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Study on diabetic foot and its management in tertiary care centre

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Abstract

Background: Diabetic foot ulcer is most commonly encountered in diabetic patients for long duration. With neuropathy.

Aim: To study the bacteriology, pathophysiology of diabetic foot, various limb salvage procedures and outcome, different treatment modalities and newer techniques wherever applicable to prevent complications and to minimise the progression of occurred complication

Materials and Methods: It is a prospective study of patients who presented with wound in the foot in the duration of August 2018 – December 2019. The primary outcome of the study was evaluated on the basis of clinical examination, investigations, duration of hospital stay, conservative management or need for major surgical interventions, and postoperative complications.

Results: 78 male and 22 female patients were selected for the study. Highest number of cases was found in 51-60 years of age (34%) with youngest being 34 and oldest being 78. Majority of the patients in the study revealed history of trauma preceding the foot complications and the chances of injury is increased in these patients because of increased incidence of ischemia, neuropathy and infection. The study also indicates the increased foot complications in persons whose occupation precedes to trauma. 30 patients in this study had neuropathy, 16 patients had ischemia and all cases had culture positive. 32 cases were managed by daily dressing and wound debridement, and slough excision. 18 patients were treated with Split skin graft, 6 patients with I & D for abscess, 6 patients fasciotomy and followed by dressing, 20 cases with disarticulation, BKA was done in 8 cases and AKA in 10 cases.

Conclusion: Males are almost four times more affected than females, duration of diabetes varied among the patients from 1 year to 22 years and many patients were diagnosed post admission, trivial trauma of some kind was the initiating factor in nearly half of the cases, commonest presenting lesion was Ulcer 52%, conservative treatment consisting of control of diabetes was effective, neuropathy treated with methyl Cobalamin. Neuropathic foot was offloaded. Wound debridement, slough excision followed by dressing resulted in healing in some cases. Diabetic foot wear were advised for the patients. Split skin grafts, Disarticulation needed for some patients. In complicated cases patients with other comorbid conditions like atherosclerosis, hyperlipidemia it may even lead to below knee amputation and above knee amputations were the other modes treatment.

Keywords: Neuropathy, ischemia, amputation

Introduction

“Every other diabetic is a surgical diabetic”-Joslin. Diabetes is a worldwide problem. A majority of diabetic patients develop foot ulcers in one point of time or other during the course of their illness. A significant number of such patients will require long-term hospital treatment and amputations. The etiopathogenesis of diabetic foot lesions are multifactorial. Diabetic neuropathies, vasculopathy, poor control of diabetes and bacterial infection are some of them. The reasons for diabetic foot are

1. Foot is the most vulnerable part of body for injury and infection neglected by patient.
2. The site of preference for neuropathy and ischaemia is also the foot. Diabetes is one of the major problems of this generation with worldwide dimension.

According to Modi *et al.* overall incidence of diabetics in India is 1.2%.^[1] The death in each year is due to its complications (2.1% in urban, 1.5% in rural), which are usually common in age group of 40-60 years affecting both sexes equally. The complications are more prevalent among the people of lower economic due to negligence, illiteracy and poverty.

Materials and Methods

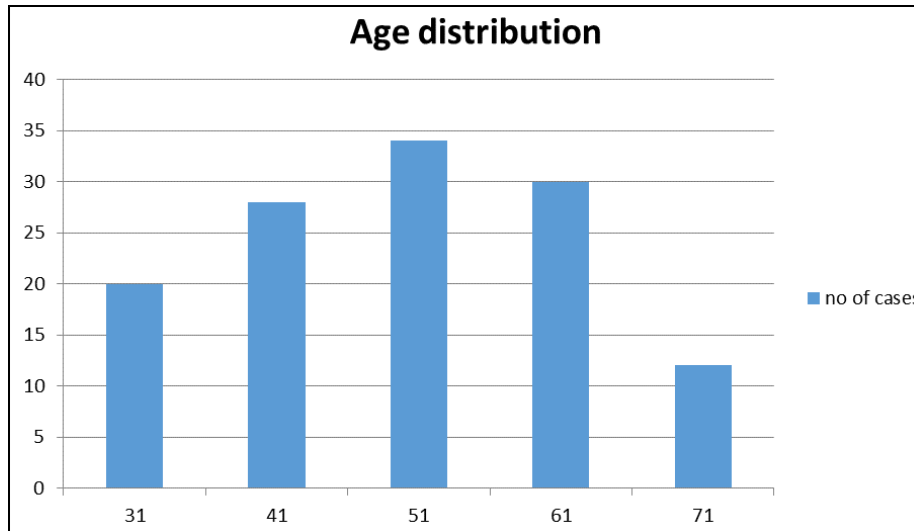
In this study, 100 patients were selected who attended our hospital in the period of August 2018 – November 2019.

