Original Article

Diabetic Foot

Demographic and Clinical Characteristics of 100 Consecutive Patients with Diabetic Foot Presented in Nishter Hospital Multan

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ABSTRACT

Objective: To study the incidence of infected diabetic foot among diabetic admissions on the surgical floor.
Study Design: Quasi-experimental study
Place and Duration of Study: This study was conducted at the Surgical Unit-IV, Nishtar Hospital Multan from June 2013 to March 2016.
Materials and methods: The study on diabetic foot management was carried out involving 100 patients with septic foot complications in diabetics.
Results: Out of 100 patients, 59 (59%) were male, 41 (41%), were female, 76 (76%) patients were admitted through emergency, 18 (18%) through outpatient department and only 6 (6%) patients were referred from physicians. Family history of diabetes was found in 45% of the patients in both parents. As regards age, most of the patients i.e. 50 (50%) patients were in age group 61-70 years. In 25 (25%) patients left foot was involved, right foot was involved in 55 (55%) patients while in 20 (20%) patients both feet were involved. As regards management of patients, 15 (15%) patients were taking insulin, 30 (30%) were on OHA, 30 (30%) were controlled by diet and remaining 20% had no treatment. Planter infection and infection on dorsal aspect was seen in 30% patients respectively.
Conclusion: No aspect of regimen of therapy for diabetics is more important than the proper care of his feet
Key Words: Demography, Clinical Characteristics, Diabetic Foot

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INTRODUCTION

Diabetes mellitus is a metabolic disorder characterized by hyperglycemia, hyperlipidaemia and hyperamino-acidaemia accompanied by relative or absolute deficiency i.e. it is caused by a decrease either in the secretion or activity of insulin and is associated frequently with specific lesions of microcirculation, neuropathic disorders and a predisposition to atherosclerosis[1,2].

Management of many medical conditions is relatively easy if patient has only one affliction but in practice many medical illnesses have complications which require surgery and diabetes is one of them. Diabetes is a challenge for general surgery. It offers a serious bar to any kind of operation.

Diabetes is universal with widely varying prevalence rates in different populations and within the same population. Foot problems are common reason for hospital admission among diabetes patients. The presentation of diabetic foot disease may lack the drama of acute surgical and medical conditions but the consequences are often more serious[3].

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One reason for common lack of interest is that foot tends to lie between specialties, not entirely the domain of physician or surgeon. In most of the cases there is late referral from the Physicians. One of the reasons for this large number of foot problems is low IQ and low standards of education of our patients. Diabetics don't take prophylactic care of their feet. Diabetics with or without foot lesions do not undertake regular chiropody, and tend to ignore demonstrations and discussions on foot care. They do not maintain a high standard of foot hygiene[4].

There is more emphasis on infected diabetic foot lesions. Pathophysiological alterations incriminated in the causation of these infections are disturbed general and local immunity, defective function of leukocytes particularly polymorphs, tissue hypoglycemia, anesthesia making the area susceptible to unnoticed trauma, circulatory insufficiency and delayed wound healing[5].

Foot salvage is most important as far as management of diabetic foot lesions is concerned. If regular foot care were carried out as routinely as urine monitoring, the moientrbidity from foot lesions would have been drastically reduced.

In the management there is side by side control of diabetic foot and the overall stress associated with surgical procedure. Total stress is the sum of factors such as length of operation, type of anesthesia used,

amount of physical trauma and patient's psychological reaction.

The purpose of this study has been to study the incidence of infected diabetic foot among diabetic admissions on the surgical floor. This incidence will highlight that foot problems are one of the common reasons of hospital admissions among the diabetic patients.

MATERIALS AND METHODS

This is a quasi-experimental study. The study on diabetic foot management was carried out in Nishtar Hospital Multan involving 100 patients with septic foot complications in diabetics over a period of 3 years from June 2008 – June 2011. 76 patients were admitted through emergency, 18 patients through outpatients department and 6 were referred by physicians.

All the cases were prepared for operation under general anesthesia with endotracheal intubation. All the previous treatment of diabetes was stopped and insulin therapy was started. Intravenous line was maintained with Normal Saline or 5% Dextrose Water with 16 units of plain insulin. Insulin therapy was monitored by serial blood sugar or urine sugar studies done one hourly. During this period patients were closely watched for hypoglycemia. Pre-operative antibiotics were started.

