

A Clinical Study of Surgical Complications and Management of Diabetic Foot

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ABSTRACT

Introduction: The prevalence of foot ulceration in the general diabetic population is 4–10%, being lower (1.5–3.5%) in young and highest (5–10%) in older patients. The lifetime risk for foot ulcers in diabetic patients is about 15%. The major adverse outcome of foot ulceration is amputation. Aim of the study was to analyze the risk factors leading to complication in diabetic foot infection and to study the outcome of treatment modalities and suggest a patient friendly hospital management strategy for diabetic foot.

Material and Methods: This study was conducted in 100 patients of diabetic foot in the Department of general surgery at Santhiram medical college and hospital, Nandyal, during the period of Aug 2012 to Oct 2015.

Results: Commonest presenting lesion was ulcers (64%), followed by cellulitis (20%), and gangrene (16%). 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 (56%), 86% of patients were treated with wound debridement, 14% of patients underwent amputation. Prognosis was good in all patients.

Conclusion: Diabetes Mellitus is a lifelong disease and diabetic foot complications can be life threatening, physically incapacitating, costly to treat and result in extensive morbidity. Screening, proper evaluation, early identification and treatment of the 'at risk foot' can reduce complications.

Keywords: Diabetes; foot ulcers; neuropathy; ischemia.

INTRODUCTION

Knowledge of Diabetes¹ is important because of its high prevalence. Diabetes has proved itself to be a silent killer disease. It has been estimated that there are more than two hundred million diabetics in the world. Today in the world, maximum numbers of patients are suffering from this disease, and moreover they are associated with complication secondary to diabetes.² According to WHO, diabetes is a chronic disease that occurs when the pancreas don't produce enough insulin or when body cannot effectively use the insulin when it produces. Diabetic foot ulcers^{3,4} are a growing problem in the diabetic community. Globally, diabetes mellitus has grown to pandemic proportions, affecting 194 million people worldwide and is expected to increase in prevalence to 344 million by the year 2030. Of these patients, between 2 and 6% will develop a diabetic foot ulcer (DFU) yearly. The onset of a DFU often precipitates a complex chain of events that may lead to limb loss. The longterm outcome for a diabetic patient after a major limb amputation is grave, with 50% of these patients deceased at 5 years.

Aim of the study was to analyze the risk factors leading to complication in diabetic foot infection and to study the outcome of treatment modalities and suggest a patient friendly hospital

management strategy for diabetic foot.

MATERIAL AND METHODS

This study is based on a prospective study of 100 cases admitted and treated (from Aug 2012 to Oct 2015) in Santhiram Medical College and General Hospital, Nandyal. The present study, was undertaken to find out etiology, clinical presentation, complications, management, and prevention of surgical complications of 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, gangrenes, 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 Post Prandial Blood sugar levels, ESR, ECG, complete urine examination for the presence of ketone bodies and sugar and special investigations like Doppler studies, 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 conservative treatment⁵, split skin grafting, and amputation.^{6,7} Patients with Diabetic Cellulitis of foot were treated with debridement, split skin grafting, and amputations. Patients with Diabetic Gangrene foot were treated with amputation.

STATISTICAL ANALYSIS

Descriptive statistics like mean and percentages were used for results interpretation using Microsoft office 2007.

RESULTS

An analysis of 100 cases of diabetic foot was done. These cases were admitted and treated in different surgical units in Santhiram Medical College and Hospital, Nandyal, AP during the period of Aug 2012 to Oct 2015.

Age Distribution

Diabetic foot lesions are commonly found in middle aged person usually in the 4th and 5th decades of their life. All patients are with in 30 to 80 years range and majority being in the 40-70 years of life (Figure-1).

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Sex Distribution

There were 52 males and 48 females, of which 84% of patients belonged to low socioeconomic status. The higher incidence of diabetic foot lesions in male is mainly due to the unhygienic foot care, trauma and smoking.

Clinical Presentation

Of these 100 patients, 64% of patients presented with diabetic ulcer foot, 20% of patients presented with diabetic cellulitis foot, 16% of patients presented with diabetic gangrene foot (Figure-2).

In the present study 42(42%) had associated hypertension. In this study, it is observed that 22 patients (44%) were previously known diabetics already under antidiabetic treatment and 8% of patients has family history of Diabetes. In the present study 42% of patients has loss of sensation over foot and 15 % of patients had diminished peripheral arterial pulsations over foot, and both loss of sensation over foot and diminished peripheral arterial pulsations over foot in 43% of patients. Fasting blood sugar levels at the time of admission are 80-100 mg/dl in 9% of cases, 100-120mg/dl in 23% of cases and 120-150 mg/dl in 68% of cases. Anaemia was present in 54% of cases.

Culture and Sensitivity

Staphylococcus aureus was isolated from 58% of cases of Diabetic foot infection (Figure-3), Beta hemolytic streptococci in 10 % of cases and anaerobic cocci in 24% of cases, gram negative organisms in 32% of cases, klebsiella and pseudomonas in 15% of cases.

Treatment

Of the 64 patients who present with Diabetic ulcer foot, 31% of patients were treated conservatively (Figure-4), 55% of patients were treated with split skin grafting, 14% of patients were treated with amputation of toes or trans metatarsal amputation or below knee or above knee amputation.

Of the 20 patients who presented with Diabetic cellulitis of foot, 60%(12) of patients were treated with slough excision, debridement and later split skin grafting, 40%(8) of patients were treated with amputation of toes or trans metatarsal amputation or below knee or above knee amputation.

All the patients who presented with Diabetic gangrene of foot (16 patients) were treated with amputation of toes or trans metatarsal amputation or below knee or above knee amputation.