All the patients who gave consent for this study with diabetic foot admitted and treated in the department of surgery with ulcer, blister, abscess, gangrene. Detailed history taking, Clinical examination, Investigations (Routine Laboratory investigation, Relevant special investigations, Conservative management with meticulous dressing and if needed major surgical interventions with its outcome. The same protocol was followed for all the

patients and their response was analysed by Statistical analysis was done using SPSS 23.0.

Results

Totally out of 100 cases studied, youngest patient was 35 years and oldest was 78 years of age. Highest number of cases was found in 51-60 years of age (34%) followed by 61-70 years of age (26%). Incidence were more in the age group of 50-60 years of age with comorbid conditions like atherosclerosis, hyperlipidemia associated with it.



Graph 1: Age distribution

Out of 100 patients in this series, 78 were males and 22 were female patients. Around 60 patients had some minor trauma / injury before the onset of the lesion.

Out of 100 cases 52 cases presented with ulcer, 28 cases with either gangrene of toe or foot region, 16 cases with cellulitis of the foot and the leg and 4 cases presented with the abscess in the foot region.

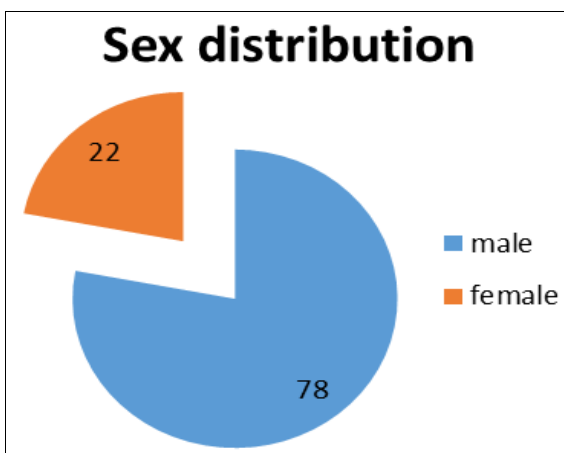


Fig 1: sex distribution

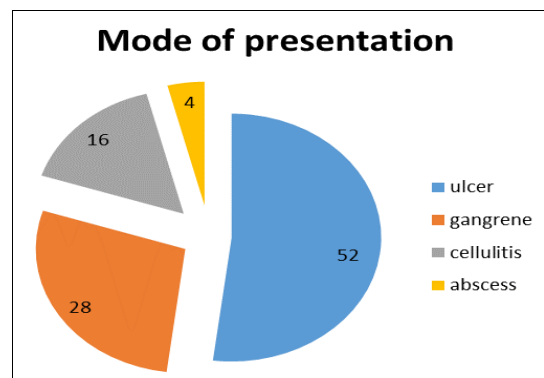


Fig 2: Mode of presentation

In majority of the cases of surgical complications of diabetes, some kind of trauma is the beginning of the problem. This is because of three factors, they are

1. **Ischaemia:** Due to ischaemia the injured part will be under perfused, and therefore impairing the healing process.
2. **Neuropathy:** Result in loss of sensation and the patient will be unaware of the injury and neglects it which results in ulcer and infection.
3. **Hyperglycemia:** Acts as a perfect medium for the multiplying organisms.

