ulcer/gangrene.

In terms of lifestyle habits, 9 patients (20%) were smokers and alcohol consumers, 9 patients (20%) were smokers only, 16 patients (36%) were alcohol consumers only, and 11 patients (24%) reported no addiction.

The majority of patients (85%) were known diabetics, with the highest number of amputations observed in patients with diabetes for over 20 years, highlighting the risks associated with chronicity of diabetes mellitus.

Blood sugar levels at admission were >200 mg/dl in 23 patients (50%) and between 101-200 mg/dl in 17 patients (39%).

Among the patients, 5 (11%) had bone involvement such as osteomyelitis/Charcot's foot, while 16 patients (36%) had a history of vascular disease. Preoperative and postoperative wound swabs revealed various causative organisms, with pseudomonas being the most common.

The majority of patients presented with grade IV Wagner's lesions, followed by grade I and V, reflecting ulcer as a common presentation. Amputations (34%) were the most common treatment modality, with below-knee amputations being the most frequent. Following

initial surgery, 7 patients required local debridement and 3 patients required amputation at a higher level.

Of the overall treated patients, 44 (96%) were discharged, while 1 patient (4%) died. Most patients (73%) were treated according to Wagner's classification recommendations, while 12 patients (27%) required more aggressive or conservative treatment based on clinician judgment.

Discussion

The study conducted from July 2018 to February 2021 in a tertiary care center involved 45 diabetic foot patients managed according to Wagner's classification. Key findings are summarized as follows:

1. Age Distribution: Patients ranged from 32 to 80 years, with the highest prevalence observed in the 51-60 age group. This contrasts with a study by "Rooh-ulmuqim," where the majority fell in the 41-50 age bracket.

2. Sex Ratio: Among the 45 cases, there were 30 males and 15 females, indicating a male predominance. This trend aligns with findings from previous studies, possibly due to higher exposure to foot injuries among males.

3.Presentation: Gangrene and mixed features were the most common presentations (36% each), followed by ulcers (20%), cellulitis and abscess (4% each), and osteomyelitis (11%).

4. Site of Lesion: Toes (39%) and the foot dorsum (61%) were the most frequently affected areas, consistent with previous studies.

Grade	0	I	II	III	IV	V
Present study	0	22%	22%	12%	29%	15%
Rooh-Ul-Muqim, Ahmed M, Griffin S	6%	14%	25%	30%	21%	4%

5. History of Trauma: A significant number of patients (60%) had a history of trauma, emphasizing the role of repetitive injuries in diabetic foot ulceration.

6. History of Previous Ulcer/Gangrene: Nearly 39% of patients had a previous history of ulcer or gangrene, indicating its significance in predicting future amputations.

7. History of Addiction: Smoking and alcohol consumption were common among patients, with 20% reporting both habits, 20% smokers only, and 36% alcohol consumers. These factors increase the risk of vasculopathy and diabetic foot complications.

8. Duration of Diabetes: Most patients (85%) had known diabetes, and amputations were more common in those with diabetes for over 10 years.

9. Blood Sugar Levels: Higher blood sugar levels (>200 mg/dl) at admission were associated with increased infection severity and subsequent amputations.

10.Bone Involvement: Around 11% of patients had bone involvement, often associated with Charcot's foot or osteomyelitis.

11. vascular disease: Vascular disease was present in 36% of patients, contributing to ischemic complications.

12. Causative Organisms: Microbiological culture identified various organisms, with Pseudomonas aeruginosa being the most prevalent (39%).

13. Wagner's Classification: Most patients were classified as grade IV (38%) or grade V (22%), with none in grade 0. Surgical intervention was the primary treatment modality (93%).

14. Treatment Outcomes: Approximately 98% of patients were discharged following treatment, with a mortality rate of 2%.

15. Adherence to Wagner's Classification: While 73% of patients were treated according to Wagner's recommendation, 27% received more aggressive treatment based on clinical judgment, indicating a need for uniform treatment protocols.

Wagner's Classification and Treatment Outcomes: Adherence to Wagner's classification and treatment outcomes were consistent with previous studies, with surgical intervention being the primary treatment modality and high rates of successful discharge observed.

Treatment Modality	Present Study	Rooh-Ul-Muqim, Ahmed M, Griffin S
Conservative	7%	17%
I and D	4%	10%
Debridement	18%	28%
Amputation or Disarticulation	62%	48%
Others	9%(Scraping of ulcer)	2%

Overall, while some variations exist, the study's findings are largely consistent with previous research, supporting the robustness of the conclusions drawn regarding diabetic foot management.

Conclusion

1. Diabetic foot ulceration poses a significant burden on healthcare resources and leads to disabling morbidity, often culminating in lower extremity amputation. Emphasizing prevention strategies is paramount.

2. Wagner's classification serves as a valuable tool for guiding treatment decisions based on the severity of the lesion, leading to improved outcomes. Lower grade lesions may respond well to conservative measures such as antibiotics and debridement, whereas higher grade lesions often necessitate amputation.

3. Maintaining effective glycemic control and providing patient education are crucial in mitigating diabetic foot disease and its complications.

4. Timely presentation and admission to healthcare facilities, coupled with aggressive medical and surgical interventions tailored to the disease grade, can significantly enhance outcomes and reduce the burden of morbidity and mortality associated with diabetes.

5. It is imperative to recognize that every incision on the sole of a diabetic patient carries the potential risk of developing into a future ulcer, underscoring the importance of proactive management and preventive measures.

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