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Research Article

Study of Limb Complications of Diabetes Mellitus and Their Surgical Management in a Rural Population

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Abstract: Diabetes and its long term major complications include septic, vascular and neuropathic lesions affect the various anatomical regions of the body. There is increase in incidence of diabetes and its complications mainly foot ulcers, skin and soft tissue infections, surgical site infections, peripheral vascular disease leading to amputation, charcot neuroarthopathy, ankle ulceration with osteomylities and fracture of foot in rural population. The usual presentation is with uncontrolled state of diabetes and its complications. Hence the need for study is to advice the patients in rural population regarding the early detection by explaining the symptoms and to educate them for regular checkups and change in lifestyle for good control of diabetes. A better quality of life can be achieved. This study aims to evaluate the surgical complications of diabetes, their outcome and management modalities. A total of 100 patients admitted with limb complications of diabetes were studied. The following conclusions can be drawn from this study: The major incidence of these complications occurs in the age of 51-60 years and men who worked outdoors were commonly affected. These patients are usually known diabetics on irregular treatment. The common lesions are septic lesions of the foot in the form of ulcers, cellulitis and gangrene, followed by vascular and neuropathic lesions. Most of them were managed conservatively. Gangrenous lesions required surgical intervention in the form of either, minor or major amputations. Commonly affected site is lower limb followed by upper limb.
Keywords: Septic; vascular; neuropathic ulcer; gangrene; diabetes

INTRODUCTION

"Diabetes Mellitus" is a syndrome with metabolic, vascular, neuropathic components that are interrelated [2]. Metabolic syndrome due to alterations of Carbohydrate, Fat & Protein metabolism Secondary to absent or markedly diminished insulin secretion or ineffective action of insulin. Vascular syndrome consists of abnormalities in both large vessels (macro angiopathy) and small vessels (micro angiopathy). Macroangiopathy causes cerebrovascular accidents (strokes), cardiovascular (MI) and Peripheral vascular diseases. Finally a variety of abnormalities occur in peripheral nervous system. These neuropathic changes are due to metabolic alteration as well as vascular causes.

Once regarded as a single disease, diabetes is now seen as a heterogeneous group of diseases, characterized by a state of chronic hyperglycemia resulting from a diversity of etiologies, environmental and genetic acting jointly[3]. Defective production and action of insulin is the underlying cause. It is a long term disease with variable manifestations and progression.

Diabetes is an "Ice berg" disease. Recent estimates across worldwide as of 2014, an estimated 387 million people have diabetes worldwide with type 2 diabetes making up about 90% of the cases. This represents 8.3% of the adult population, with equal rates in both women and men. From 2012 to 2014, diabetes is estimated to have resulted in 1.5 to 4.9 million deaths each year. Diabetes at least doubles a person's risk of death. The number of people with diabetes is expected to rise to 592 million by 2035.The global economic cost of diabetes in 2014 was estimated to be $612 billion USD In the United States, diabetes cost $245 billion in 2012[1].

Major burden is occurring in developing nations like India. At present incidence is 2.4% in rural, 4-11% in urban population of India [4].

Prevalence of diabetes mellitus increase after age of 40 years, 15-20% after age of 65 years. Diabetes is leading cause of peripheral vascular disease. A person with diabetes is

- 20 times more likely to develop gangrene
- 30-40 times risk of a major amputation

The cost of health care and burden over the families is huge, eventually causing a staggering economic instability to the nation. Hence its worthwhile to know more about diabetes, its implications, its surgical aspects in depth.

Diabetes exhibits following points from surgical point of view

1. Surgical conditions which are etiologically related to diabetes (like carbuncles).
2. Surgical conditions whose symptoms, course and management are altered by diabetes (traumatic ulcer).
3. Surgical condition which are associated with diabetes but not related to it (like elective surgery in diabetes).
4. So the objectives and aim of the study is to known more about the mode of presentation, clinical features and outcome of management of surgical complicationof diabetes mellitus.

AIMS OF THE STUDY

- The incidence of diabetic patients presenting with complication of foot and other soft tissue infections and macrovascular complications with special relation to age, sex and lifestyle with special reference to rural population.
- Various modes of presentation of complications in diabetic's presentations of diabetic foot like ulceration, resistant deep infections, cellulitis, severe ischemia leading onto gangrene.
- To educate the patients in rural population, the advantages of early detection, good control of diabetes, to prevent the complications.
- Various factors responsible for primary prevention of surgical complications and management.
- Treatment options currently available and the changing trend.
- The outcome following surgical management. study percentage of surgical intervention like debridement, minor/major amputations

MATERIALS AND METHODS

This study was conducted from Dec 2013 to September 2015. A series of 100 cases was compiled for this study during this period. Analytical data obtained is compared and discussed with the data available in the literature.

Each case is studied elaborate history was taken, a thorough general physical examination was done along with meticulous examination of the local lesions. Relevant lab investigations were carried out as depicted in the proforma.

Each patient was treated according to the respective problems. Generally, all the patients admitted for surgical complications were first made to get fasting blood glucose. In case the patient was detected as diabetic for the first time plain insulin of appropriate dosage was started according to the fasting blood glucose level. If the patient was a known diabetic on oral hypoglycemic agent was switched over plain insulin. All these patients were required to have a eighth hourly urine sugar chart for monitoring the effectiveness of insulin therapy. In required cases daily fasting blood sugar was also done.

Patients who presented with features of ketoacidosis were treated appropriately with aggressive insulin therapy, IV fluids, and antibiotics. And once stabilized patient received subcutaneous 8th hourly insulin dose.

A strict diabetic diet was advised to the patients. A diet enriched with vitamins B, C, and E was given along with supplementation of minerals like zinc and chromium. In cases of patient who were anaemic either oral iron supplementation or blood transfusions were done to improve the general condition. Broad spectrum antibiotics like cephotaxime, gentamycin and metronidazole combination usually was initiated. In case of ischaemic lesions vasodilators like comp lamina retard (Xanthitol), pentoxyfylline were started. Antiplatelet drugs like ecosprin 75 mg once daily, clopidrogrel 75 mg OD were initiated to improve local blood circulation.

