

Analysis of Clinical Presentation And Management of Diabetic Foot Ulcer Cases with Preventive Measures in A Tertiary Care Hospital. Government Medical College And Esi Hospital. Coimbatore

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Abstract:

Aim: To study the age, sex, clinical presentation and management of diabetic foot ulcer cases attending referral hospital-GMC and ESI Hospital. Coimbatore. Analysing whether regular treatment and awareness of diabetic mellitus help in preventing complications.

Methods: A prospective study during a period of 6 months from NOVEMBER 2016-APRIL 2017 done in patients attending surgical department of GOVERNMENT MEDICAL COLLEGE AND ESI HOSPITAL, COIMBATORE.

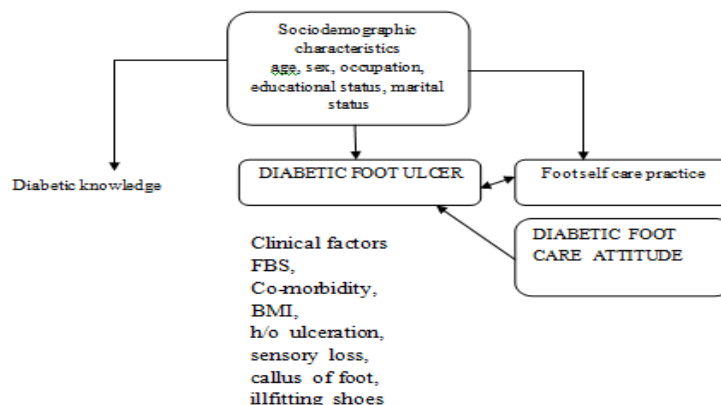
Results: On evaluating the diabetic foot ulcer patients even with regular treatment there is no change in occurrence of foot ulcer as the cause is mainly hyperglycemia along with infection in the normal as well as atheromatous changes in the vascular system.

Conclusion: Diabetic foot ulcer may be prevented by educating the patient on foot care as well as good glycemic control.

Keywords: Diabetes, debridement, foot ulcer, glycemic control, sensitive antibiotics.

I. Introduction

Diabetic foot ulcers are a complication of diabetes and approximately 5% of sufferers require major amputation. Diabetes is the most common disease process associated with lower limb amputation accounting for approximately half of non traumatic amputations.(1)Diabetic foot ulcers result from neuropathy, vasculopathy, and immunopathy.(2) More than 60% of diabetic foot ulcers are primarily due to an underlying neuropathy.(2)Loss of nerve function is associated with hyperglycemia as reflected in the mean level of glycosylated Hb.overtime.Peripheral neuropathy affects all components of the peripheral nervous system, sensory, motor, and autonomic each of which contribute to foot ulcer development.(2,3) Self care is fundamental in diabetes management and prevention. Existing guideline state the need for patient education as a prerequisite to prevent ulceration.(4) Approximately 15% of people with diabetes will be affected by a foot ulcer during their lifetime.(5) Five year recurrence rates of foot ulcers are 70%(6).Upto 85% of all amputations in relation to people with diabetes are preceded by a foot ulcer.(5,6)People with diabetes with one lowerlimb amputation have a 50% risk of developing a serious lesion in the second limb within 2 years.(7)People with diabetes have a 50% mortality rate in the 5 years following the initial amputation. Conceptual frame work showing possible predictors of diabetic foot ulcer.



Aetiology And Classification Of Diabetic Foot Ulcers

The incidence of neuroischaemic ulcers is 52.3%, neuropathic ulcers 36% and ischemic ulcers 11.7%.Neuropathy includes sensory, motor, and autonomic components. Deficient protective sensation leads to ulceration on high pressure areas, motor neuropathy results in biomechanical abnormalities an autonomic neuropathy causes decreased sweating and dry skin which is more prone to hyperkeratosis an ulceration. Ischemia is caused by peripheral arterial disease resulting in decreased blood supply and tissue perfusion which significantly compromise ulcer healing. Peripheral arterial disease in patients with Diabetes tends to be multifocal and commonly affects the infrapoplitealvessels.Furthermore disease progression is usually accelerated(8) and together with microvascular disease results in poor outcomes.Endothelial dysfunction appears to be the main cause of both the macrovascular and microvascular disease and the mechanisms which contributes to this include persistanthyperglycemia, increased advanced glycation end products, oxidative stress, endothelial imflammation and reduced nitric oxide activity.

