



PREDICTING OUTCOME IN PATIENTS WITH DIABETIC FOOT ULCER WITH DIABETIC ULCER SEVERITY SCORE(DUSS)

General Surgery

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ABSTRACT

Introduction: A number of foot ulcer classification systems have been devised in an attempt to categorize ulcers more effectively and allow effective comparison of the outcome of routine management. DUSS (Diabetic Ulcer Severity Score) is one of the latest wound based system of classification, which needs to be validated. **Aims and Objectives:** Our aim was to validate this score (DUSS), with patients outcome having diabetic foot ulcer including healing and amputation **Methods:** Total of 100 Diabetic patients attending surgical outpatient clinic or admitted into the hospital with diabetic foot ulcers were included in the study **Results:** Most common age group affected with Diabetic foot was between years. Males were commonly affected. The probability of healing with score 0 was 93% and that of score 4 was 10%. Chances of amputation with Score 0 was 6.89% and Score 4 was 90% **Conclusion:** DUSS scoring system provides an easy diagnostic tool for predicting probability of healing or amputation. This is a very simple and easy scoring system which needs no advanced investigation tool and can be easily followed even in busy OPDs

KEYWORDS

Diabetes, foot ulcer, scoring system

INTRODUCTION

Diabetes mellitus is an iceberg disease. It's a global problem. The incidence of diabetes mellitus is increasing globally (1). The lifetime risk of developing foot ulcers in people with diabetes ranges from 12% to 255% (2).

India is destined to become the 'Diabetes Capital of the World' as it currently has the highest number of diabetics in the world. Diabetic foot ulcers are most common in older adults, with older diabetics being twice as likely to develop a foot ulcer, three times as likely to develop a foot abscess, and four times as likely to develop osteomyelitis (3).

Eighty-five percent of major diabetic amputations begin with a foot ulcer, and the usual route to amputation is when an infection penetrates the foot and leads to gangrene. The remaining 15% of major amputations are due to pain at rest, ischemia destroying the foot, or unstable Charcot joints.

Every 30 seconds, somewhere in the world, someone loses a leg or part of a leg to diabetes.

Foot ulcers can be prevented by applying simple strategies, thereby reducing ulcers leading to amputation. 15% of people with diabetes will develop foot ulcers at some point in their lives, causing significant health problems that affect their quality of life. This leads to a large consumption of medical resources (4).

There are multiple grading systems and classifications for diabetic foot ulcers. Their intention is to set side by side treatment modality and outcomes in different parts of the world. These scoring systems contain various parameters, Depth of ulcer, presence of infection, location of ulcer, neuropathy and arterial insufficiency.

All of these scoring systems are difficult and do not predict long-term outcomes. The Diabetic Ulcer Severity Score marks these shortcomings because it is simple enough to be used in routine clinical practice. The classification of diabetic foot ulcers into foot and toe ulcers is in itself a new method. This scoring system can predict rate of amputation. This is a very useful tool for making decision for patients requiring amputation.

Diabetic foot ulcers frequently presents in surgical outdoor. Amputation almost doubles patient hospitalizations (increased morbidity) and is associated with significant mortality. This study attempts to predict the likelihood of diabetic foot ulcers leading to amputation. The foot and its arch help to walk gracefully and maintain balance in a two-legged human. Diabetic foot loses this wonderful arch

and loses balance (5). The World Health Organization (WHO) defines diabetic foot as the lower limb of a diabetic patient that has the potential risk of pathologic consequences, including infection, ulceration and/or destruction of deep tissues associated with neurological abnormalities, various degrees of peripheral vascular disease and/or metabolic complications of diabetes. Peripheral neuropathy, vascular disease, and overlying infections are the main causes of diabetic foot ulcers. Progressive ulcers are difficult to treat because of poor wound healing due to a combination of neuropathy, ischemia, and hyperglycemia (6). Diabetic foot is more of a syndrome than a disease.