In patients with septic lesions like abscess, furuncles, and carbuncles incision drainage, excision was done either under local anaesthesia or under general anesthesia. Pus was taken for culture and sensitivity.

Ulcers were treated according to their merit. A thorough debridement which included slough excision was done. Wounds were dressed with gauzes medicated with glycerin mag sulfate. This reduced the inflammatory edema and helped in separation of slough. Dirty ulcers were also treated with hydrogen peroxide solution to help in separating the slough. In some ulcers with adherent slough, a collagenase preparation like salutyl was used. For some ulcers infected with pseudomonas as evidenced by the colour of discharge and pus culture sensitivity report, were treated locally with diluted vinegar (diluted acetic acid solution). Clean ulcers were dressed with povidone iodine solution preparations.

Ulcers with healthy granulation tissue which were ready for grafting were dressed with wet saline dressings. Severe foot infections, spreading cellulitis, osteomyelitis of the bone, and gangrene of the toes and the feet were subjected to surgical treatment. For instance cellulitis of the foot extending to the leg, multiple incisions were made. Minor amputations like toe amputation, disarticulation of the toes was done for gangrene of the toes. In case of gangrene with spreading cellulitis of foot, fore foot amputation was

done. In severe cases of infections and gangrene spreading to the foot and to the leg, major amputations like below knee / above knee or hip disarticulation was done. At the time of discharge counselling was given regarding foot care, preventions of ulcer. Patient was asked to follow up regularly for residual ulcers. Patients were also asked to report to diabetic clinics for further diabetic management and treatment.

Sample size: Calculated sample was 100 patients.

Statistical methods:

This is a prospective study and results are expressed in, Diagrammatic presentation Mean + SD.

Inclusion criteria:

All the patients with Diabetes Mellitus presenting with foot ulcers, infection of foot and gangrene of foot.

Exclusion criteria:

1. Patients with foot infections without Diabetes.
2. Patients with ulcer and Gangrene of foot other than Diabetic etiology.

Evidence Based Treatment Protocols [5]

- Strict glycemic controle with insulin.
- Thorough surgical debridement.
- Systemic antibiotics.
- Statins for hyperlipidemia.
- Tarsal tunnel release for patients with neuropathy.
- Offloading.
- Moist wound environment and oxum dressing.
- Patient's education regarding foot care.

RESULTS

The analysis of the study of 100 cases is as follows:

1.Age:

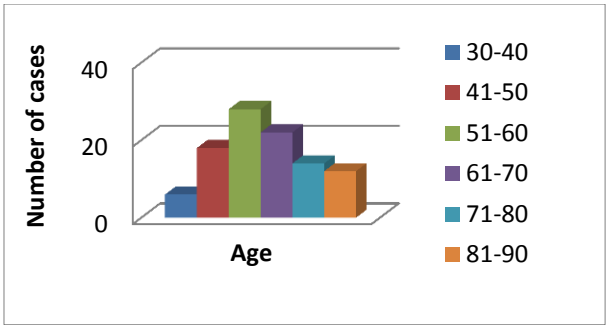
Age of the 100 patients were studied and ranged from 30 years to 86 years average being 61 years.

Table-1: Showing % of patients in different age groups

Age	Number of cases	Percentage
30-40	06	6
41-50	18	18
51-60	28	28
61-70	22	22
71-80	14	14
81-90	12	12
Total	**100**	**100%**

Mean ± SD: 61.2 ±13.28

International study done by Wheel-lock and Root[6] according to this the youngest patient was 32 years and oldest patient was 89 years.



Graph-1: Bar graph showing Age groups

2. Sex:

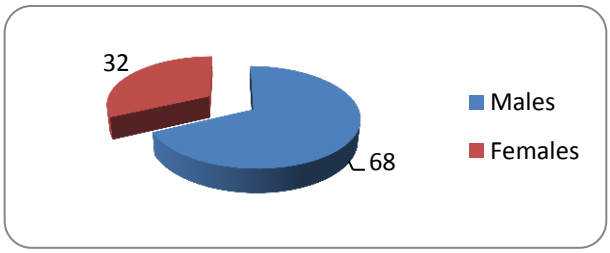
Male incidence is higher for the following regions.

Table-2: Sex In the present study out of 100 cases 68 were males and 32 were females.

Study	Total	Percentage
Males	68	68
Females	32	32
Total	**100**	**100%**

Men are bread winners, work in the fields, farms and hence exposed to trauma.

Smoking habits are higher in men and hence peripheral arterial disease coexists with diabetes which flare up the lesions.



Graph-2: Pie chart showing sex

3.Socio-economic status:

Nearly about 65% of patients were from lower socio- economic status basically farmers. Though in western literature incidence is higher in higher state of society

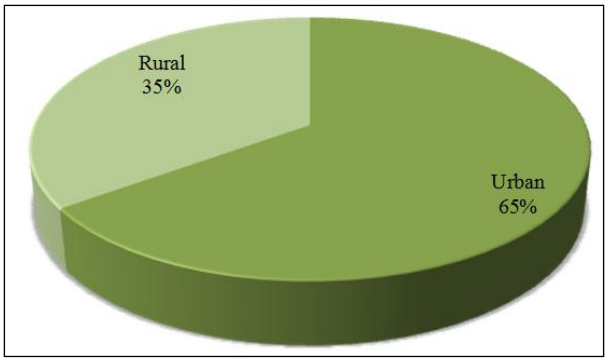
4.Region:

65 cases were from urban area whereas 35 cases were from rural area.

Table-3: Regional Distribution

Total cases	Cases	Percentage
Urban	65	65
Rural	35	35

This is in confirmation with western literature which says that urban population are more prone for diabetic complications.