WAGNER CLASSIFICATION FOR DIABETIC FOOT ULCER

GRADE DISCRIPTION OF ULCERS

- 0 Intact skin in patients who are at risk
- 1 superficial ulcers with exposed subcutaneous tissue
- 2 Exposed tendon and deep structure
- 3 Ulcers extend to the deep tissue and have either associated soft tissue abscess or osteomyelities
- 4 Ulcers include feet with partial gangrene.
- 5 Feet ulcers with more extensive gangrenous tissue.

Methodology-men and materials:

Allthe patients who attended surgery department of GMC AND ESI HOSPITAL, refered from ESIdispensary for diabetic foot ulcer were examined.Total no of patients 80 for a period of 6 months from NOVEMBER 2016-APRIL 2017.

Type Of Study.-Prospective study.

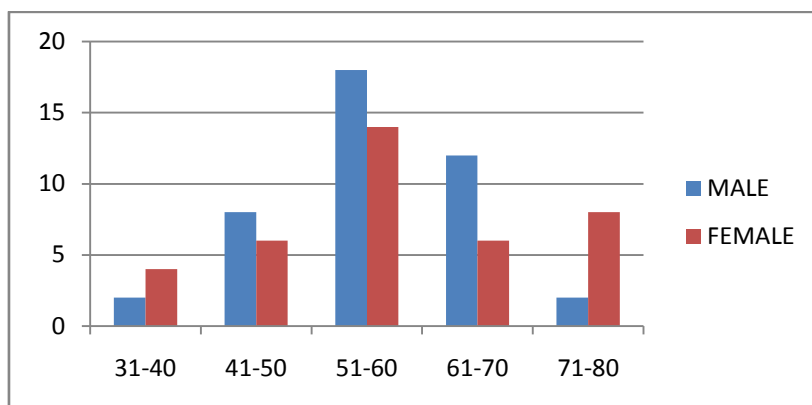
Inclusion criteria: patients of more than 18 years of age with diabetes having foot ulcer. Patient recently diagnosed as DM with foot ulcer. Exclusion Criteria; Patients less than 18 years with foot ulcer, pregnant women, patient with septicemia.

Type Of Study: Prospective Study Observation & Result :1 Sex Total no of patients was 80.out of which Male 42(52%) and Female 38.(48%)

Age of patient

Among Male patients 18 were in the age group of 51-to 60, 12 were 61-70 yrs,8pts were 41-50 yr age, more than 70 years 2 patients and 2 pts were below 40 yrs. Among female pts 14 were in the age group of 51-60 yrs, 8 were 71-80 ,6pts were in the age group of 61-706 pts were in the age group of 41-50 yrs and 4 pts were below 40 yrs.

AGE	MALE	FEMALE
31-40	2	4
41-50	8	6
51-60	18	14
61-70	12	6
71-80	2	8



Whether they are ip or nip: total no of insured patients (ip)16 and non insured person were (nip) 64. Among ip , male were 12 and female 4.

Among the nip male pts 30 and 10 were working in private concern

Education:	male	female
Illiterate	4	4
School	36	32
College	2	2
Total	42	38

Residence

From Coimbatore district 54 patients and 26 patients came from nearby places like Thiruppur 8, Karur2, Palladam4, Pallakkad2, annur2, salam2, Madurai2, Pollachi2& Dharmaburi2.

Duration of illness:-

Ranged from 3Days to 2Months. With Foot ulcer & some have taken treatment either in ESI dispensary or from CMCH or Pvt hospital.

Site of lesion:- The lower limb ulcer patients were taken for the study.

Lower Limb	RT	LT	BOTH LEGS
	52	24	4

Type of lesion:-Patients were presented with superficial ulcer, deep ulcer, abscess, cellulitis with ulcer and pregangrenous or gangrenous changes of the toes.