RESULTS

Out of 100 patients, 59 (59%) were male, 41 (41%) were female, 73 (73%) were diabetic. Family history of diabetes was found in 45% of the patients in both parents. As regards age, most of the patients i.e. 50 (50%) patients were in age group 61-70 years .Age range was 34-70 years (Mean age = 58.68 $\pm$ S.d.8.106) In 25 (25%) patients left foot was involved, right foot was involved in 55 (55%) patients while in 20 (20%) both feet were involved. As regards management of patients, 15 (15%) patients were taking insulin, 30 (30%) were on OHA, 30 (30%) were controlled by diet.Planter infection and infection on dorsal aspect was seen in 30% patients respectively. Penetrating trauma and insect bite were the major causing agents. Bacteriological agents i.e. staphylocossus were present in 66% of the patients. Operative treatment is shown in table 1.

DISCUSSION

As seen in this study the patients who developed septic foot complications formed about 18.8% of the total diabetic patients admitted in the ward. The rest of the diabetics were admitted with enlarged thyroids, gallstones, enlarged prostates, hernias, lump breasts and road traffic accidents. This %age is comparable with those of Western countries.

In the Western World lesion of foot are responsible more than 1/5 of the hospital admissions of diabetic patients (Pratt 1965).

Table No.1: Demographic & clinical characteristics of our patients

Site of involvement		
Site	**No. of patients**	**%age**
Left foot	25	25.0
Right foot	55	55.0
Both feet	20	20.0
Management of diabetes		
Management	**No. of patients**	**%age**
Insulin	15	15.0
OHA	35	35.0
Diet	30	30.0
No treatment	20	20.0
Foot involvement and function		
Involvement/ function	**cases**	**%age**
Whole foot functionless	10	10.0
Planter infection	30	30.0
Infection on dorsal aspect	30	30.0
Both aspects involved	20	20.0
Forefoot infection	10	10.0
Causing agents		
Agents	**cases**	**%age**
In growing tonail	10	10.0
Penetrating trauma	30	30.0
Insect bite	30	30.0
Callosities/corns	20	20.0
Neuropathy	10	10.0
Bacteriological agents		
Agents	**No. of patients**	**%age**
Staphylococcus	66	66.0
Streptococcus	20	20.0
Clostridia	03	03.0
Pseudomona	01	01.0
E-Coli	02	02.0
Klebsiella	02	02.0
Bacteroides	01	01.0
Proteus	03	03.0
Actinomycosis	02	02.0
Operative treatment		
Treatment	**cases**	**%age**
Debridement Alone	10	10.0
Ray Amputation	30	30.0
Mid Tarsal Amputation	30	30.0
Syme's Amputation	20	20.0
Mid Crural Amputation	10	10.0
Klebsiella	02	02.0

According to another study at autopsy 29% of diabetics (543 of 1854) have gangrene or amputation of an extremity (Warren, et al, 1966). In Sweden foot problems account for 25% of all diabetics in patient care (Bolton, 1990).the %age of patients with septic foot in Diabetes may be much higher in our country but as there is no prophylactic measure for foot problems in our country because of low IQ. Of our patients and moreover there is no system to educate those at high

risk to prevent foot lesions, lesser number of people some to hospitals.

There is a sex predilection for the males in cases of foot sepsis due to diabetes mellitus in our study whereas in western countries there is no sex predilection. This is perhaps due to the fact that males in our society work in outdoors and are more prone to penetrating trauma and trauma to neuropathic feet as they work bare footed.

As in western countries the patients who developed septic foot complications tend to be elderly. About 60% of the patients were above the age of 50 years. The higher incidence in elderly is probably due to the fact that overall incidence of non-insulin dependent diabetes mellitus is more and this type of diabetes is seen more in the elderly.