Graph-3: Pie chart showing regional distribution

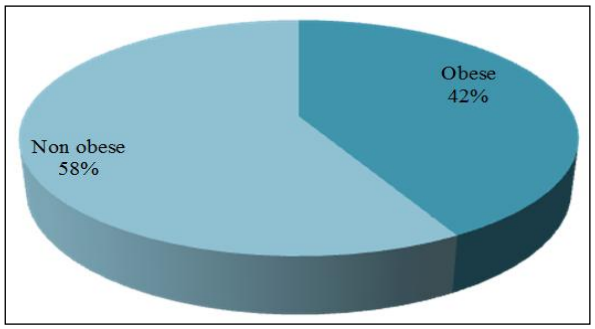
5.Obesity:

In our study the number of patients who were obese were 42 while remaining 58 were ill nourished.

Table –4: Nutritional status

Total cases	Cases	Non obese
100	42	58

According to literature diabetes is more common in obese but in our study non obese patients were more common as most of the patients were of lower socio-economic status.



Graph-4: Pie chart showing nutritional status of diabetic complication

6.History of trauma:

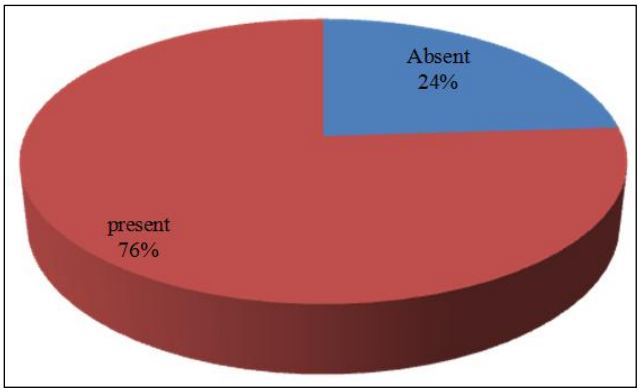
Nearly 76 patients in this series of 100 had past history of trauma and subsequently lesions developed. Preceding trauma is most often the cause for problems due to Patients are unaware of trivial injury due to neuropathy. Poor blood supply leads to diminished healing. A state of hyperglycemia acts as a good nidus for infection.

Predisposing factors:

In the present study trauma is the most common predisposing factor was present in 76 cases and constitutes 76%.

Table – 5: Showing cases with history of trauma

Present	**76**	**76**
Absent	24	24
Total	100	100%



Graph-5: Pie chart showing trauma is the most common predisposing factor

7. Signs and symptoms:

Patients presented with various symptoms usually with non healing wounds, claudication of the limbs, rest pain, and gangrene of extremities.

Table-6: Shows the varied signs and symptoms

Sl. No.	Symptoms	Percentage
1	Polyuria	23
2	Polydypsia	25
3	Loss of weight	50
4	Fever	40
5	Inability to walk	75
6	Ulceration	60
7	Claudication	24
8	Rest pain	25
9	Generalized weakness	75
10	Impaired sensation of the foot	40
11	Impaired pulsations	40
12	Tropic changes	65
13	Coldness of the feet	20
14	Gangrene	35
15	1mpairedrefluxes	30
16	Signs of ketoacidosis Regional lymphadenopathy	3
17	Polyuria	75

8. **Different Anatomical sites affected**

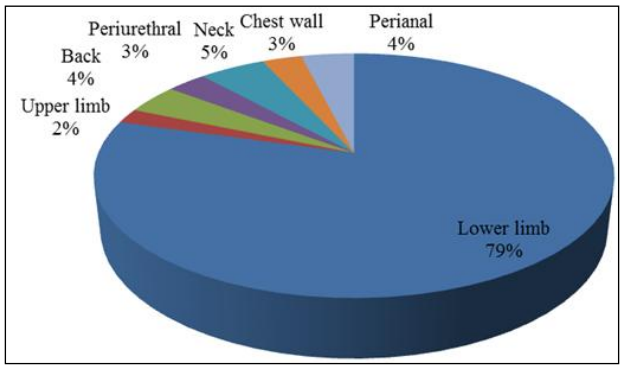
Table-7: Anatomical distribution of lesions

Sites	Number of cases	Percentage
Lower limb	81	81
Upper limb	2	2
Back	4	4
Periurethral	3	3
Neck	5	5
Chest wall	3	3
Perianal	4	4

Present study shows that the commonest site for lesions was lower limb constituting 80% of cases followed by upper limb with then back, periurethral

abscess with. One patient presented with perianal abscess. Lower limb affliction is more due to many factors.

a. Ischaemia due to atherosclerosis and arteriosclerosis
b. Neuropathy
c. Prone to trivial injury like shoe bites, corns, callosities and most of the patients in present study walked bare foot.



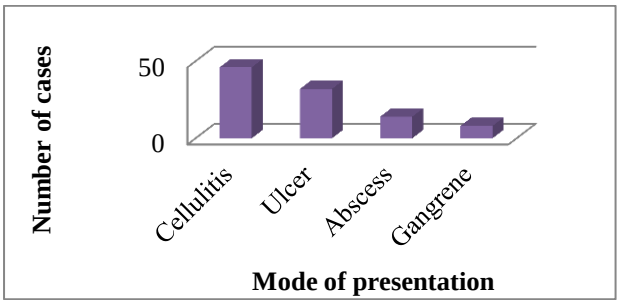
Graph-6: Pie chart showing anatomical distribution of lesions

9. Mode of Clinical Presentation:

During this study out of 100 cases 46 presented with cellulitis, 32 cases with ulcer, 8 cases with gangrene and 14 cases with abscess.

Table-8: Shows mode of presentation

Mode of presentation	No. of cases	Percentage
Celiulitis	46	46
Ulcer	32	32
Abscess	14	14
Gangrene	08	08
Total	100	100%



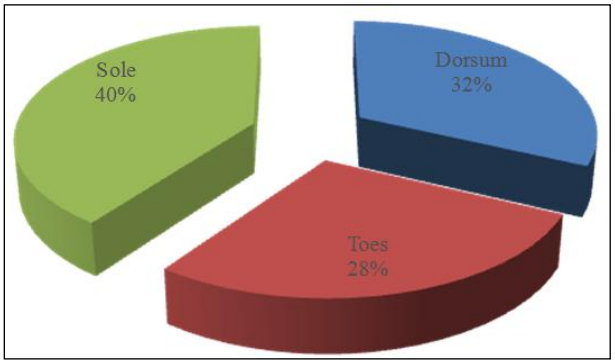
Graph-7: Bar graph showing mode of clinical presentation, cellulitis is the most common

10. Site of Lesion:

The most common site of lesion in diabetic foot was sole of the foot which accounted for 40% of all cases.

