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A CLINICAL ANALYSIS OF THE SVS-WIFI SCORING METHOD FOR RISK STRATIFICATION IN PATIENTS WITH DIABETIC FOOT ULCERS.

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Abstract

Background: Diabetic foot ulcers (DFUs) continue to be a significant contributor to morbidity, hospitalization, and lower-limb amputation in patients with diabetes. Prompt recognition of ulcer severity and limb loss risk is crucial for prompt treatments. The Society for Vascular Surgery – Wound, Ischemia, and Foot Infection (SVS-WIfI) score system offers an objective methodology for assessing DFUs. ***Aims:*** To evaluate the effectiveness of the SVS-WIfI (Wound, Ischemia, Foot Infection) scoring system in stratifying risk and predicting clinical outcomes in patients with diabetic foot ulcers. ***Materials and Methods:*** This prospective observational study was conducted over a period of 12 months in the surgical department of a tertiary care centre. A total of 55 patients with clinically diagnosed DFUs were enrolled after meeting inclusion and exclusion criteria. Detailed demographic data, duration of diabetes, comorbidities, and ulcer characteristics were recorded. Each patient was evaluated using the SVS-WIfI scoring system, scoring the ulcer across three components—Wound, Ischemia, and Foot Infection—and classified into corresponding WIfI clinical stages. All patients received standard wound management, infection control measures, and vascular assessment as per institutional protocols. They were followed at regular intervals to assess wound healing, need for surgical intervention, progression to major amputation, and other complications. ***Results:*** According to the SVS-WIfI classification, patients were categorized into stages 1–4, with advanced stages indicating greater severity of ischemia and infection. A notable correlation was identified between elevated WIfI clinical stages and negative outcomes. Patients categorized as Stage 3 and Stage 4 had increased rates of delayed healing, necessity for debridement or minor amputation, and advancement to major amputation relative to those in Stages 1 and 2. The WiFi score demonstrated significant predictive validity for limb-threatening events, with elevated ischemia and infection grades associated with unfavorable healing outcomes. ***Conclusion:*** The SVS-WIfI scoring system is an essential tool for evaluating severity and anticipating outcomes in DFUs. Integrating the WIfI approach into standard DFU assessment enhances risk classification, informs management strategies, and may decrease limb-loss rates through prompt intervention.

Keywords: Diabetic Foot Ulcer, Foot Infection, Ischemia, SVS-WIfI, Wound Classification.

INTRODUCTION

Diabetic foot ulcers (DFUs) constitute a major and expensive consequence of diabetes mellitus, substantially increasing morbidity, hospitalization, and lower-limb amputation globally.1 The lifetime risk of an individual with diabetes getting a foot ulcer is estimated to be between 15% and 25%, with recurrence rates being significantly elevated despite advancements in medical and surgical treatment.2

DFUs result from a complex interaction of peripheral neuropathy, ischemia, infection, and inadequate glycemic control, resulting in compromised wound healing and heightened vulnerability to tissue loss.3 The increasing prevalence of diabetes globally presents a significant challenge to healthcare systems, particularly in low- and middle-income nations, where delayed presentation and insufficient access to specialized care are prevalent.4

Evaluating the severity of a DFU only through conventional clinical judgment is challenging. Numerous classification systems, including the Wagner, University of Texas, and PEDIS scores, have been employed to stratify patients; however, many of these systems primarily emphasize ulcer depth or infection presence and fail to provide a comprehensive evaluation of ischemia and its consequences for limb preservation.5,6

The Society for Vascular Surgery implemented the Wound, Ischemia, and Foot Infection (SVS-WIfI) score system to address these deficiencies. The WIfI classification assesses the DFU based on three essential components: wound extent, ischemia severity, and infection extent, each rated from grade 0 to 3. The ratings are subsequently aggregated to categorize patients into clinical stages 1 to 4, which correspond to the risk of amputation and the possible advantages of revascularization.7 This approach offers a comprehensive and objective evaluation, enabling the early detection of high-risk individuals and permitting doctors to customize interventions accordingly.8