DISCUSSION

This study consists of 100 cases of diabetic foot patients with emphasis on surgical management and its complications over a period of three years. After analysis of the data, the highest number of patients was seen in the age group of 40- 70 years. Male to female ratio was approximately 1.1:1. Surgical complications are more common in men due to their increased susceptibility to trauma, smoking, and alcoholism. Commonest presenting lesion was ulcers, followed by cellulitis and gangrene. Commonest site of lesion was dorsum 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 human actrapid or human mixtard or lente or Glargine insulin along with appropriate oral or iv antibiotics was effective in most of the cases. Wound debridement, slough excision, followed

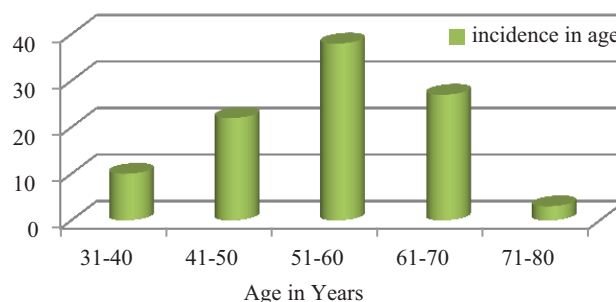


Figure-1: Age incidence of patients with diabetes mellitus

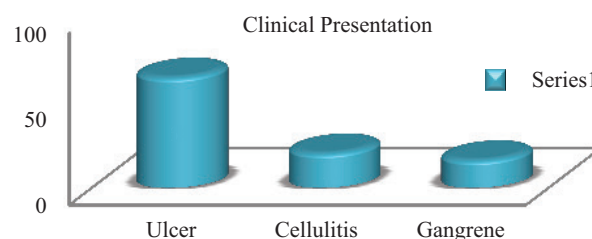


Figure-2: Distribution of types of Presentation

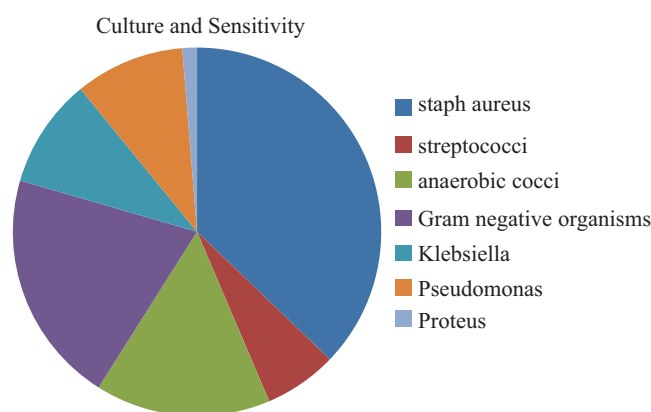


Figure-3: Common bacteria isolated

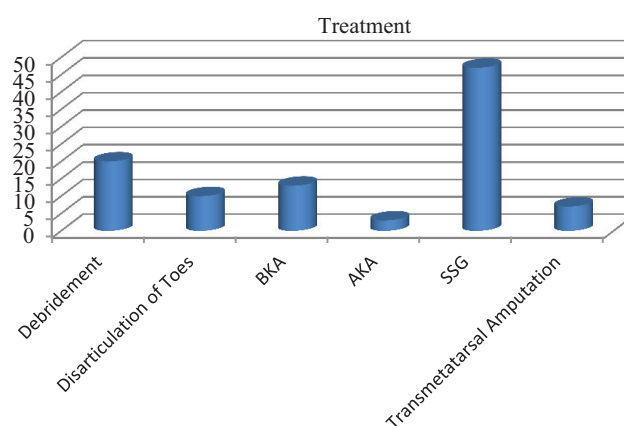


Figure-4: Treatment modalities

by dressing with povidine-iodine, metronidazole, collagenase, L- lysine, mupirocin, dressings resulted in healing of ulcers. Split skin grafting, disarticulation, bellow knee amputation, and above knee amputation, were the other modes of treatment. Wong et al.⁸ reported 87% success rate in limb salvage after using repeated 'piecemeal' debridements and herbal drinks. Dressing materials used include saline-soaked gauze dressings; moisture retaining dressings, optimize the wound environment and promote healing.⁹ Promogran© by Johnson and Johnson's

is a freeze dried matrix composed of collagen and oxidized regenerated cellulose.¹⁰ It acts by forming a biodegradable gel after contact with wound exudates, that binds and inactivates matrix metalloproteases which affects wound healing. In a randomized control trial it is found to be efficacious especially for ulcers of less than six months duration.¹¹ Medicated honey has antiinflammatory, antiseptic and osmotic properties and has been used as such or in combination with sterile dressings.¹² A randomized control trial compared the efficacy of a TCC and removable cast walker and half-shoe in patients with Diabetic foot ulcers, it is found that TCC to be the most effective modality.¹³ Hyperbaric Oxygen (HBO) has been found to be a useful adjunctive therapy for DFUs and is associated with decrease in amputation rates.^{14,15} In one study¹⁶, topical phenytoin application before autografting promoted granulation tissue formation and was found to enhance graft uptake in large DFUs. Mortality rate in the present study was 3%.

Patient education and self-care practices like maintaining foot hygiene and nail care should be promoted.¹⁷ Skin is kept moisturized with the use of topical moisturizers after washing the feet gently with soap and water. Offloading and appropriate footwear to relieve focal high pressure areas is recommended for foot at-risk.

CONCLUSION

Diabetes Mellitus is a lifelong disease and diabetic foot complications can be life threatening, physically incapacitating, costly to treat and result in extensive morbidity. Screening, proper evaluation, early identification and treatment of the 'at risk foot' can reduce complications. 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.

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