Table-9: Shows site of lesion

Site	No. of cases	Percentage
Dorsum	32	32
Toes	28	28
Sole	40	40
Total	**100**	**100%**



Graph-8: The most common site of lesion in diabetic foot was sole of the foot

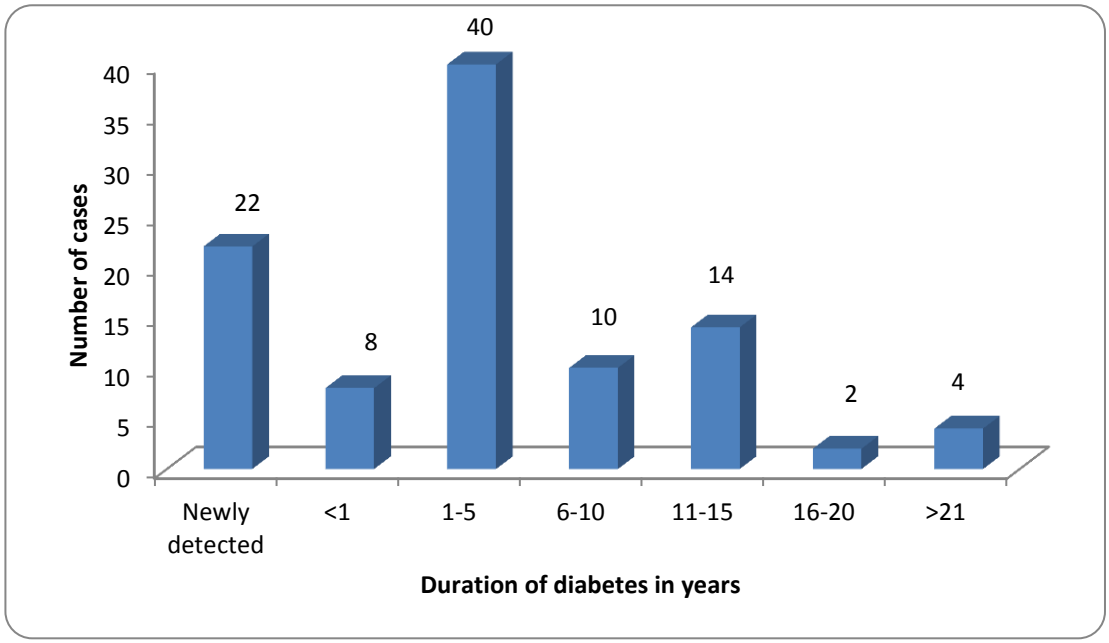
11. Duration of Diabetes Mellitus:

In our study 22 cases were freshly detected at the time of admission and 78 patients were known diabetics. In 40 patients (40%) duration was between 1-5 years.

Table-10: Showing duration of diabetes

Duration of diabetes in years	No. of cases	Percentage
Newly detected	22	22
<1	08	08
1-5	40	40
6-10	10	10
11-15	14	14
16-20	02	02
>21	04	04
Total	**100**	**100%**

Among the 78 known diabetic patients 32 patients were on regular treatment above graph shows majority of patients presented with both neuropathy and vasculopathy.



Graph-9: Bar graph showing duration of diabetes

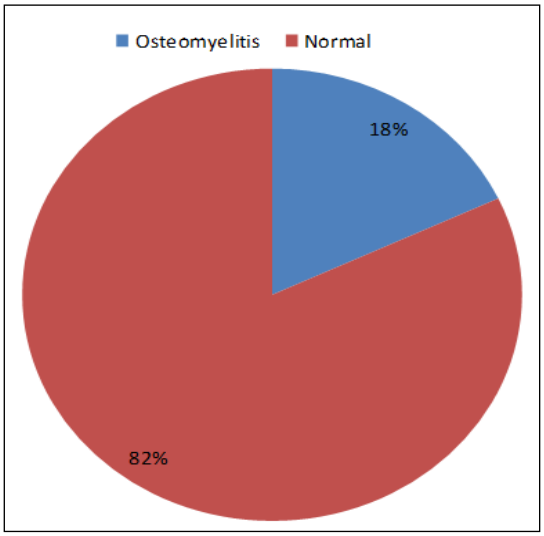
12. Incidence of bone infection:

Out of 100 patients 18 patients showed osteomyelitis in x ray.

Table-11: Shows incidence of osteomyelitis

Osteomyelitis	No. of cases	Percentage
Osteomyelitis	18	18
Normal	82	82
Total	**100**	**100%**

So the incidence of osteomyelitis in present study was 18%

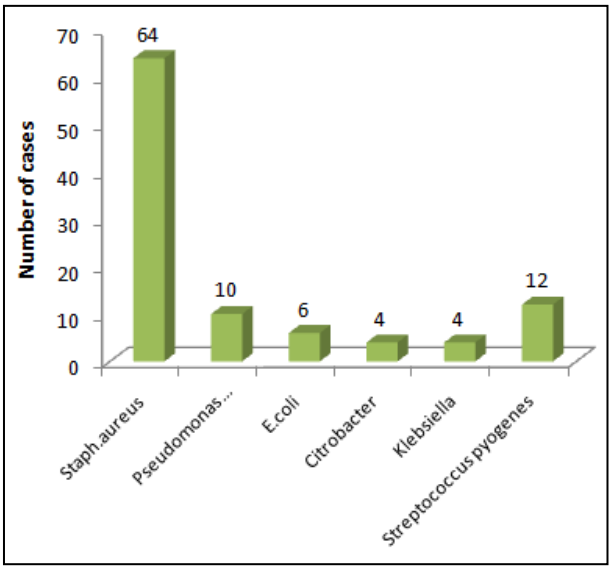


Graph-10: Pie chart showing incidence of bone infections

13. Incidence of Different Causative Organisms

Table-12: Shows different causative organisms

Causative organisms	No. of cases	Percentage
Staph, aureus	64	64
Pseudomonas aeruginosa	10	10
E.coli	06	06
C itrobacter	04	04
Klebsiella	02	02
Streptococcus pyogenes	10	10
Proteus	02	02
Candida	02	02
Total	**100**	**100%**

