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UNRECOGNISED ISCHEMIC HEART DISEASE IN DIABETIC FOOT PATIENTS IN A TERTIARY CARE CENTRE: A PROSPECTIVE OBSERVATIONAL STUDY

General Medicine

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ABSTRACT

OBJECTIVES: To identify the presence of undetected IHD and also to evaluate the conventional risk factors for CVD in diabetic foot patients.
MATERIAL AND METHODS: It is a prospective observational study. 150 diabetic foot patients were randomly selected from the diabetic ward of PESIMSR Hospital, Kuppam. A detailed history relevant to CVD risk factors was obtained. They underwent a set of general, systemic examination and relevant investigations to detect IHD.
RESULTS: The incidence of unrecognized IHD in our study was 35.32%. IHD in diabetic foot patients was higher in males and in those aged more than 50 years. The most common risk factor for CVD found to be age>50 years(73%) followed by hypertension (48%).
CONCLUSION: There was a positive correlation between Diabetic Foot and IHD. Hence there is a need to screen every diabetic foot patient for early detection of IHD to initiate treatment and prevent its morbidity and mortality.

KEYWORDS

Diabetic Foot, IHD, CVD, Diabetes Mellitus.

INTRODUCTION:

The World Health Organization (WHO) estimates that between 2000 and 2030, the world population will increase by 37% and the number of people with diabetes will increase by 114% [1,2,3] . Diabetes is a chronic illness that requires continuing medical care, education and support to prevent acute complications and to reduce the risk of long-term complications. Cardiovascular disease (CVD) is the major cause of morbidity and mortality for individuals with diabetes, and the largest contributor to the direct and indirect costs of diabetes. The common conditions coexisting with type 2 diabetes (e.g., hypertension and dyslipidemia) are clear risk factors for CVD, and diabetes itself confers independent risk. In all patients with diabetes, cardiovascular risk factors should be assessed at least annually. These risk factors include dyslipidemia, hypertension, smoking, positive family history of premature coronary disease and the presence of micro or macroalbuminuria.[4]

Data from the Framingham Heart Study revealed that even for the asymptomatic patient, PAD (Peripheral Arterial Disease) is a marker for systemic vascular disease involving coronary, cerebral, and renal vessels, leading to an elevated risk of events, such as myocardial infarction (MI), stroke, and death. The proatherogenic changes associated with diabetes include increase in vascular inflammation and derangements in the cellular components of the vasculature, as well as alterations in blood cells and haemostatic factors. These changes are associated with an increased risk for accelerated atherogenesis as well as poor outcomes.

Ischemic heart disease (IHD) is a condition in which there is an inadequate supply of blood and oxygen to a portion of the myocardium; it typically occurs when there is an imbalance between myocardial oxygen supply and demand.

The term Diabetic Foot consists of a mix of pathologies including diabetic neuropathy, peripheral vascular disease, Charcot's neuroarthropathy, foot ulceration, osteomyelitis and the potentially preventable endpoint, i.e. limb amputation.[5] The lifetime risk of a person with diabetes developing foot ulceration is reported to be as high as 25%.[6] It is estimated that more than a million people with diabetes require limb amputation each year, suggesting that one major amputation is performed worldwide every 30 seconds.[7]

AIMS AND OBJECTIVES:

To identify the presence of undetected IHD in patients with diabetic foot based on the clinical history and relevant investigations and to evaluate the conventional risk factors for CVD in diabetic foot patients.

MATERIALS AND METHODS:

This is a prospective observational clinical study done between March 2016 and February 2017 in which 150 diabetic foot patients admitted to the diabetic ward at PESIMSR Kuppam were randomly selected using the case records as the primary source of data. A detailed history was taken regarding the duration of diabetes, family history, medication history, history of CVD risk factors like hypertension, smoking, obesity and dyslipidemia. All patients underwent a complete general and systemic examination. All patients were investigated with ECG and 2D Echocardiogram.

Inclusion Criteria: Patients with Type 2 DM with diabetic foot and unrecognised IHD.

Exclusion Criteria: All Type 2 DM patients without diabetic foot and those patients with documented IHD.

RESULTS:

Table 1: Gender distribution of patients studied

GENDER	NUMBER OF PATIENTS	%
MALE	99	66
FEMALE	51	34
TOTAL	150	100

Table 2: Age distribution of patients studied

Age in Years	No. Of Patients		Total
	Male	Female	
31-40	2	1	3 (2%)
41-50	23	14	37 (24.66%)
51-60	31	18	49 (32.66%)
61-70	25	13	38 (25.33%)
71-80	15	4	19 (12.66%)
>80	3	1	4 (2.66%)
Total	99	51	150 (100%)
Mean Age	59.76	58	59.66

Table 3: Duration of Diabetes mellitus

Duration in Year	No. Of Patients		Total
	Males	Females	
<1	4	2	6 (4%)
1-5	31	19	50 (33.33%)
6-10	33	14	47 (31.33%)
>10	31	16	47 (31.33%)
Total	99	51	150 (100%)

Table 4: Duration of Diabetic Foot

Duration in days	No. Of Patients		Total
	Male	Female	
1-7	2	5	7 (4.66%)
8-14	6	4	10 (6.66%)
15-21	21	6	27 (18%)

21-30	18	7	25 (16.66%)
>30	52	29	81 (54%)

Table 5: Symptoms in patients

Symptoms	No. Of Patients		Total
	Male	Female	
Exertional Angina	19	13	32 (21.33%)
Exertional Dyspnea	41	28	69 (46%)
Fatigue	80	40	120 (80%)
Faintness	2	4	6 (4%)
Palpitations	4	3	7 (4.66%)
Angina at rest	5	3	8 (5.33%)
Claudication	37	22	59 (39.33%)

