Assessment of Risk Factors Leading to Amputation in Diabetic Neuropathic Ulceration of Foot

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Author’s contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

ABSTRACT

More than 65% of the patients were found to have neuropathy and associated deformity. 90% of patients had history of trauma predisposing to diabetic ulcer, of which trivial trauma accounts for 60% of injuries. About 35% of these patients presented with abscess and 20% with gangrene. Majority of blood sugar values ranged from 200-350 mgs% with insulin requirements of about 20-40 units per day. 50% of cases were subjected to decompressions which resulted in salvaging of the legs.

Keywords: Neuropathy; trauma; diabetic ulcer.

1. INTRODUCTION

As we are aware that diabetes mellitus is a very well known disease causing a long term defects in the diabetic foot syndrome, which is the main reason leading to hospitalization than any other diabetes. Diabetic foot ulcer will eventually lead to amputation of legs or digits [1-6]. Mortality rate and recurrent infection is highly reported in these cases. The consequence of diabetic foot ulcer is severe and even ending up in amputation [7-10]. In this study a detail analysis of epidemiology, microbiological profile and assessment of risk factors leading to amputation
in neuropathic ulceration of foot in diabetes is done.

2. METHODOLOGY

Patients reported for diabetic foot was taken for the study (200 cases), complete hematological, biochemical, microbiological and radiological investigations were carried and Blood sugar and Renal parameters were performed. X-ray of local part, Ultrasonogram Abdomen and Hand held Doppler study of both limbs was done.

3. RESULTS

Peak Incidence of diabetic foot was seen in the age group of 61-70 years. Increased prevalence was seen among males (67%), in the age group of 51-60 years. There was significant family history of diabetes mellitus in 67.5% of patients. It is observed in this study that 81% of the foot lesions had occurred in patients who have had Diabetes mellitus for more than 1 year to 10 years. The analysis showed that about 52.5% of patients had uncontrolled Random Blood Sugar levels on admission in the range of 201-300 mg/dl. About 21% of patients presenting with Diabetic foot lesions had Diabetic Ketoacidosis. About 110 patients presented with Diabetic foot ulcers with infection and their pus was sent for culture and sensitivity, of this 73% were of single organisms like Klebsiella, E.coli, Proteus, etc. Only 18% had mixed organism grown in culture. Retinopathy of various grades was present in 96% of patients and this is a risk factor for diabetic foot complications as they are more prone to trauma due to impaired vision.

The average number of days of hospitalization was 27. Maximum duration was 168 days complete recovery was seen in 93.5% of patients either after slough excision, disarticulation or Amputation. Success rate was about 93.5% and mortality rate of 2.5% (5 patients) was encountered in our study. Outcome was not traceable in the remaining 4% of patients.

4. DISCUSSION

From the study, it was found that majority had the habit of consuming alcohol and smoking cigarettes. More than 60% were from poor socioeconomic class. About 90% of patient’s history of trauma predisposing to diabetic ulcer, of which trivial trauma accounts for 60% of injuries. About 35% of these patients presented with abscess and 20% with gangrene. 20% of patients presented with gangrene and the rest in Wagner’s grade I, II and III. Cases of gangrene were subjected to amputation of the gangrenous part. 50% of cases were subjected to decompressions which resulted m salvaging of the legs. Majority of blood sugar values ranged from 200-350 mgs % with insulin requirements of about 20-40 units per day. Few patients required higher the doses of insulin.

| Table 1. Family history of diabetes |
|-----------------------------------|
| Family History of Diabetes       | No. of Patients | %    |
| Present                          | 135             | 67.5%|
| Absent                           | 65              | 32.5%|

There was significant family history of diabetes mellitus in 67.5% of patients ($p < 0.001$)

| Table 2. Range of Blood Sugar Levels and number of patients in each group |
|-------------------------------------------------------------------------|
| Blood Sugar mg/dl | Random Blood Sugar | Fasting Blood Sugar | Postprandial Blood Sugar | Pre Dinner Blood Sugar | Post Dinner Blood Sugar |
|-------------------|-------------------|--------------------|-------------------------|-----------------------|------------------------|
| < 150             | 1                 | 1                  | -                       | 3                     | -                      |
| 150-200           | 49                | 123                | 3                       | 110                   | 1                      |
| 201-250           | 70                | 43                 | 43                      | 67                    | 39                     |
| 251-300           | 35                | 27                 | 52                      | 15                    | 57                     |
| 301-350           | 42                | 6                  | 83                      | 4                     | 84                     |
| 351-400           | 3                 | -                  | 17                      | -                     | 15                     |
| > 401             | -                 | 2                  | -                       | -                     | 4                      |
Table 3. Assessment of renal parameters

| Renal Parameters | No. of Patients | %   |
|------------------|----------------|-----|
| Elevated         | 70             | 35  |
| Normal           | 130            | 65  |

Table 4. Assessment of Bacteriology in foot infections

| Microorganism Noted   | No. of Patients | %   |
|-----------------------|-----------------|-----|
| Single Organism       | 80              | 73% |
| Mixed Organism        | 20              | 18% |
| No organism isolated  | 10              | 9%  |

Table 5. Clinical pattern of presentation of diabetic foot lesions

| Presentation          | No. of Patients | %   |
|-----------------------|-----------------|-----|
| Abscess               | 4               | 2   |
| Cellulitis            | 46              | 23  |
| Ulcer                 | 110             | 55  |
| Gangrene              | 39              | 19.5|
|                       | Toe gangrene (36)|     |
|                       | Foot gangrene (3)|     |
| Joint involvement     | 1               | 0.5 |

5. CONCLUSION

Diabetic foot ulcer is common, disabling and frequently leads to amputation of the digits or the leg. Mortality is high and healed ulcers often recur. The ostrich approach of the patient to the disease seldom salvages the limb. Therefore it is important to educate the public about diabetes, diabetic foot ulcers related complications, and foot care to avoid disability, morbidity and mortality. As prevention is better than cure.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline patients consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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