(e) ISSN Online: 2321-9599

(p) ISSN Print: 2348-6805

ORIGINAL ARTICLE

Risk factors leading to complications in diabetic foot ulcer- A clinical study

Mohd Rehan Rashid

Assistant Professor, Department of Surgery, Hind Institute of Medical Sciences, Safedabad, Barabanki, Uttar Pradesh, India

ABSTRACT

Introduction: Diabetes mellitus is a multi-system disease affecting many systems and tissues. Foot problems, including foot ulcerations, are common with diabetes. Foot ulceration risk factors are based on many factors and may differ from community to community. Present study aimed to analyze the risk factors leading to complication in diabetic foot**. Material and Methods:** This study was conducted in 200 patients of diabetic foot in the Department of general surgery at Hind Institute of Medical Sciences, Safedabad, Barabanki, Uttar Pradesh, India**.** Detailed history, clinical findings and investigations were recorded. Data were collected on a special proforma for analysis. **Results:** Commonest presenting lesion was ulcers (59%), followed by cellulitis (26%), and gangrene (15%). Trauma is the initiating factor in most of the cases. Out of which 82% of patients had infection. Most common microorganism grown from wound discharge culture was staphylococcus aureus (53%), 142 patients were treated with wound debridement out of them skin grafting was done in 30 patients, 28 of patients underwent amputation. Prognosis was better in patients with controlled blood sugar level. **Conclusion:** Early screening for diabetic foot ulceration risk factors is an important process. Screening for foot complications should start at the time of diagnosis of diabetes and integrated with sustainable patient education at primary care level by training of health care providers at primary care level.

Key words: Diabetes, foot ulcers, neuropathy, ischemia

Corresponding Author: Dr. Mohd Rehan Rashid, Assistant Professor, Department of Surgery, Hind Institute of Medical Sciences, Safedabad, Barabanki, Uttar Pradesh, India

This article may be cited as: Rashid MR. Risk factors leading to complications in diabetic foot ulcer- A clinical study. J Adv Med Dent Scie Res 2014;4(2):174-177.

INTRODUCTION

Diabetes prevalence is increasing in developing and developed countries all over the world. Diabetes complications are increasing too in this pandemic, making diabetes a major global health problem in different countries. Among diabetes complications, managing diabetic foot remains as a major challenge for health care systems.[1-3]

Diabetic foot is still the most frequent reason of hospitalization of patients with diabetes, and diabetes is the main cause of more than half of nontraumatic lower limb amputations. In fact, every 30 seconds in the world, a lower limb is amputated due to diabetes, and it goes without saying that these amputations increase mortality rate.[4,5]

About 15–25% of patients with diabetes may develop foot ulcer during their lifetime. The long-term outcome for a diabetic patient after a major limb amputation is grave, with 50% of these patients deceased at 5 years. Present study was designed to analyze the risk factors leading to complication in diabetic foot ulcer.[2-5]

MATERIAL AND METHODS

This study is based on a prospective study of 200 cases admitted and treated in Hind Institute of Medical Sciences, Safedabad, Barabanki, Uttar Pradesh, India.

The present study, was undertaken to analyze the risk factors leading to complication in diabetic foot**.**. The age, sex, occupation and socio economic status of patient were noted. Detailed History of the current illness was noted and previous history of wounds, gangrene, ulcer, boils were noted. Any associated arterial or venous disorders associated with diabetes are noted.

Patients were evaluated with General physical and local examination and systemic examination based on history and clinical findings. Routine investigations such as complete blood counts, Fasting and Postprandial Blood sugar levels, ESR, ECG, complete urine examination for the presence of ketone bodies, sugar and X- ray of the part involved, culture and sensitivity of the discharge from ulcer were also done. Patients with diabetic ulcer foot were treated with, debridement, split skin grafting, and amputation. Descriptive statistics like mean and percentages were used for results interpretation using Microsoft office 2007.

RESULTS

Table 1: Risk factors for developing of DFU

Risk factors	100%
Trauma	85%
Infection	82%
uncontrolled DM	56%
Poor hygiene of foot	64%
age >50 yrs	72%
sex, male	64%
low socioeconomic status	68%

An analysis of 200 cases of diabetic foot was done. Age Distribution of Diabetic foot lesions are commonly found in middle aged person usually in the 5th decades of their life. (Table-1). Sex Distribution there were 128 males and 72 females, of which 68% of patients belonged to low socioeconomic status.