Table 6: Risk factors of CVD in Diabetic Foot Patients

Risk Factors	No. Of Patients		Total
	Male	Female	
Nil	5	9	14 (9.33%)
Smoking	55	0	55 (36.66%)
Hypertension	44	28	72 (48%)
Dyslipidemia	31	27	58 (38.66%)
Obesity	21	15	36 (24%)
Atherogenic diet	32	12	44 (29.33%)
Age >50 years	74	36	110 (73.33%)
All	17	1	18 (12%)

Table7: ECG findings in Diabetic Foot patients

ECG	No. Of Patients		Total
	Males	Females	
Normal	40	19	59(39.33%)
LVH	27	11	38(25.33%)
ST Elevations	0	0	0
ST DEPRESSION IN 1-Avl,V5-V6 with T inversions	20	12	32(21.33%)
ST Depression in 11,111,aVF with T inversions	14	5	19(12.66%)
LBBB New Onset	2	0	2(1.33%)

Table 8: 2D Echo findings in Diabetic foot patients

2D Echo findings	No. Of Patients		Total(n=150)
	Males(n=99)	Females(n=51)	
Normal	59(59.59%)	36(70%)	95(63.33%)
RWMA	35(35.35%)	18(35.29%)	53(35.32%)
LV Dysfunction	28(28.28%)	13(25.49%)	41(27.33%)

In our present study, mean age of the patients was found to be 59.66 years and 32.66% of patients belonged to the age group of 51-60 years. 66% of the studied patients were male and 34% were female. The mean duration of diabetes was found to be 8.34 years. The majority (33.33%) of the study population had diabetes in the range of 1-5 years. 54% of the study population had diabetic foot for more than a month. The most common symptom was fatigue (80%) followed by exertional dyspnea (46%).

The most common risk factor for CVD found in our present study was age (more than 50 years) which accounted for 73% of the study population followed by hypertension which was present in 48%. Dislipidemia was found in 38.66%. 36.66% of the population were active smokers. Obesity was the least common risk factor in our present study (24%). 12% of the study population had all the risk factors.

Abnormal ECG findings were noted in 35.32% of patients out of which 21.33% had ischaemic changes in lateral leads, 12.66% had ischaemic changes in inferior leads and 1.33% had new onset LBBB. 35.32% had regional wall motion abnormality on 2D echocardiogram.

DISCUSSION:

IHD is the major cause of morbidity and mortality for individuals with diabetes. Diabetic Foot is associated with adverse CVD risk factor profiles. The risk factors that favour the development of peripheral artery disease and inturn diabetic foot are similar to those that promote the development of coronary atherosclerosis. Studies like 4S and Steno 2 trial have shown that there is a decrease in ischemic events when all modifiable risk factors are addressed.[8,9]

Table 9: Comparison of the mean duration of diabetes

STUDY	MEAN DURATION OF DIABETES(years)
Pham et al.[10] 2000	16±12
Davis et al.[10] 2006	7±5
Pinto et al.[10] 2008	14
Iversen et al.[10] 2009	10
Brownrigg et al.[10] 2012	12.7
JUDE et al. [11] 2001	12.95±10.8
LEIBSON et al. [12] 2004	12.2
LI et al.[13,14,15] 2006	7±6.75
PRESENT STUDY	8.34

Table 10: Comparison of the risk factors

STUDIES	SMOKING %	HYPERTENSION%	DYSLIPIDEMIA%
BOYKO et al.[10] 1996	**25.7**	NOT STUDIED	NOT STUDIED
RAMSEY et al.[10] 1999	NOT STUDIED	**56.4**	NOT STUDIED
DAVIS et al.[10] 2006	**26.7**	**87.5**	NOT STUDIED
PINTO et al.[10] 2008	**29.4**	**60.3**	NOT STUDIED
IVERSEN et al.[10] 2009	**11.1**	**57.4**	NOT STUDIED
JUNRUNGSEE et al.[10] 2011	**31.9**	**55.3**	**63.8**
BROWNRIGG et al.[10] 2012	**20.6**	**57.6**	**47.6**
JUDE et al.[11] 2001	**81**	**63.8**	**24.4**
LEIBSON et al.[12] 2004	**60.0**	**41.0**	NOT STUDIED
PRESENT STUDY	**36.66**	**48.0**	**38.66**

Table 11: Comparison of IHD in diabetic foot patients in various Studies

STUDIES	IHD %
RAMSEY et al.[10] 1999	**7.0**
DAVIS et al.[10] 2006	**43.8**
PINTO et al.[10] 2008	**32.3**
SOHAN et al.[10] 2009	**38.4**
IVERSEN et al.[10] 2009	**15.3**
JUNRUNGSEE et al.[10]2011	**31.9**
BROWNRIGG et al.[10] 2012	**31.4**
PRESENT STUDY	**35.32**

CONCLUSION:

The patients with diabetic foot have a higher risk of developing IHD. These findings are in concurrence with data from other studies where diabetic foot has been strongly associated with IHD. There is a need to promote screening for diabetic foot patients to identify risk of IHD. Each patient with diabetic foot undergoing surgery should have a pre-anaesthetic cardiac evaluation to identify undetected IHD to prevent unprecedented perioperative cardiac complications. There is also a need to create public awareness on diabetic foot and its possible increased adverse cardiovascular outcomes. This will aid in prevention, early diagnosis and treatment of IHD and will go a long way in not only reducing the cost of medical care, but also in improving morbidity and mortality.

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