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A CLINICAL STUDY OF DIABETIC FOOT AND ITS ASSOCIATION WITH PERIPHERAL VASCULAR OCCLUSIVE DISEASE

Cardiology

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ABSTRACT

Background: Diabetes mellitus is characterized by hyperglycemia over a prolonged period due to pathology in either the insulin secretion, insulin action, or both. Worldwide, as of the recent 2018 data collected from the World Health Organization (WHO) around 422 million adults have diabetes mellitus which is estimated to almost double by 2030 which is composed of mainly type 2 diabetes (85-90% of all cases). Early detection of Peripheral arterial disease in asymptomatic diabetic patients reduces the morbidity and mortality. Hence the need for early detection and diagnosis of peripheral arterial disease and evaluation in asymptomatic diabetic patients by formulating effective protocols to reduce the morbidity, mortality involved in the diabetic patients.

Methods: Patients admitted and seen in out-patient department for diabetic foot ulcers between June 2017 and January 2018 in Department of Cardiothoracic and Vascular surgery, Andhra Medical College and King George Hospital, Visakhapatnam, India were taken for study.

Results: 200 cases satisfying the inclusion criteria were taken up for the study from June 2017 and January 2018. Out of 200 patients, 98 patients presented with ulcer in foot, 34 presented with gangrene of toe or foot. After clinical examination it was found that 33 patients had associated neuropathy, 19 patients had ABI less than 0.3 and 26 patients had ABI in between 0.4 and 0.9. Patients with ulcer and gangrene foot and with ABI less than 0.9 were admitted and evaluated with doppler study of lower limbs and Computed Tomography angiogram of both lower limb arterial system. After getting proper consent, appropriate procedure was done for each patient. Wound debridement was done by General surgery department in 33 cases, toe disarticulation in 17, fore foot amputations in 7, Below knee amputation in 6, above knee amputation in 4, Arterial embolectomies for Acute Limb ischemia in 23, arterial thrombolysis in 7 patients with injection heparin. 5 patients underwent revascularization procedures.

Conclusions: The prevalence of peripheral artery disease in patients with diabetic foot is significantly high i.e. 38 % as per this study. Males have a higher predilection for developing peripheral vascular disease than females. The average age of presentation of PAD in diabetics is 40 -60 years. The most common level of arterial occlusion in PAD associated diabetic foot is femoro-popliteal segment followed by distal tibial segments followed by aorto iliac disease.

KEYWORDS

INTRODUCTION:

Peripheral vascular occlusice disease is one of the most common and dreadful complication of Diabetes mellitus. The most common symptom of PVOD is intermittent claudication usually relieved by rest, followed by tissue loss or gangrene and rest pain collectively termed as Critical Limb Ischemia. PVOD is the major risk factor for lower extremity amputation and is associated risk factor for coronary artery disease and cerebrovascular disease. Special emphasis on ankle brachial index along with screening of the patients of PVOD in view of longer duration of asymptomatic period. The risk factors associated with PVOD in diabetes patients are old age, poor glycemic index, Hypertension, cigarette smoking, hypercholesterolemia [1]. Framingham heart study revealed that 20% of symptomatic patients with PAD had diabetes but this probably underestimates the prevalence as most people with PAD are asymptomatic [2].

Additionally, PAD causes significant long-term disability in diabetic patients [3,4]. The treatment of patients with PAD can therefore be expensive, owing to need for a variety of diagnostic tests, therapeutic procedures, and hospitalizations [5].

Age, duration of diabetes, and peripheral neuropathy are associated with an increased risk of PAD in patients with pre-existing DM [6,7]. Using ABI to identify PAD, the prevalence of PAD in people with DM over 40 years of age has been estimated to be 20% [8]. This prevalence increases to 29% in patients with DM over 50 years of age[9]. The severity and duration of DM are important predictors of both the incidence and the extent of PAD, as observed in United Kingdom Prospective Diabetes Study, where each 1% increase in glycosylated hemoglobin was correlated with a 28% increase in incidence of PAD, and higher rates of death, microvascular complications and major amputation[10,11]. This correlation is particularly strong in men with hypertension or active tobacco use. Patients with PAD who have DM also tend to stay longer in hospital, incur greater costs, and account for greater use of hospital resources compared to patients with PAD alone[12].

METHODS :

Patients admitted and seen in out-patient department for diabetic foot ulcers between June 2017 and January 2018 in Department of Cardiothoracic and Vascular surgery, Andhra Medical College and King George Hospital, Visakhapatnam, India were taken for study.

Inclusion criteria

- All Diabetic patients with foot ulceration and gangrene toe
- Diabetics with previous foot ulceration and amputations
- Diabetics with callus over foot
- Diabetics with foot deformities
- Diabetics with burning sensation/pins and needles/ loss of sensation in foot
- Diabetics with intermittent claudication / rest pain in feet

Exclusion criteria

- Non-diabetic ulcers
- Diabetic ulcers with co-existing varicose veins /DVT
- Malignant ulcers
- Diabetics on corticosteroids/ immunosuppresants
- Diabetics with previous amputations for malignancy/acute trauma
- Diabetics with lymphoedema foot
- Diabetics with osteomyelitis foot.