In contrast to previous systems, WIfI offers a dynamic evaluation that can inform judgments about limb salvage techniques, the necessity for vascular examination, and the prioritization of therapies.9 By measuring the relative impact of ischemia and infection, it provides clinicians with an objective approach to forecast wound healing capacity and the likelihood of limb loss. This comprehensive strategy corresponds with contemporary multidisciplinary DFU therapy, which prioritizes early diagnosis, rigorous infection control, vascular optimization, and prompt surgical intervention.10,11

Numerous international studies have validated the efficacy of the WIfI scoring system in forecasting wound healing outcomes, amputation risk, and the necessity for vascular intervention. Notwithstanding its increasing recognition, the efficacy of the WIfI scoring system fluctuates across different countries and healthcare settings. The justification for the current study arises from the necessity to produce region-specific evidence that can facilitate the incorporation of the SVS-WIfI score into routine diabetic foot evaluations. Demonstrating the practical utility of WIfI scoring may assist physicians in early identification of high-risk ulcers, enhance treatment planning, and ultimately mitigate the incidence of major amputations.

AIMS AND OBJECTIVES

- To evaluate the effectiveness of the SVS-WIfI (Wound, Ischemia, Foot Infection) scoring system in stratifying risk and predicting clinical outcomes in patients with diabetic foot ulcers.

MATERIALS AND METHODS

This prospective observational study was conducted at the Department of General Surgery, Sree Mookambika Institute of Medical Sciences, over a period of twelve months. A total of fifty-five patients presenting with clinically diagnosed DFUs were enrolled after obtaining informed consent.

Inclusion Criteria

1. Patients diagnosed with diabetes mellitus presenting with DFUs.
2. Individuals aged 18 years and above.
3. Patients willing to participate and provide informed consent.
4. Ulcers suitable for assessment using the SVS-WIfI scoring system.
5. Patients fit for regular follow-up during the study period

Exclusion Criteria

1. Patients with non-DFUs (traumatic, venous, arterial, pressure ulcers).
2. Patients with extensive gangrene requiring immediate major amputation at presentation.
3. Patients with critical illness or hemodynamic instability precluding clinical assessment.
4. Individuals with psychiatric or cognitive impairment preventing cooperation or follow-up.
5. Patients who declined to participate or withdrew consent.

Patients were evaluated at the time of presentation, and detailed demographic information, duration of diabetes, glycaemic status, comorbidities, history of previous ulceration, and relevant clinical findings were recorded. Ulcers were examined meticulously for location, size, depth, presence of necrosis, discharge, and signs of infection. Peripheral pulses were assessed clinically and supplemented with ankle–brachial index (ABI) and Doppler studies to determine the vascular status.

Each patient was classified using the Society for Vascular Surgery Wound, Ischemia, and Foot Infection (SVS-WIfI) scoring system. The wound component was graded based on ulcer depth and extent of tissue loss, ischemia was assessed using ABI and perfusion parameters, and infection severity was graded according to clinical features of local and systemic involvement. The individual component scores were combined to determine the WIfI clinical stage for each patient. All patients underwent standard wound care as per institutional protocols, which included debridement, offloading, infection control, glycaemic optimisation, and vascular evaluation when indicated. Patients requiring surgical procedures such as debridement, drainage, minor amputation, or revascularisation were managed accordingly.

Follow-up assessments were conducted at regular intervals to monitor wound healing, progression or improvement of the ulcer, need for further surgical intervention, and occurrence of complications including minor or major amputations. Outcomes were correlated with the initial WIfI stages to assess the predictive value of the scoring system. Data were entered in a structured proforma, and statistical analysis was performed to evaluate the association between WIfI classification and clinical outcomes, using appropriate tests to determine significance. A p value less than 0.05 was considered statistically significant.

