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Original Research Article

A Prospective Study of Complications and Management of Diabetic Foot Ulcers

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ABSTRACT

Background: Increase in blood sugar level produces symptoms of polyuria, polydypsia and polyphagia. In today's era a vast majority of people are suffering from this disease and its associated secondary complications. Diabetic foot is a major complication associated with diabetes. The present study was conducted with the main aim to study the complications associated with diabetic foot and to study the effect of various treatment modalities in the management of diabetic foot.

Materials and Methods: The present study was done in the department of general surgery, Subharti Medical College, Dehradun, Uttarakhand (India). This prospective study was carried out to determine the complications and management of diabetic foot. The demographic details of all the patients were recorded in a tabulated form. Systemic examination based on clinical findings was also performed. Investigations of patients included fasting and postprandial blood sugar levels, urine examination to check the presence of ketone bodies or sugars. All the data was recorded in a tabulated form and analysed using SPSS software. The results of the data were compared and assessed using chi square test.

Results: The present prospective study enrolled 110 patients. The mean age of the patients was 51.86 +/- 12.6 years. There were 57 males and 53 females. Majority of the patients were of lower socioeconomic status. The lesions were majorly due to trauma and smoking. There were 61.8% patients who presented with an ulcer. In 21.8% cases (n=24), there was cellulitis. Majority of the bacteria (42.7%) were staphylococcus aureus. There was equal incidence (11.8%) of streptococci and anaerobic cocci. All the patients of gangrenous foot (n=18) were treated by amputation either metatarsal or above or below the knee. Patients of diabetic ulcer were treated by debridement (n=25) and some by split thickness skin graft (n=30).

Conclusion: Early identification of symptoms with proper hygiene maintenance is the key in controlling the disease at an early stage. If diabetic foot is managed at an early stage then mortality can be decrease.

Keywords: Cellulitis, Diabetes, Prospective, Smoking.

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INTRODUCTION

A thorough knowledge about diabetes is important because of its high prevalence.[1] If it is not treated, it can lead to serious complications that can ultimately cause death. Increase in blood sugar level produces symptoms of polyuria, polydypsia and polyphagia.[2,3] In today's era a vast majority of people are suffering from this disease and its associated secondary complications.[4] Long term complications associated with diabetes include micro vascular and macro vascular complications like retinopathy, nephropathy and neuropathy. Diabetic foot is another major complication associated with diabetes.[5] The symptoms that dictate the late phase of diabetic foot ulcer are pain in legs and feet, numbness, muscle cramps, tingling or burning sensation and general fatigability.[6,7] Infection of diabetic foot is the major prognostic factor in diabetic foot ulcers and is the chief cause of amputation.[8,9] Infections of diabetic foot can be soft tissue infection and bone infection, bone infection are more commonly encountered in clinical setting. The long term outcome of diabetic foot is grave; the long-term survival after limb amputations in 50% of the patients is not more than 5 years. The present study was conducted with the main aim to study the complications associated with diabetic foot and to study the effect of various treatment modalities in the management of diabetic foot.

MATERIALS AND METHODS

The present study was done in the department of general surgery, Subharti Medical College, Dehradun, Uttarakhand (India). This prospective study was to determine the complications and management of diabetic foot. The demographic details of all the patients were recorded in a tabulated form. The study was approved by the institute's ethical board and all the patients were informed about the study. A written informed consent was obtained from all in their vernacular language. Any previous history of gangrene, ulcers or wounds was noted with complete general and physical examination of the patients. Systemic examination based on clinical findings was also performed. Investigations of patients included fasting and postprandial blood sugar levels, urine examination to check the presence of ketone bodies or sugars. Patient's ECG and ESR were recorded.

Special investigations like colour Doppler studies and culture and sensitivity tests of discharge from foot ulcer were also done. The treatment for diabetic ulcer done in our study was debridement, split thickness skin grafting and amputations. Patients with gangrenous foot were amputated.

All the data was recorded in a tabulated form and analysed using SPSS software. The results of the data were compared and assessed using chi square test.