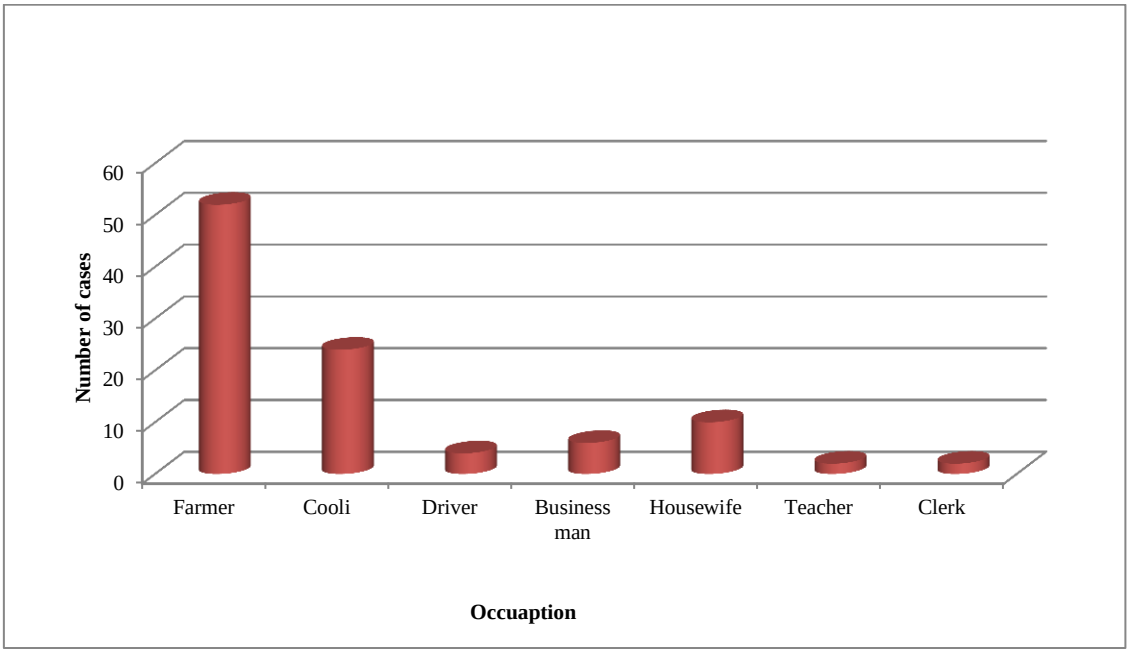


Graph-11: Bar graph showing incidence of different causative organisms

14. Occupation:

Table-13: Shows occupational involvement of diabetic complications

OCCUPATION	No. of cases	Percentage
Farmer	52	52
Coli	24	24
Driver	4	4
Business man	6	6
Housewife	10	10
Teacher	2	2
Clerk	2	2
Total	**100**	**100%**

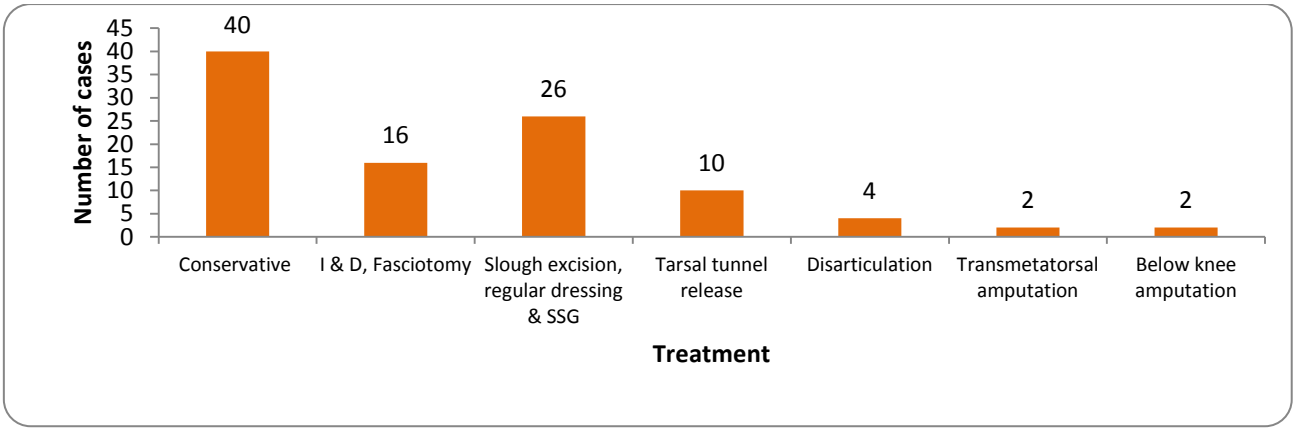


Graph-12: Occupational Involvement of Diabetic Complications

15. Treatment:

Table-14: Various treatment modalities

Treatment	No. of cases	Percentage
Conservative	40	40
I & D, Fasciotomy	16	16
Slough excision, regular dressing & SSG	26	26
Tarsal tunnel release	10	10
Disarticulation	4	4
Transmeta torsal amputation	2	2
Below knee amputation	2	2
Total	**100**	**100%**



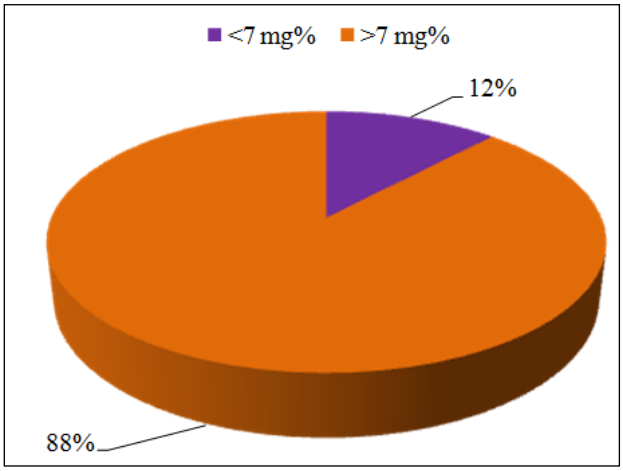
Graph-13: Showing Various Treatment Modalities