Diabetic neuropathy although frequently accompanied by pain and parasthesias, causes its greatest problem by the opposite effect, the loss of pain sensation. The patient without pain sensation unwittingly allows his foot to endure repeated trauma until trophic changes and frequently secondary infection develops. In the study neuropathic feet were the commonest underlying cause of foot sepsis in diabetes. In US diabetes is estimated to affect 5% of general population and it is the most common cause of neuropathy. Although studies reveal an incidence of neuropathy of up to 60% (Asbury and Brown, 1982), the incidence of clinical neuropathy is generally estimated at between 10 to 20% of those with diabetes. In a recent study o 500 diabetics 39% of patients had significant atherosclerotic disease involving medium and large sized arteries of lower limb (Janka, Standle et al, 1980)

Diabetic foot infectons are polymicrobial. In my study culture sensitivity reports show that in 72 % cases Staphylococcus Aureus, in 64% of cases pseudomonas, and in 27% of cases streptococcus were the major infecting agents. Besides this E. coli, Klebsiella, Bacteroids, Proteus and Clostridia were isolated from the septic foot. These results can be compared to a study carried out on 82 patients with foot sepsis in diabetes (Fierer et al, 1979).

According to this study Staphylococcus aureus was isolated from 20 cases, streptococcus from 22 cases, Klebsiella from 19 cases, Bacteroidesfragilis from 25 cases, anaerobic gram positive cocci in 32 cases and clostridia in 19 cases. This study underscores the importance of anaerobes in these infections. Compared to this in our study gram positive cocci and gram negative bacilli were the main infecting agents.

In the management of diabetic foot infections it is most important that before surgery patient must have a complete physical examination and laboratory evaluation. In this study besides routine investigations every patient had his serial blood and urine sugar studies done. It is vitally important that the patient's diabetes is well controlled pre-operatively. Patients were not allowed to go to the surgery with a very high blood sugar. A few hours delay may free the patient from acidosis, ketosis and extreme hyperglycemia, thereby making the total surgical procedure including anesthesia management and immediate post-operative period, easier and safer for the patient. Besides any patient to be operated upon for foot sepsis in diabetes, is to discontinue all his previous treatments and to put ho on insulin therapy. The goal of blood sugar control and insulin administration should be the avoidance of extreme degrees of hyperglycemia and ketosis, as well as avoidance of hypoglycemia.

In my study the diabetic patients undergoing foot surgery were all given general anesthesia. This allows adequate time for proper debridement. Under no condition the surgery on septic foot be performed under any kind of local blocks, as they may compromise further the blood supply to the tissues. All the operations should be performed by experienced Surgeon.

Another very important aspect of management of diabetic foot is that there should be a proper debridement of foot. Al the necrotic tissue should be removed and incision should be made well through the healthy tissue. All the tissue spaces should be opened as they are potential source of infection. Failure to confine a web space infection may lead to disaster and may end up with below knee amputation. Most importantly planter fascia should be incised and the central planter space which lies deep to it should be opened up. Thorough wound toilet should be performed with saline and hydrogen peroxide. All these principles were followed and the end result in most of the cases was excellent. Once all the necrotic tissue and infective foci were removed, leaving behind the healthier tissue, the wound healed nicely. During post-operative management of all these cases the blood sugar levels were very closely monitored in our patients. This is very important because had the diabetes not been adequately controlled the foot wound would never have healed. Importance of this is shown by the fact that in two of our cases adequate control of diabetes could not be achieved early on so they had to be taken to the operating table thrice and one of the patients ultimately ended up with above knee amputation.

Out of 34 cases, in 13 cases amputations at different levels had to be performed i.e. in 38% of cases amputations were performed. A recent European study stated that 22,000 lower limb amputations are now being performed annually in US. Almost two thirds of these are being performed on diabetic patients. About 5/15 of all diabetics have an amputation in some part of life (Robson and Edstrom, 1977).

According to a study risk of loss of limb due to gangrene is increased approximately six to eight folds in diabetics. The average yearly rate of amputation for diabetics is 80 per 10,000 with somewhat higher value in diabetics older than 65 years of age (National

Diabetes Data Group, 1980). Although exact figures for the number of amputations performed for septic feet in diabetes for our country is not known but it bound to be high as health care facilities in our country are scarce. Where amputations had to be carried out, they were carried out through healthy tissue. This will save serial amputations which are the result of amputations carried out through unhealthy tissues.

CONCLUSION

No aspect of regimen of therapy for diabetics is more important than the proper care of his feet. Prevention of foot lesions is of utmost importance in treating the diabetic patients. Proper prophylaxis is instrumental in preventing foot loss in diabetic patients.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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