Original Article

A study of prevalence and clinical profile of peripheral vascular disease in patients with diabetic foot infections

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Abstract

Introduction: Diabetes is a common affliction in all parts of the world. Its incidence is rising in developing countries like India with high incidence in the developed world. Foot infections are the most common problems in persons with diabetes. **Aims and Objectives:** To Study of Prevalence and Clinical profile of Peripheral Vascular Disease in Patients with Diabetic Foot infections. **Methodology:** This was a prospective analytical study**,** All diabetic patients admitted with a diagnosis of foot infection in the Department of General Surgery, Yenepoya Medical College Hospital between December 2013 to October 2015.Patients with diabetic foot infections aged above 18 yrs**.** Patients who have undergone arterial Doppler study included into study while Patients with previous history of peripheral arterial disease or previous surgeries for arterial occlusive disease, Patients with necrotizing fasciitis and severe sepsis, previous amputations excluded from the study. Statistical tests were carried out using S.P.S.S software. **Result:** The youngest patient was a 26 yr old female and oldest was male aged 80 years Most of the patients were in the age group 41-60 years**.** There were 65 males and 34 females in the study group of which 52 patients had PVD, 16 (30.8%) were females and 36 (69.2%) were males.PVD is more among patients who presented with ulcers 22 of 45 patients and gangrene 23 of 28 patients as compared to abscess and cellulitis. Majority of patients presented with ulcers (46%) or gangrene (28%) of toes or forefoot and only 20% were cases of cellulitis which was managed with conservatively 46% , 28%, 20%, 6%, ulcer, gangrene, cellulitis, abscess. **Conclusion:** The older the individual have more the chances of having peripheral vascular Compromise also a tobacco user and patient presenting with worse clinical findings is more likely to have PVD. Majority of patients presented with ulcers, gangrene, of toes or forefoot and less number of patients were having cellulitis.
Key Words: Peripheral Vascular Disease, Diabetic Foot infections, Clinical profile of -Peripheral Vascular Disease

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INTRODUCTION

Diabetes is a common affliction in all parts of the world. Its incidence is rising in developing countries like India with high incidence in the developed world. Foot infections are the most common problems in persons with diabetes. These individuals are predisposed to foot infections because of a compromised vascular supply secondary to diabetes. Diabetic foot infections are one of the most common manifestations of the disease necessitating hospital admissions. Foot infections are a common and serious problem in persons with diabetes. Diabetic foot infections (DFIs) typically begin in a wound, most often a neuropathic ulceration. While all wounds are colonized with microorganisms, the presence of infection is defined by ≥2 classic findings of inflammation or purulence Diabetic foot infection is the commonest cause of hospital admission for diabetic patients. According to available medical reports, over 10% of diabetic patients will develop foot ulcers during their lifetimes.[1] More than 50% of lower extremity amputations occur in diabetics.[2] On an average, diabetic patients with lower extremity infections are found to be in their fifth decade, have had diabetes for average of 18 years and more often on insulin for glycaemia control.

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The average hospital stay for a diabetic with foot infections in the United States was found to be about a month with high cost to the individual and the society.[3]The thickened epidermis and dermis situated on loculated fatty tissue of the plantar foot pad act as cushions for the foot ,absorbing the impact forces and protecting the deeper structures. Factors that alter normal transmission of forces or loss of sensation as seen in diabetic feet potentiate the risk of local injury.[4]Peripheral arterial disease (PAD) is a contributing factor to the development of foot ulcers in up to 50% of cases.[5,6] It commonly affects the tibial and peroneal arteries of the calf. Endothelial cell dysfunction and smooth cell abnormalities develop in peripheral arteries as a consequence of the persistent hyperglycemic state.[7]There is a resultant decrease in endothelium-derived vasodilators leading to constriction. Further, the hyperglycemia in diabetes is associated with an increase in thromboxane A2, a vasoconstrictor and platelet aggregation agonist, which leads to an increased risk for plasma hypercoagulability.[8] There is also the potential for alterations in the vascular extracellular matrix leading to stenosis of the arterial lumen.[6]Moreover, smoking, hypertension, and hyperlipidemia are other factors that are common in diabetic patients and contribute to the development of PAD.[9] Cumulatively, this leads to occlusive arterial disease that results in ischemia in the lower extremity and an increased risk of ulceration in diabetic patients Ischemia and neuropathy are two major predisposing factors for the development of diabetic foot infections.[10]The development of peripheral vascular disease has been documented in more than 50% of diabetics having disease for 10 to 15 years in some studies[11]. Penn I *et al* found the prevalence to be 22% with weak or absent ankle pulses in 13% of subjects. Not only is atherosclerotic disease manifest at an earlier age in diabetics, but it tends to involve distal and smaller vessels[12]. Multi segmental occlusive pattern occurs more commonly below the popliteal region in diabetics than in age matched controls, the metatarsal arteries are occluded in up to 60% of diabetics. In contrast the incidence of aorto iliac disease tends to be similar[13].Specific capillary and arteriolar lesions associated with diabetes do not exist. Early diagnosis and prompt definitive treatment may be delayed due to lack of foot sensation, patient's poor eyesight, poor judgment by physician. Breeches in the skin integrity resulting from a puncture, laceration, or abrasion can be the initiating factor in the development of foot infection, foot infections in diabetics commonly originate at the nail plates or the interdigital web spaces. Bose k *et al* found 60% foot infections started in web spaces, 30% in nails and 10% were secondary to punctures.[14]