15. HBA1C LEVEL:

In our study all patients are investigated for level of HbA1C in blood, only 12% of patients had HbA1C level < 7mg% and they had shorter hospital stay compared to others

Table -15: Shows level of HBA1C

HbA1C level	No. of cases	Percentage
<7mg%	12	12
>7mg%	88	88



Graph-14: Pie chart showing level of HBAlC level

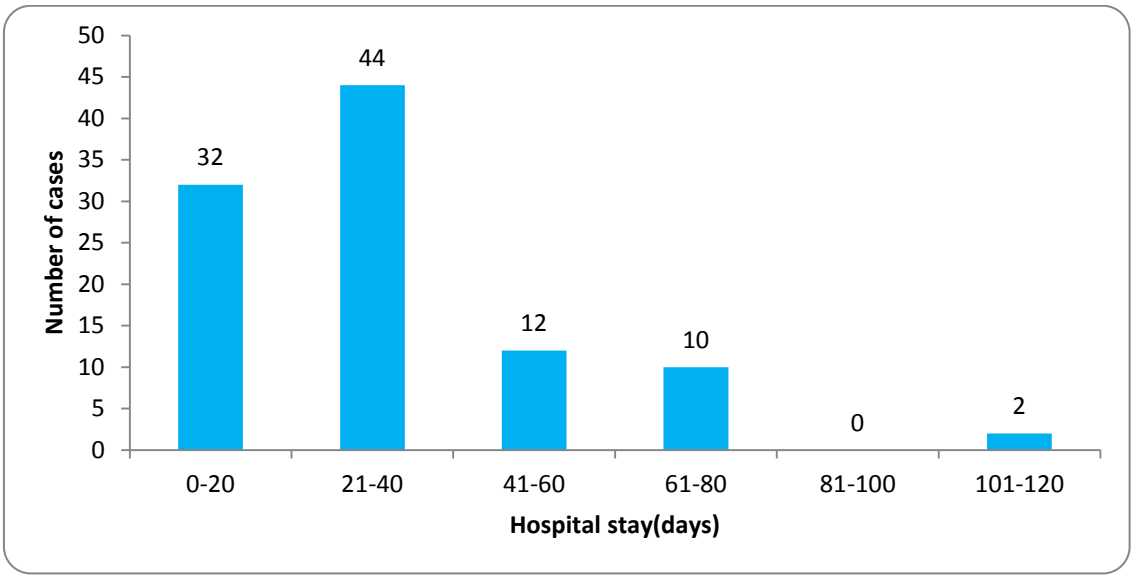
16. Hospital stay.

In this study average duration of hospital stay was about 31.94 days with minimum being 3 days with maximum being 110 days. The maximum number of patients was in 2 1-40 days group

Table-16: Shows duration of hospital stay

Hospital stay(days)	No. Cases	Percentage
0-20	32	32
21-40	44	44
41-60	12	12
61-80	10	10
81-100	00	00
101-120	02	02
Total	**100**	**100**

Mean ± SD: 34.68 ±21.64



Graph-15: Bar graph showing duration of hospital stay

17. **Surgical complications of diabetes**:

In present series the major surgical complications of diabetes were recognized as a) septic b) ischaemic, c) neuropathic. Though most of these lesions

Table-17: Types of surgical complications

Type of lesions	Number of patients	Percentage
Septic lesions	52	52
Neuropathies	30	30
Ischaemia	18	18

Type of lesions

In present study it was seen that septic lesions was the leading complication with 68 patients. However in more than 35% of patients more than 2 types of complications were seen. In septic lesions various types of lesions were seen.

Table-18: Types of septic lesions

Lesions	Number of patients	Percentage
Ulcers	52	52
Gangrene	16	16
Abscess	10	10
Carbuncles	3	3
Cellulitis	19	19

So it can be seen that ulcers formed the majority of septic lesions in our study with 52% followed by gangrene 16%, cellulitis with 19%, and then abscess and carbuncles.

‘

Table - 19: Incidence of septic lesions

Series	Warren Lecompte[7]	Present study
No. of cases	818	100
Septic lesions	213	52
Percentage	26	52

So in present study the incidence of septic lesions is very high as compared to the available data. This is due to the number of patients taken for study is 100 and also that majority of patients are ignorant about the nature of disease and delay in seeking treatment.

18. Neuropathic lesions:

In this series of 100 cases of surgical complications of diabetes 32 patients were found to have peripheral neuropathy clinically. The age of patients varied from 40-80 years and the average age of incidence is around 55 years. All these patients were known diabetics with past history of diabetes ranging from 3 years to 25 years. Patients gave history of parasthesia, hyperesthesia, tingling numbness and weakness of the feet. On examination, trophic changes of the toes, absent sweating, absent sense of fine touch, vibration, pain, sensory modalities was seen.

Table -20: Number of cases presenting with neuropathic lesions

	Bonkalo series [8]	Duncan’s series [9]	Present Study
Total no. of cases	150	354	100
No. of cases with Neuropathy	74	125	33
Percentage	49.33	35.3	33

Table 18 shows different signs elicited in all these patients and it is compared with Rundle series and

it can be seen that both the series had almost similar results.

Table-21: Signs of neuropathy

Signs	Rundle series[10]		Present study	
	No. of cases	Percentage	No. of cases	Percentage
Poor achille's tendon reflex	125		33	78
Poor patellar reflex	117	93	30	88
Decreased cutaneous sensations	63	50	17	50
Impaired vibrating sense	57	46	13	39

In all these cases other causes of neuropathy like leprosy, syphilis and spinal cord disorders were excluded by

1. Absence of nerve thickening
2. VDR-test
3. Plain X-ray evaluation of the joints.

Peripheral neuropathy is a major cause of foot lesions due to diabetic microangiopathy, vasonervosa of the digital nerves arc involved resulting in dcmyelination. Hence decreased cutaneous sensation, proprioception, pain perception and joint sense. It also affects the motor fibres resulting in atrophy of intrinsic muscles and loss of arches of the foot. Autonomic fibres are involved resulting in loss of sweating and temperature regulation. Due to all these features trivial injury are left unnoticed which get infected and cause non healing tropic ulcers.