RESULTS

A total of **55 patients** with DFUs were included in the study. The mean age was **58.4 ± 10.2 years**, with a male predominance (67.3%). Nearly **60%** had diabetes for **more than 10 years**, indicating long-standing disease as a major contributory factor. (Table 1,2)

Table 1: Distribution of demographic Characteristics

Variable	Category	n	Percentage (%)
Age (years)	<50	8	14.5%
	50–59	18	32.7%
	60–69	20	36.4%
	≥70	9	16.4%
Gender	Male	37	67.3%
	Female	18	32.7%

Table 2: Duration of Diabetes

Duration	n	Percentage (%)
<5 years	9	16.4%
5–10 years	13	23.6%
10–15 years	21	38.2%
>15 years	12	21.8%

Most patients presented with **Grade 2 wound severity, moderate ischemia**, and **moderate-to-severe infection**, reflecting late presentation. (Table 3)

Table 3: Distribution of SVS-WIfI Component Grades

Component	Grade 0	Grade 1	Grade 2	Grade 3
Wound	0 (0%)	11 (20%)	26 (47.3%)	18 (32.7%)
Ischemia	4 (7.3%)	15 (27.3%)	21 (38.2%)	15 (27.3%)
Infection	3 (5.5%)	19 (34.5%)	22 (40%)	11 (20%)

More than **60%** of patients belonged to **Stage 3 or Stage 4**, indicating a **high risk for limb-threatening complications**. (Table 4)

Table 4: Distribution of WIfI Clinical Stages

WIfI Stage	n	Percentage (%)
Stage 1	6	10.9%
Stage 2	14	25.5%
Stage 3	18	32.7%
Stage 4	17	30.9%

The major amputation rate was 20%, consistent with the advanced WIfI stages seen at presentation. Overall amputation rate was **47.3%**, with major amputation in **20%**. (Table 5)

Table 5: Clinical Outcomes

Outcome	n	Percentage (%)
Complete Healing	22	40%
Minor Amputation	15	27.3%
Major Amputation	11	20%
Non-Healing/Ongoing Treatment	7	12.7%

Higher WIfI stages (**3 & 4**) were significantly associated with **poor healing and higher amputation rates** (p = **0.003**, highly significant). (Table 6)

Table 6: Correlation Between WIfI Stage and Healing Outcome

WIfI Stage	Healed (n=22)	Not Healed / Amputated (n=33)	p-value
Stage 1–2	15 (68.2%)	5 (15.2%)	**0.003**
Stage 3–4	7 (31.8%)	28 (84.8%)	

Severe ischemia was a **strong predictor** of major amputation (p = **0.021**). Patients with **Grade 2–3 ischemia** had a significantly higher likelihood of major amputation (p = **0.021**). (Table 7) Higher infection grades were significantly associated with **major amputation** (p = **0.014**). (Table 8) Longer duration of diabetes (**≥10 years**) was significantly correlated with **higher WIfI stages** (p = **0.018**), indicating more severe ulcers and ischemic burden.

Table 7: Correlation Between Ischemia Grade and Major Amputation

Ischemia Grade	Major Amputation (n=11)	p-value
Grade 0–1	1 (9.1%)	**0.021**
Grade 2–3	10 (90.9%)	

Table 8: Correlation Between Infection Grade and Type of Amputation

Infection Grade	Minor Amputation (n=15)	Major Amputation (n=11)	p-value
Grade 0–1	9 (60%)	1 (9.1%)	**0.014**
Grade 2–3	6 (40%)	10 (90.9%)	

DISCUSSION

In the present study, 55 patients with DFUs were evaluated for severity and clinical outcomes using the SVS-WIfI scoring system. The study population primarily comprised older individuals with a mean age of 58.4 years, and males represented approximately two-thirds of the population.