Therefore, diabetics can prevent foot complications with simple precautions. If you already have an ulcer, recognizing it as soon as possible and treating it appropriately can save your limb.

MATERIALS AND METHODS

Total 100 patients clinically suspected of diabetic foot were taken in study.

Inclusion Criteria

1. All patient giving written and informed consent
2. Age limit: 20 – 60 years
3. All subjects suffering from Diabetes Mellitus as per WHO criteria who have foot ulcers :-
 - a) Symptoms of Diabetes + random blood sugar > 200 mg/dl Or
 - b) Fasting blood sugar > 126 mg/dl c) 2 hour plasma glucose level > 200 mg/dl
4. All diabetic lower limb ulcers irrespective of ulcer duration

Exclusion Criteria

1. Venous stasis ulcer with diabetes mellitus
2. Ulcers located above the ankle
3. Non diabetic foot ulcers
4. Non diabetic neuropathic ulcers
5. Ulcers with evidence of gangrene

Duss Scoring System

VARIABLE	SCORE 0	SCORE 1
Palpable pedal pulses	Present	Absent
Probing to bone	No	Yes
Ulcer site	Toes	Foot
Ulcer no.	Single	Multiple

The score obtained was then compared with the outcome to validate the prediction of DUSS Score

RESULTS

100 patients were included in the study. The following observations were made. The most commonly affected age group was 51-60 years

AGE	Gender		Total
	Female	Male	
21-30	2	8	10
31-40	11	18	29
41-50	17	7	24
51-60	18	19	37
Grand total	48	52	100

Most common age group affected in our study was between the age group of 51-60 years.

Males were more affected in the study (52%).

SCORE	NO. OF PATIENTS	PERCENTAGE
0	29	29%
1	25	25%
2	9	9%
3	27	27%
4	10	10%
GRAND TOTAL	100	100%

MANAGEMENT	NO OF PATIENT
DEBRIDEMENT	47
DEBRIDEMENT+SSG	18
RAY AMPUTATION	18
BELOW KNEE AMPUTATION	12
ABOVE KNEE AMPUTATION	5
GRAND TOTAL	100

In the management of diabetic foot ulcer 47% of patients were managed conservatively i.e., debridement. 18% undergo debridement followed with split skin graft cover for the wound of the remaining 35%, toe amputation (minor amputation) was performed in 18% of patients, 12% underwent below knee amputation and 5% above knee amputation.

In our study, 70% had no comorbidities and remaining 30% were found to be hypertensive. (P value- 0.21)

AGE	DEBRIDEMENT	DEBRIDEMENT+SSG	RAY AMPUTATION	BELOW KNEE AMPUTATION	ABOVE KNEE AMPUTATION
31-40	11	1	2	1	3
41-50	6	1	3	5	1
51-60	9	0	2	7	0
TOTAL	32	5	7	13	4

In our study, as age increases incidence of amputation increases with more no of males undergoing amputation.

SCORE 0

MANAGEMENT	FEMALE	MALE
DEBRIDEMENT	7	21
DEBRIDEMENT+SSG	1	0
RAY AMPUTATION	0	0
BKA	0	0
AKA	0	0
TOTAL	8	21

Wound debridement is the main line of management with score 0 patients. (P value- 0.01)

Debridement were more in males as compared to female patients.

SCORE 1

MANAGEMENT	FEMALE	MALE
DEBRIDEMENT	5	8
DEBRIDEMENT+SSG	1	4
RAY AMPUTATION	3	4
BKA	0	0
AKA	0	0
TOTAL	9	16

Wound debridement and debridement with split skin graft is the main mode of management in score 1 patients. (P value- 0.17)

Debridement were more in males as compared to female patients.

SCORE 2

MANAGEMENT	FEMALE	MALE
DEBRIDEMENT	1	4
DEBRIDEMENT+SSG	0	0
RAY AMPUTATION	0	0
BKA	0	0
AKA	0	0
TOTAL	1	4

DEBRIDEMENT	1	0
DEBRIDEMENT+SSG	0	0
RAY AMPUTATION	0	0
BKA	4	4
AKA	0	0
TOTAL	5	4

Below knee amputation is the main mode of management in score 2 patients. (P value- 0.01)

Below knee amputation in males is equal to female.