Duration and treatment of diabetes, family history of diabetes, previous history of surgery (amputations/disarticulations) were also recorded.

Physical examination was done to evaluate the site and size of ulcer, presence or absence of discharge; peripheral pulses; touch perception, pain and temperature; vibration perception and joint mobility. X-ray foot, doppler and ankle brachial index (ABI) were taken. Follow up was done with physical examination, doppler and ABI once in every month for a minimum of 2 months.

RESULTS:

Patients admitted and seen in out-patient department for diabetic foot

ulcers between June 2017 and January 2018 in Department of Cardiothoracic and Vascular surgery, Andhra Medical College and King George Hospital, Visakhapatnam, India were studied and showed the following results.

Our study demonstrated a prevalence of 39% i.e., 78 patients out of 200 patients had PAOD associated with diabetic foot.

Prevalence of PAD according to the duration of diabetes is maximum between 1-10 years with a prevalence of 15% (30 cases out of 200), closely followed with a 24 % prevalence (48 cases out of 200) in the duration of diabetes between 11-20 years.

Our study reported a higher prevalence of PAD in males with diabetic foot with an incidence of 32% compared to an incidence of 18% in females.

Our study reported that around 17 patients (8.5%) with PAD and diabetic foot had occlusion in the femoropopliteal segment followed by tibial occlusion noted in 8 patients (4%). Amputations and disarticulations have higher frequency (39.2%) than revascularisations (18.28%) for PAD associated diabetic foot.

Out of 200 patients, 98 patients presented with ulcer in foot, 34 presented with gangrene of toe or foot. After clinical examination it was found that 33 patients had associated neuropathy, 19 patients had ABI less than 0.3 and 26 patients had ABI in between 0.4 and 0.9. Patients with ulcer and gangrene foot and with ABI less than 0.9 were admitted and evaluated with doppler study of lower limbs and Computed Tomography angiogram of both lower limb arterial system. After getting proper consent, appropriate procedure was done for each patient. Wound debridement was done by General surgery department in 33 cases, toe disarticulation in 17, fore foot amputations in 7, Below knee amputation in 6, above knee amputation in 4, Arterial embolectomies for Acute Limb ischemia in 23, arterial thrombolysis in 7 patients with injection heparin. 5 patients underwent revascularization procedures.

Discussion:

Diabetic foot related problems are increasing in India owing to the high prevalence of diabetes mellitus in Indian population. With a prevalence of 65.1 million, which is more than 7.1% of the adult population, India holds the second place in the world. It is difficult to estimate the prevelance of PAOD in patients with diabetes because of varied presentation from tingling and numbness to peripheral neuropathy to intermittent claudication pain, diabetic foot ulcers, diabetic foot gangrene. The prevalence of PAD increases with advancing age and is 4.2% below 50 years of age and rises to 58% in those above 80 years of age.[9] Similarly it also increases with increased duration of diabetes, 15% at 10 years and 24% after 20 years [10]. Our study has given a prevalence of 39% when compared to Marinelli et al (33%) and Migdalis et al (44%) which have given a prevalence of 33% and 44% respectively. i.e., 78 patients out of 200 patients had PAD associated with diabetic foot. On analyzing the prevalence of PAD in diabetic foot patients according to sex, from our study it is higher in males (32%) than in females (18%). While comparing with other studies, the result of our study is comparable to rest with higher incidence in males than in females[12]. This also correlates with the existing data that male sex has a higher prevalence of PAD in diabetic foot. The amputations are higher (49.12 %) than revascularizations (12.28 %) in our institution which is similar to Zagreb study. When compared to the study by Zagreb et al, the percentages of amputations are higher [12].

Conclusion:

The prevelance of the PVOD in diabetes mellitus patients is significantly high i.e. 39%. Hence the need for early detection and diagnosis of peripheral arterial disease and evaluation in asymptomatic diabetic patients by formulating effective protocols to reduce the morbidity, mortality involved in the diabetic patients. Higher predilection for males for developing peripheral vascular occlusive disease than female counterparts. Older patients have higher chances of peripheral vascular compromise. The average age of presentation of PAOD in diabetics is 40-60 years. The most common level of occlusion of arterial system in patients with PAOD is femoro-popliteal system followed by tibial arterial system. The outcome of diabetic foot ulcers with significant PAOD disease have higher amputation rates. PAOD is a systemic marker of Vascular diseases like Myocaridal infarction, stroke and death especially in the lower socioeconomic status people. Formulating effective protocols for the evaluating the patients with PAOD significantly reduces the morbidity and mortality associated with PAOD.

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