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A Study on Predictive Factors for Amputation in Diabetic Patients with Acute Foot Ulcers

Pankaj Surana[1], Byomokesh Patro[2*], P.N. ShanmugaSundaram[3], Uday S. Kumbhar [4]
Department of General Surgery, ESIC Medical College & PGIMSR, Chennai, Tamilnadu, India

Original Research Article

***Corresponding author**
Byomokesh Patro

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Abstract: Ulceration of foot is most common complications in diabetes mellitus associated lower extremity amputations. To study the factors for amputation in diabetic patients with acute foot ulcers. A total of 130 Diabetic Patients with acute foot ulcer (<1 month) attending Surgical Outpatient department, ESIC Medical College & PGIMSR, Chennai considered for the present study. Patients of diabetic foot ulcer with Wagner's Grades 1 to 3 above 30 years of age were included in the present study whereas patients with associated Peripheral Vascular Disease, Venous or Lymphatic disorders of lower limb and Pregnancy, Chronic Liver/Renal dysfunction were excluded from the present study. Laboratory investigations for all patients like Blood glucose, HbA1c, White Blood Cell (WBC) Count, C-reactive protein (CRP), Erythrocyte Sedimentation Rate (ESR), Serum Albumin were done and recorded. 75 male patients and 55 female patients out of 130 acute diabetic foot ulceration were noted in the present study. As per Wagner classification grade 2 and 3 patients were more in our study and above 60 years patients were more in number when compared other age group. Haemoglobin, HbA1c, WBC count ESR followed by Serum albumin at higher levels indicates the major predictive factors for amputation in the present study was noted. Haemoglobin, old age, total WBC count, ESR are the major predictive factors in acute foot ulcers in diabetic lower extremity amputations.
Keywords: acute, diabetes, foot, ulceration.

INTRODUCTION

Diabetic foot ulcers are the most common complications of diabetes leading to high morbidity and increased mortality. Foot ulcers negatively impact the quality of life of a patient as it affects the physical, psychological, social and spiritual well-being of a person [1]. Diabetic foot ulcer is one of the common complications of DM and commonest cause of lower limb amputations is diabetic ulcers. Worldwide, a lower limb is lost every 30 seconds as a consequence of diabetes [2].The presence of micro vascular [3] and macro vascular complications [4], old age are considered to be major risk factors of Diabetic foot ulceration [5]. Hemoglobin status, control of blood pressure, and prompt lipid levels are crucial elements in the reduction of risk related to complications of diabetes [6]. The present study was planned to determine the predictive factors for amputation in diabetic foot ulceration and its comorbidities.

MATERIALS AND METHODS

130 Diabetic Patients with acute foot ulcer (<1 month) attending Surgical Outpatient department, ESIC Medical College & PGIMSR, Chennai considered for the present study. Patients of diabetic foot ulcer with Wagner's Grades 1 to 3 above 30 years of age were included in the present study whereas patients with associated Peripheral Vascular Disease, Venous or Lymphatic disorders of lower limb and Pregnancy, Chronic Liver/Renal dysfunction were excluded from the present study. Laboratory investigations for all patients like HbA1c, White Blood Cell (WBC) Count, C-reactive protein (CRP), Erythrocyte Sedimentation Rate (ESR), Antibiotic sensitivity and Serum Albumin were done and recorded. Patient treated according to diabetic foot protocols, with in patient admission, antibiotics according to culture sensitivity, regular debridement and dressing and amputation. All the patients were informed about the study protocol and Consent was obtained from Institutional Ethical Committee, ESIC Medical College & PGIMSR, Chennai, Tamilnadu (ESIC/CHE/TN/16/04/2018).

RESULTS

We have observed 75 male cases and 55 female cases with acute diabetic foot ulceration were noted in the present study. As per Wagner classification grade 2 and 3 patients were more in our study and above 60 years patients were more in number when compared other age group. Male patients are more

number when compared to female cases with acute diabetic foot ulceration as per Wagner classification in the present study (Table 1). DFU predominantly affects right lower limb than left lower limb. Out of 96 considered acute diabetic foot ulcer patients as per Wagner's grade 64 cases are affected right lower limbs whereas 32 are left lower limb in the present study (Table 2). The other factors considered in the present study like Haemoglobin, ESR, WBC count, Serum Albumin, C-Reactive Protien, HbA1c and antibiotic sensitivity have shown significant levels for amputation of lower extremities. Haemoglobin, HbA1c, WBC count ESR followed by Serum albumin at higher levels indicates the major predictive factors for amputation in the present study was noted (Table 3).

Table-1: Acute Diabetic foot ulceration cases among study population according to Wagner's Grading

Wagner's grade	Age	Male	Female
1	30-50	13	6
2	51- 60	28	31
3	61-70	35	18
4	70-80		
5	>80		
Total		75	55

Table-2: Acute DFU cases Distributed in Affected Lower limb according to Wagner's grading

Wagner's grade	Right Leg	Left Leg
1	6	4
2	22	11
3	36	17
4		
5		
Total	64	32

Table-3: Other factors predicting the foot ulceration

Factor	Value	Male	Female
Hemoglobin	<8-9 g	24	19
WBC	1200-15000	12	7
ESR	25-100mmHr	8	11
HbA1c	6-7.5	21	16
Serum Albumin	2-2.5	7	1
C reactive protein	10-15mgL	5	1
Antibiotic sensitivity	Resistant to drug	1	0

DISCUSSION

A diabetic foot wound exposing the bone was more likely to be associated with amputation [7]. Haemoglobin is responsible for the cellular oxygen supply. Amputation tendency increases with fall in Haemoglobin levels due to reduced oxygen supply [8, 9]. The wound infection rate is depending on the total WBC count and increases when the infection increases higher levels of WBC count can be observed [10]. In the present study we have observed higher levels of Haemoglobin and total WBC count which is in agreement with the literature. The C - reactive protein and ESR are the direct and indirect measure of acute inflammatory process. Elevated levels of C-reactive protein and ESR leads to amputations in diabetic foot ulcers [8]. Older age and higher WBC counts are the major predictive factors in amputation. We have observed higher levels of total WBC and also more number of diabetic foot ulceration was observed in old age patients like above 60 years in the present study .The finding s in the present study are mere to the previous literature [11-13]. Majority of Diabetic foot ulcers (60–80%) heal, while 10–15% of them continue to be active, and up to 24% of Diabetic foot ulcers eventually lead to lower extremity amputation [14, 15]. Duration of diabetes mellitus, inadequate glycemic control, and wound severity are predictive risk factors for diabetic foot ulceration [16]. The parameters considered in the present study have predictive role in diabetic foot ulceration and its amputation in lower extremities [8-12].

CONCLUSION

Our study acknowledges the major predictive factors for amputations in diabetic foot ulcers and provides awareness in understanding the diabetic related amputations due to acute foot ulceration.

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