Ulcer	48
Gangrene	4
Cellulitis with ulser	28

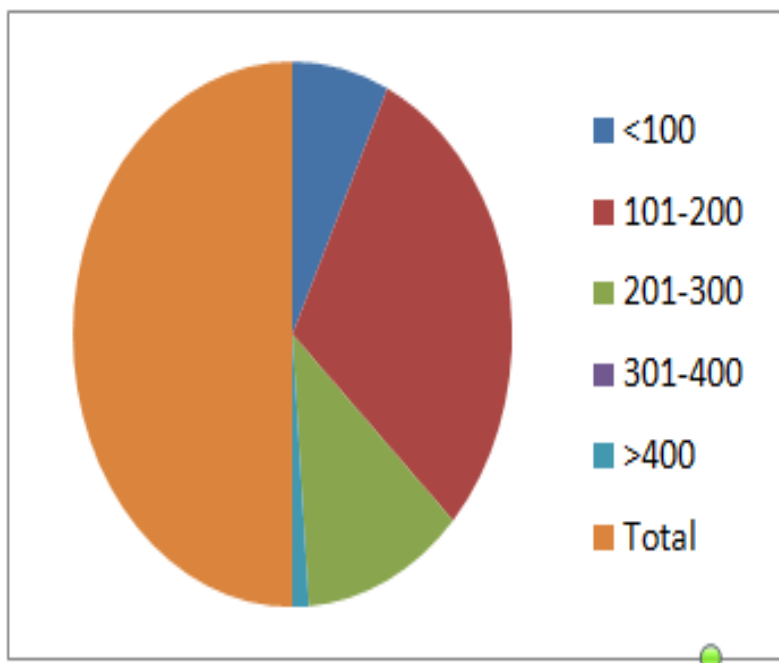
Investigations:-

The patients were investigated with RBS, FBS, PPBS, BLOOD UREA, Serum creatinine HbA1C, X ray chest, X ray foot AP and lateral if needed, ECG.

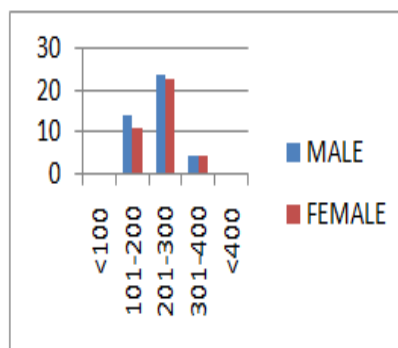
HbA1c ranges from 7.4 to 9.8

RBS ranges from 100-200mg/dl in 12 patients and 201-300 mg/dl in 68 patients.

Fbs	Male	Female
<100	6	Nil
101-200	25	23
201-300	10	11
301-400	Nil	4
>400	1	Nil
Total	42	38



PPBS	MALE	FEMALE
<100	Nil	Nil
101-200	14	11
201-300	24	23
301-400	4	4
<400	NIL	Nil



Blood sugar level of our patients was high showing that hyper glycemia is one of the most important factor for development of the ulcer.

Blood urea

Range	No.of patients
21-30mgms%	50
31-40	24
41-50	1
>50	2

2 patients With blood urea >50 were treated and repeat blood urea came down to normal level after 5days.

Serum Creatinine

< 1Mgs%	58
1.1Mgs% to 2Mg	20
>2.1Mgs to 3	2

Treatment

After getting diabetologist's opinion, the patients were treated with insulin & oral hypoglycemic agents to bring the blood sugar under control. For the infection all pts were initially started on appropriate antibiotics including anaerobic agents. Where the response nervosa was poor. Pus culture anaerobic agents sensitivity was done. According to fertility the antibiotics were given dimension of the antibiotics therapy ranged from 7days to 10 days. Most of the results showed that the micro organism was pseudomonas group. All the patients were asked the questions to know whether they were aware of complication of diabetes.

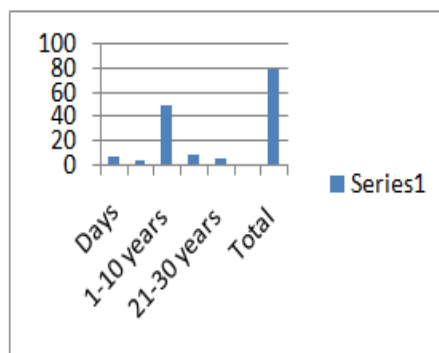
1. whether they are IP are NIP

2. whether the foot ulcer was treated earlier either in ESI Dispensary or Private Concerns.
3. How long the pts having DM?
4. whether the pts adapt diet control
5. Are they do regular exercise?
6. Are they on regular treatment

The Patients Are As Follows

1. Among the total 80pts Insured Patients (IP) is 16(20%) and non Insured Patients (NIP) dependent on IP is 64. (80%)
2. Awareness on dietary management in diabetics.