Table 1: Commonly seen presentations of diabetic foot

PRESENTATION	FREQUENCY	PERCENTAGE
Ulcer	68	61.8
Cellulitis	24	21.8
Gangrene	18	16.3

Table 2: Commonly isolated bacteria in the cultures

BACTERIA	FREQUENCY	PERCENTAGE
Staph aureus	47	42.7
Streptococci	13	11.8
Anaerobic cocci	13	11.8
Gram negative organisms	15	13.6
Kleibsella	9	8.1
Pseudomonas	9	8.1
Proteus	4	3.6

Table 3: Treatment modalities followed in our study

TREATMENT	FREQUENCY	PERCENTAGE
Debridement	25	22.7
Below knee Amputation	15	13.6
Disarticulation of toes	13	11.8
Split skin grafts	48	43.6
Above knee amputation	3	2.7
Transmetatarsal amputation	6	5.4

RESULTS

The present prospective study enrolled 110 patients. The mean age of the patients was 51.86 +/- 12.6 years. There were 57 males and 53 females. Majority of the patients were of lower socioeconomic status. The lesions were majorly due to trauma and smoking.

Table 1 shows the most common presentations of diabetic foot. There were 61.8% patients who presented with an ulcer. In 21.8% cases (n=24), there was cellulitis. There were 16.3% subjects who presented with gangrenous foot.

Table 2 shows the frequently isolated bacteria by culture and sensitivity tests. Majority of the bacteria (42.7%) were staphylococcus aureus. There was equal incidence (11.8%) of streptococci and anaerobic cocci. From the isolates, 8.1% were Kleibsella and gram negative organism. The least percentage (3.6%) of cases was of proteus.

Table 3 shows the treatment modality opted in our department. All the patients of gangrenous foot (n=18) were treated by amputation either metatarsal or above or below the knee. Patients of diabetic ulcer were treated by debridement (n=25) and some by split thickness skin graft (n=30). Patients of cellulitis were treated by debridement followed by split thickness skin grafts. There were a total of 2.7% patients who underwent amputation above the knee. In 13.6% patients there was amputation below the knee.

DISCUSSION

Diabetes is a longstanding chronic disease with a vast number of complications associated with it. Majority of population in today's era is suffering from this endocrinal disorder. It is of two types. Autoimmune diabetes mellitus which is also called juvenile onset and type 2 diabetes mellitus which is adult onset. In the present

study there were 110 patients of diabetic foot. It was observed that maximum number of complications was seen in men because of their increased chances of trauma and higher percentage of smokers. There was a high incidence of ulcer and least common presentation was gangrene. The most commonly isolated bacteria were staphyloccous aureus and the least common was proteus. If there is bony involvement with infection than the only surgical treatment that offers better prognosis is amputation. Digital amputation carries a risk of relapse of infection and reulceration.[10]

In the study conducted by Esther et al[11], who compared the surgical complications after primary closure and healing by secondary intention following diabetic foot. There was faster healing and lower incidence of exudation after primary surgical closure. In our study, maximum success rate was observed by using split thickness skin graft. In a study by Wong et al[12], success rate of 87% was observed after limb salvage. In a study conducted by A Ravitheja et al[13], ulcers were the most common presentation of diabetic foot, seen in 64% cases. The most commonly isolated organism was staphylococcus aureus, seen in 56% cases.

In recent cases, diabetic foot ulcers were treated by hyperbaric oxygen therapy as an adjunctive therapy and it has lead to significantly lower incidence of amputation.[14,15] Educating the patient and taking care of feet with maintenance of proper hygiene is the key to reducing the incidence of diabetic foot ulcers.[16] Feet should be kept moisturised after washing it with soap and water. There were few limitations of our study like the sample size was small and the follow up period was variable for cases. There was no randomisation done in our study regarding the mode of treatment.

CONCLUSION

Diabetes mellitus is a chronic condition with lifelong complications. Some of the complications are life threatening. Early identification of symptoms with proper hygiene maintenance is the key in controlling the disease at an early stage. If diabetic foot is managed at an early stage then mortality can be decrease.

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