SCORE 3

MANAGEMENT	FEMALE	MALE
DEBRIDEMENT	1	4
DEBRIDEMENT+SSG	0	1
RAY AMPUTATION	2	4
BKA	6	9
AKA	0	0
TOTAL	9	18

Below knee amputation is the main mode of management in score 3 patients along with ray amputation and debridement in few patients. (P value- 0.01)

Below knee amputation is more in males as compared to female

SCORE 4

MANAGEMENT	FEMALE	MALE
DEBRIDEMENT	0	0
DEBRIDEMENT+SSG	0	0
RAY AMPUTATION	0	0
BKA	1	2
AKA	4	3
TOTAL	5	5

Major amputation i.e., below knee and above knee is the main mode of management in score 4 patients. (P value- 0.01)

Above knee amputation is more in females as compared to males and below knee is more in males as compared to female.

KAPLAN MEIRANALYSIS

Duss score.	Total no of patients	Total no of amputation	Total no of healing	Percentage Healing	Percentage Amputation
0	29	2	27	93.10%	6.89%
1	25	7	18	72%	28%
2	9	8	1	11.11%	88.88%
3	27	21	6	22.22%	77.77%
4	10	9	1	10%	90%

Majority of foot ulcers among study population, with DUSS score 0,1,2 were healed by primary intention i.e., debridement or debridement with split skin graft cover over wound. However, among those with score 3 and 4 majority required amputation. As the score increases so do the incidence of amputation among diabetic foot ulcer patient.

Difference in the DUSS score among the group was found to be statistically significant (p<0.01)

DISCUSSION

A total of 100 diabetic foot ulcer patients were included in this study with surgical OPD or hospitalization based on the inclusion and exclusion criteria previously described. The most frequently affected age group in this study was between age 50 - 60s. In this study, 52% of men were most commonly affected.

In treating diabetic foot ulcers, 47% of patients received conservative treatment i.e., debridement. 18% received debridement followed by split skin graft of the wound. Of the remaining 35% patients, 18% underwent toe amputation (minor amputation). 12% were amputated below the knee and 5% above the knee.

In this study, 70% had no comorbidities and the remaining 30% had hypertension. In the study, 28% had addictive habits such as smoking, alcohol, and tobacco.

Chances of cure are higher with a score of 0 than with a score of 4.

Patients in the 50-60 year age group were more affected in both categories, with scores of 0 more than scores of 4. The frequency of score 0 is higher than the frequency of score 4 in the study population. Wound debridement is the most important treatment for patients with a score of 0.

Debridement was more common in older age group ranging from 50-60 year as compare to the younger age group, with men outnumbering women. As the score increases the line of management also changes as some debridements proceeded to ray amputation, ray amputation to below-knee amputation and then above-knee amputation. Conversion rate of amputation is more in Male as compared to female.

The majority of foot ulcers in the DUSS score 0, 1, and 2 study population were healed with primary intention. However, the majority of patients with scores 3 and 4 required amputation.

As the score increases, so does the incidence of amputation in patients with diabetic foot ulcers. This was explained by Kaplan-Meier analysis. In this analysis, the patient with a score of 0 has a 93.1% chance of healing, and 6.8% chance of amputation and as the score increases to 4, chance of healing decreases to 10% and 90% chance of getting amputation. Differences in DUSS scores among groups were statistically significant ($P < 0.001$)

CONCLUSION

DUSS scoring system provides a simple diagnostic tool that predicts the likelihood of healing or amputation by combining four clinically evaluable wound-based parameters. Study groups can be stratified according to ulcer severity, helping to provide a simple and streamlined approach in clinical practice without the need for advanced investigative tools, but leaving the wound management process unchanged.

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