Table 2: Presentation of patients

Presentation of Complication of DM	No of patients
Ulcer	116
Cellulites	48
Gangrene	28

The higher incidence of diabetic foot lesions in male is mainly due to the unhygienic foot care, trauma and smoking. Clinical Presentation Of these 200 patients, 58% of patients presented with diabetic ulcer foot, 24% of patients presented with diabetic cellulites foot, 14% of patients presented with diabetic gangrene foot or toe (Table-2).

Table 3: Associated diseases with DFU

Associated diseases	No. of pt
Newly diagnosed DM	156
Hypertension	84
diabetes mellitus	44
Diabetic neuropathy	22
Family h/o DM	16

In the present study 84 (42%) patients had associated hypertension. It is observed that 44 patients (22%) were known case of diabetes while 156 (78%) patients were diagnosed as diabetic, they were unaware about the diabetes. 8% of patients has family history of Diabetes.

Table 4: Bacteriological study

Bacteria	Percentage
Staphylococcus Aureus	58
Gram negative organisms	34
Anaerobic cocci	22
Klebsiella and pseudomonas	15
Beta hemolytic streptococci	10

Table 4 showed that Staphylococcus aureus was most common bacteria isolated from 58% of cases of Diabetic foot infection, Beta hemolytic streptococci in 10% of cases and anaerobic cocci in 24% of cases, gram negative organisms in 34% of cases, klebsiella and pseudomonas in 15% of cases.

Table 5: Modality of treatment

Modality of treatment	Percentage
Debridement of diabetic foot	71%
Debridement f/b skin grafting	15%
Amputation	14%

Treatment of the 142 patients who present with Diabetic ulcer foot, were treated debridement followed by clean and dress, 30 patients were treated with debridement followed by split skin grafting, 28 patients were treated with amputation of toes or trans metatarsal amputation or below knee amputation. All the patients who presented with Diabetic gangrene of foot (28 patients) were treated with amputation of toes or transmetatarsal amputation or below knee amputation.

DISCUSSION

Diabetes mellitus (DM) is a global health problem. During recent years DM prevalence has increased consistently. Diabetes mellitus has become among the biggest health problem in many countries, especially the low- and middle-income countries. Such growth has a major impact on the quality of life for hundreds of millions of people and their families, overwhelms the capacity of many national healthcare systems, and adversely impacts the economy of countries that are in most need of development.[2-6]

Diabetic foot syndrome is defined as a group of syndromes in which neuropathy, ischemia and infection lead to tissue breakdown, and possible amputation. It is essential to identify the "foot at risk", through careful inspection and physical examination of the foot followed by neuropathy and vascular tests.[1,3,5-8]

Ulcer is the commonest presenting feature, followed by cellulites and gangrene. Commonest site of lesion was planter surface of foot, followed by fore foot and toes. Most common microorganisms grown from culture taken from the lesion was staphylococcus aureus. Conservative treatment consists of control of diabetes with insulin along with appropriate oral or iv antibiotics was effective in most of the cases. Wound debridement, slough excision, followed by dressing with povidine-iodine, dressings resulted in healing of ulcers.[8] Split skin grafting, disarticulation, bellow knee amputation were the other modes of treatment. Wong *et al*. reported 87% success rate in limb salvage after using repeated 'piecemeal' debridement.[9] Dressing materials used include saline-soaked gauze dressings; moisture retaining dressing, optimize the wound environment and promote healing. Medicated honey has anti inflammatory, antiseptic and osmotic properties and has been used as such or in combination with sterile dressings. A randomized control trial compared the efficacy of a TCC and removable cast walker and half-shoe in patients with Diabetic foot ulcer, it is found that TCC to be the most effective modality. Hyperbaric Oxygen (HBO) has been found to be a useful adjunctive therapy for DFUs and is associated with decrease in amputation rates. Topical phenytoin application before auto grafting promoted granulation tissue formation and was found to enhance graft uptake in large DFUs. Patient education and self-care practices like maintaining foot hygiene and nail care should be promoted. Skin is kept moisturized with the use of topical moisturizers after washing the feet gently with soap and water. Of loading and appropriate footwear to relieve focal high pressure areas is recommended for foot at-risk.