20. Ischaemic lesions:

In this study of 100 cases 36 patients had ischaemic lesions. Out of them 16 cases had gangrenous lesions of the toes and foot, either dry or wet gangrene. The youngest patient age was 36 years whereas oldest was 85 years.

Table -21: Age presentation of ischaemic lesions

Age	Present series	Wheel-lock and Root series[6]
Youngest age	36	34
Oldest age	85	89
Average	58	68

It can be seen that the average age in present study is lesser than that of the series in the literature whereas the youngest and the oldest age presentation is almost similar.

Table-22: Incidence of ischaemic lesions

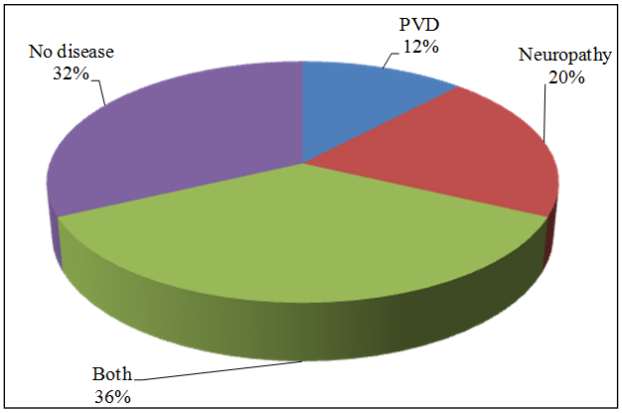
	Bell's series[11]	Present study
No. of cases studied	946	100
No. of cases with gangrene	236	16
Percentage	24.9	16

So it can be seen that incidence of gangrene in present study is almost similar to that of Bell's series.

Table-23: Sex distribution of gangrenous lesions

No. of cases studied	Bell's series[11]	Present study
Male	446	49
Incidence of gangrene	116	11
Percentage	26	23
Female	500	23
Incidence of gangrene	120	7
Percentage	24	30

In present study the incidence of gangrene amongst male is almost similar as compared to the western literature while the incidence of gangrene in female is higher as compared to the literature.



Graph-16: Showing incidence of neuropathy and ischemia

22. Amputation rate:

Amputation rate in present study is 12 i.e., 12 cases of out 16 cases of gangrene needed amputation that amounts to 75%. This rate is higher compared to the Cohen's series due to the following reasons.

a. Patient coming to our hospital are usually ignorant about the nature of disease. So the gangrene was spreading and life threatening.
b. The number of patients in present study is only 100 as compared to 215 in the literature.

All the patients, post amputation were referred to rehabilitation centres and were provided with prosthesis and crutches.

Table-24: Amputation rate

	Collen's series[12]	**Present study**
No. of cases with gangrene	215	16
No. of amputations	83	12
Percentage	38.6	75

DISCUSSION

Foot infections are frequent and serious complication of diabetes mellitus. This is a syndrome of metabolic, vascular and neuropathic components which are interrelated. The prevalence of foot infections among diabetics is 12%. 15% of all diabetics develop foot ulcer in their life time and 50 % of non traumatic amputations are due to diabetes mellitus. 50% of amputations can be reduced in diabetics by educating about DO'S and DON'TS in diabetics as mentioned before. In my study total 100 patients studied in the period of December 2013 to September 2015 and discussion of this is as follows.

1. AGE:

Most common age group who presented with diabetic foot in my study was between 51 – 60 years with an average of 60 .8 years. In JOS university study [13] it is 63.2 years and in and in Seattle series it is 64.7 years. Thus in this study presentation is most common in 5th to 6th decade. This early presentation may be due to poor glycemic control and good health awareness.

2. SEX:

In this study 68% were males and 32% were females. In seatle study [14], its 67% and in JOS university study [13],its 65%. Male prepondarence in my study is may be due to males are more exposed to injuries during there occupational and recreational activities. This is comparable to Diabetic Research Center (2005) Chennai Study At 2005.[15]

3. MODE OF CLINICAL PRESENTATION:

In this study majority of patients presented with cellulitis (46%), 32% with ulcer, 14% with abscess and 8% with gangrene. And this is comparable to JOS University [13] study in which cellulitis was 50% ulcer 28% abscess 12% and gangrene 10%.

4. HISTORY OF TRAUMA:

In the present study 76% of patients were presented with history of trauma and it was absent in 24% of remaining patients. This was comparable to Reiber *et al.;* series [16] in which 77% of patients had history of trauma.

Because of sensory neuropathy Diabetics will be having insensate foot so they are predisposed to repetitive unrecognized minor trauma and abnormal distribution of pressure on the feet hence emerge as a principle factor in causing foot ulcers.

5. Site of lesion:

Out of 100 patients studied, most common site of lesion is was sole of foot (40%).

Site of lesion	**Present study %**	**Apelquist**	**eiber *et al* series%[16]**
Sole	40	28	37
Dorsum	32	14	11
Toes	28	51	52

This is comparable only in the sole lesions with the other studies. It is also observed in our study that 60% of Diabetic foot occurred among those who walked bare foot and 35% in those wearing only slippers or chappals while only 5% prevalence was observed in those wearing shoes.

6. DURATION OF DIABETES MELLITUS:

Most of the patients presented between 1-5 years and mean age is 3.12 years. It is 11.6 in Seatle [14] series and 8.2 in John Hopkins [18] study respectively. This shows that foot complications accrued early in our study most probably due to lack of strict glycemic control.

7. INCIDENCE OF PVD AND NEUROPATHY:

Incidence of PVD and neuropathy in present study were 12% and 20% and both in 36% of patients. When only neuropathy is taken in to consideration 56% of patient in present series had neuropathy. The incidence of neuropathy in other series is Walter dp *et al.;* [19] - 39.4%.