Days	08
<11 months	04
1-10 years	50
11-20 years	10
21-30 years	06
31-40 years	02
Total	80



3. Whether treated for foot ulcer in Esi Dispensary or Private concern?
 Most of the patients were treated and referred from Esi Dispensary. Two of the patients were treated in CMCH for one month, 4 patients got native treatment for foot ulcer wear which worsened the disease. 8 patients came to our hospital for the first consultation for foot ulcer.

4. How long DM known to the Patients?

5. Newly diagnosed 4 2 male and 2 female

New diagnosed	04
1 month - 11 month	10
1 – 5 years	40
6 - 10 years	16
11 – 15 years	08
16 – 20 years	02
Total	80

6. Weather on diet control :-
 50 pts are not on diet control.
 30 pts are on diet control.
7. Weather do regular exercise 70 patients are not doing regular exercise.
 10 patient only on regular exercise.
8. Weather patients on regular treatment?
 50 pts are on regular drugs
 26 pts are not on regular drugs
 4 patients are newly deducted after coming to our hospital.

Weather already any surgical procedure like disarticulation or amputation done

Male	18
Female	06

24

Total 24 patients were already had some kind of surgical procedure for foot ulcer. Among male patients fore foot amputation done. 1year back
 Left great toe amputation done. 2years back
 Left Ak amputation done. 2years back
 Left GT amputation done. 2years back
 Rt. Great toe amputation 10 years back
 Rt. little toe amputation 5 years back

Rt. 4th toe amputation 5 months back
Rt. 4th & 5th toe amputation in ESIH.
Rt. Great toe amputation in August 2016
Rt. PT 3 disarticulation 1 year back.
Rt. BK amputation in ESIH.

Among the female patient

Great toe right amputation done in ESIH
Right great toe amputation done in ESIH
Left great toe amputation done in 2 years back
Diabetic Retinopathy was detected in 2 male patients who complaint of loss of vision.
Venous Doppler was done in 4 female patients having varicosity of vein with ulcer And found to be SFJ incompetent reflux. Varicosity in medial aspect of leg. Incompetent Perforator noted in medial aspect of leg, in below knee, lateral and middle level. No DVT. SPJ Normal.
Arterial Doppler done in patients with chronic ulcer and with gangrenous change. Arterial Doppler was found to be normal in 20 patients.
DPA Biphasic others normal in 5 patients. Diffuse Atheromatous wall thickening with proximal Vessels showing significant occlusion with distal vessels showing Biphasic flow in 2 patients.
Diffuse wall thickening noted in left LL arterial system in one patient.

II. Discussion

Total no. of patients with diabetic foot ulcer attended surgical op & got admitted as in-patients in GMC & ESIH was 80 during the period NOV 2016 –APRIL 2017 (6 months).

1. Among the 80 patients male was 42 (52%) and female was 38(48%). There is not much sex
2. Variation regarding .
3. The most common age group in male with DM & foot ulcer was 51-60 yrs as 18(45%) patients
4. & 61-70yrs as 12 (28.57%) patients fall in this group. Whereas as in female the common age group was 51-60yrs with 14 (36.8%) patients and 71-80yrs with 8(21.05%) patients.
5. 3. Among 80 patients insured patients were 16 (20%) and non insured patients (dependent patients) were 64(80%) showing that there is ESI benefit for dependents.
6. 4. Educated male patients are 38, graduate 2 patients and illiterate 4 patients showing 36 have attended school and at least studied primary school. Among the female patient's 34 patients are educated 4 illiterate and 2 patients graduated.
7. 5. Among the 80 patients 54(67.5%) patients were residing in Coimbatore district and referred from ESI Dispensary 26 patients were outside Coimbatore from nearby places. 26 patients are from Tirupur 8, Karur 4 , Palladam 4 , Palakkad 2, Annur 2 , Selam 2, Madurai 2, Pollachi 2, and Dharmapuri 2 .
8. Duration of illness ranges from 3 days to 2 months.
9. Site of lesion in the lower limb showed that right leg ulcer was 52 patients (65 %) left leg ulcer was in 24 patients (30%) and both leg ulcers was in 2 patients (5%).
10. Types of lesion showed that diabetic foot ulcer was present in 48 patients (60%) gangrene in 4 patients (5%) cellulitis with diabetic foot ulcer in 28 patients (35 %) .