Ahmad W et al[9] observed that out of 196 patients 80.1% were male. One hundred and forty-six (74.48%) patients were in the range of 40-70) years. Right foot was more commonly involved (65.3%). 91.3% patients had diabetes of more than 5 years duration. No treatment had been received by 47.4% patients while 41.3% were on oral anti-diabetics; 11.2% patients were on insulin. All patients had type 2 diabetes mellitus. Neuropathy was present in 51% patients, 62.8% had absent or diminished peripheral pulses, 43.4% had poorly controlled diabetes. According to the Wagner classification 30.6% patients had grade 1, 26.5% had grade 2, and 42.9% had grade 3 diabetic foot. Evidence of infection was seen in 85.7% patients: staphylococcus aureus was isolated in 43.4% patients. Osteomyelitis was present in 42.9% patients. Surgical intervention was performed in 85.7% patients. Direct relation was found between the duration of diabetes, sugar control, peripheral neuropathy, peripheral arterial disease. grade of diabetic foot, evidence of osteomyelitis, intervention and the outcome of the disease. They suggested that Neuropathy, peripheral arterial disease, duration of diseases and undlerlying osteomylitis are the major risk factors and need to addressed while educating patients.

From Cameroon, an interesting cross sectional study26 recruited 300 diabetic patients. The authors reviewed records, conducted an interview, and performed a meticulous foot examination with assessment of neuropathy (monofilaments and tuning fork) and ischemia (pulses). The authors sought to determine the prevalence and risk factors of the diabetic foot in a clinic population. The prevalence of foot lesions was 13.0% (inpatients 25.6% and outpatients 11.1%). Diabetic neuropathy assessed using monofilaments was found in 81 patients (27.3%). The prevalence of ischemia was 21.3% and deformity was 17.3%, whereas 37 patients (12.3%) had a previous history of foot lesions. Foot examination was done in 14.3% of the patients, and 47% had a risky nail-trimming habit. Twenty-two percent wore ill-fitting shoes. The prevalence of diabetic foot lesions was high, and known risk factors were significantly present, especially poor foot care. Inappropriate foot wear, although less prevalent than in our study, was a problem in this study as well. It could also be explained by the effect of cultural habits.[10]

Besides DM the study could not assess other co-existing factors which might have led to peripheral neuropathy like autoimmune diseases and nutritional deficiencies as study is done among diabetic patients only. However other causes of neuropathy are considerably less.

CONCLUSION

Early screening for diabetic foot ulceration risk factors is an important process. Screenings can detect modifiable local risk factors and alert both the patients and health care providers to initiate preventive measures. A multidisciplinary team approach to diabetic foot problems can save costs and reduce most foot complications and

amputation rate. If we incorporate these diabetic foot management guidelines into our practice protocols we may attain the objectives of preventing limb loss, and decrease mortality and increase the quality of life of the patient.

REFERENCES

1. Edward J Boyko et al .A prospective study of risk factors for diabetic foot ulcer. Diabetes Care. 1999;22(7):1036-1042.
2. Ramsey SD, Newton K, Blough D, McCulloch DK, Sandhy N, Reiber GE *et al*. Incidence, outcomes and cost of foot ulcers in patients with diabetes. diabetes care. 2009; 22:382-7.
3. Yusuf M, Sulaiman A R. Diabetic foot complications: a two year review of limb amputation in Kelatanese population. 2007; 48:729.
4. Fisher TK, Scimeca CL, Bharara M, Mills JL, Sr., Armstrong DG. A step-wise approach for surgical Management of diabetic foot infections. Journal of vascular surgery. 2010; 52(3 Suppl):72S-5S.
5. Khallaf AN, Fathi O. Diabetic foot ulcer: Conservative management as Limb Salvage. 2006; 30:107-11.
6. Reiber GE. Epidemiology of foot ulcers and amputation in the diabetic foot. Bowker JH, Pfeifer MA, eds. The diabetic foot, 6th ed. st. Louis, Mo: Mosby Inc, 2001, 13-32.
7. Moulik PK, Mtonga R, Gill GV. Amputation and mortality in new-onset diabetic foot ulcers stratified by etiology. Diabetes care. 2003; 26:491-4.
8. Wong MW, Leung PC, Wong WC. Limb salvage in extensive diabetic foot ulceration-a preliminary clinical study using simple debridement and herbal drinks. Hong Kong Med J. 2001; 7:403-407.
9. Ahmad W, Khan IA, Ghaffar S, Al-Swailmi FK, Khan I. Risk factors for diabetic foot ulcer. J Ayub Med Coll Abbottabad. 2013 Jan-Jun;25(1-2):16-8.
10. Ndip EA, Tchakonte B, Mbanya JC. A study of prevalence and risk factors of foot problems in a population of diabetic patients in Cameron. Int J low Extrem Wounds. 2006;5(2):83-88