When only PVD is taken in to consideration 48% of patients in present study had PVD. In Walter dp [19] - 24.2%. The most common lesion is atherosclerosis of tibial arteries leads to decreased blood flow resulting in decreased delivery of oxygen, nutrients and antibiotics to foot hampering the chance of healing. The increased incidence of these complications in our study is probably due to lack of strict glycemic control.

8. OSTEOMYELITIS:

In the present study 18% of the patients had osteomyelitis in the x-ray. Demineralization, periosteal reaction and bony destruction are classic radiographic triad of osteomyelitis appear only after 30-50% of bone destruction .it is the nidus for infection unless it is controlled wound never going to heal. It is comparable to JOS university study [13] (14%)

9. CAUSATIVE ORGANISM:

In the present study most common organism isolated was S. Aureus (64%), next is pseudomonas (10%), and Str. Pyogenic (10%). These results are comparable with JOS university study[13]. Infection is the 3rd most common factor responsible in the pathogenesis of diabetic foot lesion. When associated with ischemia frequently leads to amputation .this are comparable to JOS university study [13] and Seatle study [14] in which Staph Aureus was the most common organism.

10. NECESSITY OF STRICT GLYCEMIC CONTROLE:

In the present study all 100 patients treated with insulin. Insulin requirement was more initially and as the infection is under controle the requirement became less and less. Among 100 patients only 12% had HbA1c level < 7 mg% and they have shorter hospital stay indicating that strict glycemic controle is necessary for faster healing of wounds and decrease the incidence of amputation. Compared to Manchester university study, foot complications like neuropathy and vasculopathy, appeared early in the course of diabetes mellitus in our study. This is mainly due to lack of strict glycemic control in our patients and tells us the necessity of strict glycemic control to reduce the foot complications.

11. SURGICAL TREATEMENT:

In the present study single stage surgical approach with total excision of ulcer, broad exposure, correction of underlying osseous deformity and wound coverage using STSG in 28 patients reduced healing time, with no need for additional surgical procedures, resulting in decreased hospital stay and cost, conservative management done in 2 patients. I& d done in 8 , surgical tarsal tunnel release in 10 patients and amputation in 3 patients. This is comparable with Khyber Teaching Hospital, Peshawar and Department of Surgery, study.

12. HbAIC LEVEL AND HOSPITAL STAY:

In the present study only 6 patients had HbA1C level <7 mg% and they had shorter hospital stay compared to the other patients. It indicates that both short and long term strict glycemic controle is necessary for the faster wound healing.

13. HOSPITAL STAY:

Hospital stay was related to type, extent, severity of disease and effective short and long term glycemic controle. In the present study average duration of hospital stay was 34.64 days. Stay for non healing wounds are 28.4 days and for neuropathy it was 16 days. Causes for long hospital stay were uncontrolled diabetes, life threatening infections, malnutrition and multiple medical co morbidities.

14. FOOT CARE:

Patient education in foot care, prophylactic skin and nail care, and footwear reduces the risk for foot ulcers and lower extremity amputation by 25% in those patients with no specific risk factor [15].

Prescription footwear accommodating deformity and decreasing pressure and shear forces applied to skin overlying bone prominence, keep individuals ambulatory and protect them from ulcer formation [20] in the present study all patients educated regarding DOS AND DONTS. All are advised to wear MCR slippers selected patients referred to foot clinic Manager Jain hospital Bangalore, as this facility is not available in our hospital.

CONCLUSION

- This study comprised of 100 cases of diabetic foot patients with emphasis on surgical management and its complications over a period of one year. After analysis of the data the following are the conclusions.
- The highest number of patients was seen in the age group of 51-60 years (28%). youngest patient was 30 years old and the oldest 88 years.
- Males are more vulnerable to trauma and almost three times more affected than females because of there occupation and recreational activities.
- History of trivial trauma of some kind was the most common initiating factor in nearly half of the cases.
- Commonest presenting lesion was Cellulitis 46%, ulcer 32% , abscess 14% and Gangrene 8%.
- Duration of diabetes varied from 1year to 25 years and few patients were diagnosed post admission. only 12% had HbA1c level < 7 mg% and they have shorter hospital stay indicating that strict glycemic control is necessary for faster healing of wounds and decrease the incidence of amputation.
- HbA1c level < 7 mg% in only 12% of patient indicates poor compliance of patient regarding long term glycemic controle.
- Commonest microorganism isolated in our hospital was Staph. Aureus.
- Conservative treatment consisting of control of diabetes with Plain/Lente insulin along with appropriate oral / IV antibiotics was effective in some cases.
- Wound debridement, slough excision followed by dressing with Povidone / magnesium sulphate/ plermin/ saline resulted in healing in some cases.
- Tarsal tunnel release in selected neuropathic patients resulted in improved neuropathic symptoms.
- Split skin grafts, Disarticulation, Transmeta tarsal amputation, below knee were the other modes treatment.

SUMMARY

Foot ulceration in diabetic patients is a resource consuming, disabling morbidity that often is the first step towards lower extremity amputation. Prevention is the best treatment. The hallmark of diabetic foot problem in our populations is gross infection, and major contributing factors for late presentation include bare foot gait, attempts at home surgery, trust in faith healers and undetected diabetes [7]. Diabetic patients have

always suffered from complications affecting the lower limbs. Foot infection and the subsequent amputation of a lower extremity are the most common cause of hospitalization among diabetic patients6. It is more common in male agriculturists. Most common in middle aged males. Most commonly presents as cellulitis are non healing ulcer over plantar aspect of foot. Common precipitating factor is trivial trauma. Neuropathy, ischaemia and infections are the commonest cause of foot lesions. Staph. Aureus is the commonest organism isolated from foot lesions. Early thorough surgical debridement is helpful. Saline with Oxum gave good results. Tarsal tunnel release gave good results with symptoms of neuropathy and ulcer recurrence and patients were followed up for 6 months. Later they lossed follow up. Education regarding foot care plays a vital role in the prevention of recurrence.

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