The duration of diabetes in some patients were accurately not known, as the patient were unaware of it. In around 20 patients diabetes were diagnosed after admission. 4 patients were having diabetes for duration of more than 20 years. Maximum patients in our study were diabetics of 6 – 10 years duration (30%).

Majority of the septic lesions yielded *Staphylococcus aureus* on culture of pus. Other organisms that were isolated are, *Pseudomonas*, *Klebsiella*, *E. Coli*, *Proteus* etc. Most of them were sensitive to Ampicillin, Ceftriaxone, Gentamycin, Imipenem, Meropenem and Amikacin. Most of the cultures yielded polymicrobial growth. 36 patients culture positive for *staphylococcus aureus*.

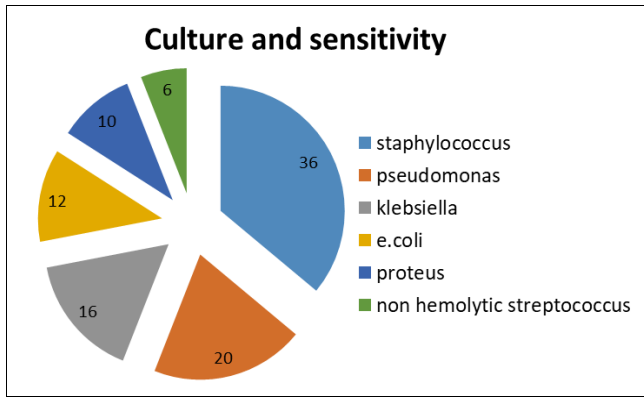


Fig 3: culture and sensitivity

The commonest pathophysiological changes that lead to diabetic foot are neuropathy, ischaemia and infection. Most of the patients had diabetes of 6-10 years duration, accounting for 30%, 20% were newly diagnosed as diabetics following admission followed by patients having diabetes of 2-5 year,

accounting 16% of study Neuropathy changes seen in 30 cases, Ischemic complication was noted in 18 cases and infective complication of foot noted in all cases.

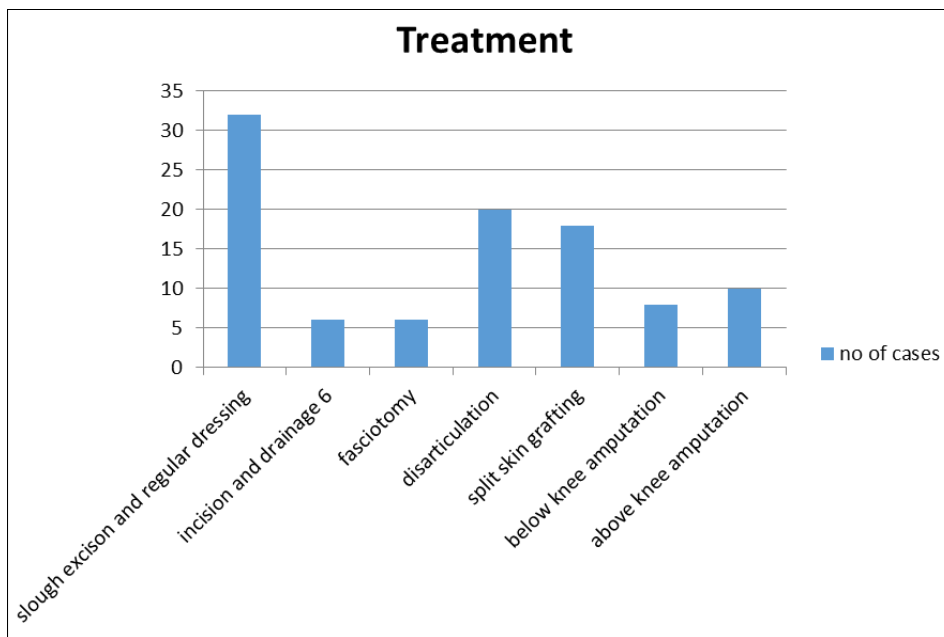
In this series 32 cases were managed by daily dressing and wound debridement, and slough excision. 18 patients were treated with Split skin graft, 6 patients under went incision and drainage for abscess and 6 patient needs fasciotomy, also 20 cases who presented with Gangrene of toes and phalanges, were treated with disarticulation of the toes. Below knee amputation was done in 8 cases and above knee amputation in 10 cases.