III. Investigations

Urine sugar albumin and deposit was done in all the patients. In 68 patients sugar was >++ and in 12 patients urine sugar was +. Urine albumin ranges from trace and nil as the patients with high blood urea serum creatinine showed albumin in the urine. The urine albumin +ve in 30 patients and in 50 patients there is no albumin in the urine. RBS ranges from 100 mgm – 200mgm in 12 patients and 201mgm-300mgm in 68 patients. Fasting & blood sugar was done on the next day which showed that the patients are not under control of the blood sugar.

	FBS	MALE	FEMALE
	<100	6	nil
	101-200	25	23
	201-300	10	11
	301-400	nil	04
	>401	01	nil
	TOTAL	42	38
	PPBS	MALE	FEMALE
	<100	nil	nil
	101-200	14	11
	201-300	24	23
	301-400	04	04
	>400	nil	nil

This showed that patients with blood sugar in the range of 201-300mgm are more prone to develop leg ulcers 24 patients male, 23 patients female showing 47 patients among 80 were in this range.

Blood urea

21-30mgm%	50	62.50%
31-40mgm%	24	30 %
41-50mgm%	04	5%
>50	2	2.5%

Serum creatinine

<1mgm%	58patients	72.5%
1.1mgm-2mgm	20	25.5%
2.1mgm-3mgm	2	2.5%

HbAc ranges from 7.4 to 9.8

6-7	NIL	
7.1-8	58	72.5%
8.1-9	20	25.5%
9.1-10	2	2.5%

Showned that 58 patients (72.5%) with 7.1-8 ranges of HbA& 20 patients (25.5%) with 8.1-9 , 2 patients with 9.1 -10. This shows that patients with poor long term control of blood sugar were more prone for DM ulcer.

The beneficiaries are dependants parents 64 patients (80%) and 16 patients 20% are insured patients. Most of the patients were referred from ESI dispensary. In analysing the duration of DM 40 patients diagnosed ≤ 5 years back ,16 patients ≤ 10 yrs, 10 patients diagnosed ≥ 11 months & 2 patients were < 20 yrs .Newly diagnosed patients 4 (2 male & female) 50 patients were on strict diet control 30 patients were not on diet control. 7 patients were doing regular exercise and 10 patients were not doing regular exercise. 50 (62.5%)patients were on regular drugs,26 patients(32.5 %) were not on regular drugs, 4 patients (5%) were newly diagnosed. This analysis showed that even with regular treatment the blood sugar was not under control and hyperglycemia was prone to develop food ulcers. In 24 patients (40%) already some surgical procedure was done in the other limb or same limb. Diabetic Retinopathy was detected in 2 patients. Venous Doppler done showed that 4 patients (5%) had varicosity of veins . Arterial Doppler done in gangrenous foot chronic ulcer patient showed normal flow in 20 patients. DPA biphasic others normal in 5 patients. Diffuse athermatous wall thickening with proximal vessels showing significant occlusion with distal vessels showing Biphasic flow in 2 patients diffuse wall thickening noted in left LL arterial system in 1 patient.

IV. Conclusion

DM in the disease affecting other organs with micro and macro angiopathy changes even with patient on regular diet control ,exercise and treatment if the blood sugar level is not under control. The most common age group affected are 51 -60 yrs even in both sex. Right lower limb ulcer is more common. Diabetic ulcer foot is more common duration of diabetes mellitus is 1-5 yrs.

Patients need to be educated on foot care. During every visit to the Diabetologist, physician, examination of the distal pulses, changes in skin colour over the feet, examination for neurological changes and presents of tropic ulcers is mandatory. This approach can definitely reduce the instances of diabetic foot ulcer and the probability of amputations.

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