This demographic profile corresponds with the findings of Seshaan KN et al.12 who similarly identified a mostly male sample (72%) with the majority of patients aged between 41 and 60 years. Likewise, Sajid H et al.13 noted a predominance of males (68.4%) with a mean age marginally lower than ours (51.03 years). A significant percentage of patients in our study had diabetes for over ten years, aligning with the chronic disease load observed in the cohorts assessed by Benyakorn T et al.14 where a high incidence of hypertension and peripheral artery disease further exacerbated limb-threatening ischemia.

WiFi grading in the study indicated that the majority of patients exhibited Grade 2 severity in the wound, ischemia, and infection components, with roughly two-thirds categorized under Stages 3–4. This distribution largely aligns with the findings of Seshaan KN et al.12 who reported that 64% of their patients were categorized in the highest-risk group (Stage 4). In contrast, Haribabu MA et al.15 indicated a somewhat greater percentage of patients in Stage 1 for wound and ischemia categories, implying earlier presentation in their cohort. The prevalence of advanced phases in our study may indicate disparities in healthcare access, awareness, or referral practices.

The clinical outcomes demonstrated a distinct and incremental elevation in amputation risk according to advancing WIfI stage. Forty percent of our sample attained complete recovery, whereas nearly fifty percent necessitated amputation, with significant amputations occurring more frequently in patients with Stage 3–4 illness. Haribabu MA et al.15 noted analogous results, indicating that Grade 3 wounds were linked to a 100% amputation rate, while Mayor JM et al.16 highlighted that elevated WIfI stages are connected with prolonged healing durations, increased readmission rates, and heightened healthcare usage. The amputation rates shown by Benyakorn T et al.14, 16% and 26% for major amputations at one and three years, respectively—reinforce the robust predictive correlation between advanced WIfI stages and limb loss.

The predictive validity of WIfI staging is proven by numerous investigations. Liette MD et al.17 revealed substantial disparities in wound healing, surgical dehiscence, and mortality among WIfI stages. Bayrak A et al.18 identified elevated WIfI and IWGDF scores as predictors of reamputation, ICU hospitalization, and mortality. Helmy Hanna AS et al.19 validated the stratified amputation risk among low-, moderate-, and high-risk WIfI categories, underscoring its clinical significance. Together, these investigations corroborate the results obtained, demonstrating the system's efficacy in classifying patients according to severity and anticipated prognosis.

The current study revealed a substantial correlation between prolonged diabetes (≥10 years) and advanced WIfI stage, with 78.8% of these individuals classified in Stage 3–4. This association aligns with the findings of Seshaan KN et al.12, who

indicated that WIfI Stage 4 and extended symptom duration are significant predictors of amputation. Additional risk factors, including male gender, diabetes, and extended hospitalization, as emphasized by Bayrak A et al.18 elucidate the aggregation of poor outcomes in high-risk patients.

Ahmed Z et al.20 indicated that the composite WIfI score, calculated from the aggregation of wound, ischemia, and infection factors, functioned as a robust predictor for amputation risk, highlighting its efficacy when utilized early in the treatment of infected and ischemic lower extremities. Their findings underscore the predictive significance of the WIfI system in facilitating prompt intervention.

Overall, the current study confirms that the SVS-WIfI scoring system is a solid and trustworthy method for forecasting limb outcomes by contrasting the results with previous research. The persistent correlation between elevated WIfI stages and increased amputation rates, extended healing durations, and inferior clinical outcomes across several studies highlights its clinical significance and advocates for its incorporation into standard evaluation and management of DFUs.

CONCLUSION

The SVS-WIfI score system functions as an effective and thorough instrument for assessing DFUs by incorporating wound severity, ischemia, and infection status. Elevated WIfI stages demonstrated a significant correlation with heightened amputation rates and suboptimal healing outcomes, underscoring its use in identifying individuals at elevated risk for limb loss. An extended period of diabetes was substantially associated with advanced WIfI grades, indicating progressive vascular and neuropathic deterioration. The WiFi system augments clinical decision-making, facilitates prompt treatments, and increases limb preservation and patient management in diabetic foot care.

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CONFLICTS OF INTEREST:
There are no conflicts of interest.

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