Antibiotics were administered after culture and sensitivity.HbA1C levels monitored.

Blood Glucose level was controlled with Insulin and Oral hypoglycaemic agents. Neuropathy treated with Methyl Cobalamine and in some cases with Pregabalin. General nutrition was maintained wound care was given.

Offloading done in Neuropathic ulcers (total contact cast).

In most of the cases, limb was salvaged by conservative treatment and amputations are done in patients with other comorbid illness like atherosclerosis, dyslipidemia depending on the nature of the wound and its vasularity.



Graph 2: treatment given

Discussion

100 cases were studied at sree Mookambika institute of medical sciences. The analysis of this study is as follows.

When compared with Wheel, Lock and Root *et al.* series, there is not much difference in youngest and oldest age group in our study 34 and 78.

Sex distribution in our present study 78 were males and 22 female cases. The male to female ratio 3.6:1. The incidence is more among males probably as they are the peoples of the family who mostly working out door, which makes them more vulnerable for trauma and sequelae.

62 cases in this series had a history of minor trauma, before the onset of foot lesion. The commonest pathophysiological changes that lead to diabetic foot are neuropathy, ischaemia and infection. Most of the patients had diabetes of 6-10 years duration, accounting for 30%, 20% were newly diagnosed as diabetics following admission followed by patients having diabetes of 2-5 year, accounting 16% of study Neuropathy changes seen in 30 cases, Ischemic complication was noted in 18

cases and infective complication of foot noted in all cases.

The incidence of gangrene in the present series is comparatively slightly more than that of Bell series of 1960 25% of patients were having gangrene at the time of presentation. Pennsylvania Hospital Series *et al.* studied 614 cases which had 45% of patients with gangrene. Diabetic Research center (2005) Chennai studied on 1319 patients, out of which 5% presented with gangrene. In our study the percentage of patients with gangrene was 28%. The commonest organism cultured was Staphylococcus aureus 36 cases, followed by pseudomonas in 20 cases. Most of the organisms were sensitive to Ampicillin, Cloxacillin, Gentamycin, Amikacin, Ciproflaxacin and Cephalosporin etc.

In the present series, 16 cases were treated by slough excision, 9 with skin graft, 10 by disarticulation of single or multiple toes at the level of metatarsophalangeal joint, 6 cases by fasciotomy and 6 cases incision and drainage of abscess done. Below knee amputation was done in 8cases and above knee amputation were done in 10 cases.

Proper control of diabetes is very important in diabetic foot management. Fasting and postprandial blood sugar estimations were well under control. Urine sugar estimation was done thrice daily.

Infection was treated with broad spectrum antibiotics and according to culture and sensitivity. Patients were educated about care of foot and Tab Trental (Pentoxifylline) was administered to in-patients with ischemic lesions. The amputation rate is much lower (18%) compared to Collen's series (38.6%) in 1962. This could be due to, better education of the patient, better glycaemic control, proper care of foot, proper use of antibiotics, extensive debridement and regular dressing. After amputation, wound healed well. The patients were referred to rehabilitation centre for prosthesis implantation for improving the quality of life.

Conclusion

Foot ulcers are one of the major complications of diabetes; they have a poor tendency to heal, which may result in long stay in hospital for treatment. The foot in diabetic patient is the cross road of several pathological processes, in which almost all components of the lower extremity are involved-skin, subcutaneous tissue, muscles, bones, joints, blood vessels and nerves. An understanding of the surgical anatomy of foot, development of complications and application of preventive and management strategies will reduce the complications of diabetic foot. Patients who are diabetic should have regular monitoring of blood sugar level and proper blood sugar control and take proper care of their feet so that they will not suffer from the consequences. They should take proper medical care at the earliest once any trauma occurs, so that the chain of events could be halted. With proper care by the attending surgeon which includes regular dressing, wound debridement, proper antibiotics the outcome can be favorable and avoid the unwanted surgeries like amputations.

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