METHODOLOGY

This was a prospective analytical study**,** All diabetic patients admitted with a diagnosis of foot infection in the Department of General Surgery, Yenepoya Medical College Hospital between December 2013 to October 2015.Patients with diabetic foot infections aged above 18 yrs**.** Patients who have undergone arterial Doppler study included into study while Patients with previous history of peripheral arterial disease or previous surgeries for arterial occlusive disease, Patients with necrotizing fasciitis and severe sepsis, previous amputations excluded from the study. Statistical tests were carried out using S.P.S.S software.

RESULT

Table 1: Distribution of PVD Patents with respect to Age

Age	PVD Absent	PVD Present	Total
21-40	2(22%)	7(78%)	9(100%)
41-60	33(57%)	25(43%)	58(100%)
>60	12(37.5%)	20(62.5%)	32(100%)

The youngest patient was a 26 yr old female and oldest was male aged 80 years Most of the patients were in the age group 41-60 years**.**

Table 2: Distribution of PVD Patents with respect to Sex

Sex	PVD		Total
	Absent	Present	
Female	18(38.3%)	16(30.8%)	34(34.3%)
Male	29(61.7%)	36(69.2%)	65(65.7%)
Total	**47**	**52**	**99**

There were 65 males and 34 females in the study group of which 52 patients had PVD, 16 (30.8%) were females and 36 (69.2%) were males.

Table 3: Distribution of PVD Patents with respect to Clinical Presentation

Clinical Presentation	PVD		Total
	Absent	Present	
Ulcer	23(51%)	22(49%)	45
Gangrene	5(18%)	23(82%)	28
Cellulitis	14(70%)	6(30%)	20
Abscess	5(83%)	1(17%)	6
Total	**47**	**52**	**99**

PVD is more among patients who presented with ulcers 22 of 45 patients and gangrene 23 of 28 patients as compared to abscess and cellulitis. majority of patients presented with ulcers (46%) or gangrene (28%) of toes or forefoot and only 20% were cases of cellulitis which was managed with conservatively 46% , 28%, 20%, 6%, Ulcer, Gangrene, Cellulitis, Abscess.

DISCUSSION

The presence of PVD was found to be 53% out of 99 patients as diagnosed by arterial Doppler study. The

prevalence in males was found to be 69% while in females was 31 %. This is found to be statistically significant since 16 of 34 females and 36 of 65 males had PVD. Also 12 patients with impalpable peripheral pulses where not included in the study and had they been included then the rate can be assumed to have been even higher. Most of the individuals in this study were in the age group of 41 – 60 years accounting for 58% of subjects .The prevalence of PVD was found to linearly increase with age, with majority of the patients in age group 41-60. 25 out of 58 patients in age group 41-60 years had PVD, however 20 of 32 patients more than 60 years had PVD which indicates its higher prevalence in patients above 60 years. Although this seems a higher compared to existing studies it correlates with accepted data that progression with age is significant and indeed faster in diabetics.[2, 15, 16] This can also be explained by the fact that age related atherosclerotic changes independent of diabetic status worsen with advancing age.[17]As also seen from this data most patients were diagnosed to be diabetics for more than 5 years prior to admission, some with age more than 60yrs.The problem of late diagnosis of diabetic status seen in our region could explain the very high prevalence of PVD in older age groups , as by the time the patients presents to a tertiary care centre with complications of diabetes, the pathophysiological changes in the foot including vascular compromise is at an advanced level. In our study we have observed that, the youngest patient was a 26 yr old female and oldest was male aged 80 years Most of the patients were in the age group 41-60 years. There were 65 males and 34 females in the study group of which 52 patients had PVD, 16 (30.8%) were females and 36 (69.2%) were males. PVD is more among patients who presented with ulcers 22 of 45 patients and gangrene 23 of 28 patients as compared to abscess and cellulitis. Majority of patients presented with ulcers (46%) or gangrene (28%) of toes or forefoot and only 20% were cases of cellulitis which was managed with conservatively 46%, 28%, 20%, and 6%, ulcer, gangrene, cellulitis, and abscess.

CONCLUSION

The older the individual the more the chances of having peripheral vascular compromise. Also a tobacco user and patient presenting with worse clinical findings is more likely to have PVD. Majority of patients presented with ulcers, gangrene, of toes or forefoot and small number of patients were having cellulitis.

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