

PREIPHERAL VASCULAR DISEASE (PVD) IN DIABETICS: INDIAN SCENARIO

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Although coronary and peripheral arterial disease are macrovascular complications of diabetes, the clinical manifestations of peripheral vascular disease occur almost a decade later than coronary artery disease. Majority of patients with peripheral vascular disease have associated coronary artery disease, however the opposite isn't true. Although atherosclerosis in patients with diabetes is similar to that seen in non-diabetic patients[1] it is generalised, occurs prematurely and progresses at an accelerated pace. Peripheral vascular disease in diabetics differs from that in nondiabetics in many aspects (Table 1). In non diabetics the sites of occlusion are usually the infra-renal aorta, iliac and superficial femoral arteries, with sparing of distal vessels. Whereas, in diabetics occlusive lesions occur in crural arteries, namely tibials and peroneals, with sparing of the arteries of the foot[2,3]. This characteristic vascular involvement in diabetics had made it possible to carry out vascular reconstruction, where proximal vessel like popliteal is anastomosed to foot vessels like dorsalis pedis thus bypassing the obstructed tibial and peroneal vessels., This pedal artery bypass technique has lead to a significant decline in the incidence of all levels of limb amputations in Western countries[4].

Table 1

Clinical Differences in Diabetic & Non Diabetic Peripheral Vascular Disease

	Diabetic	Non Diabetic
Clinical	More common Younger age More rapid	Less common Older age Less rapid
Male/Female	M > F	M >> F
Occlusion	Multisegmental	Single segment
Vessels adjacent to occlusion	Involved	Not involved
Collateral vessels	Involved	Usually normal
Lower extremities	Both	Unilateral
Vessels involved	Proximal & distal	Proximal

Prevalence:

The overall prevalence of PVD among Indians is considerably low as compared to the Western patients. Mohan et al have reported the prevalence of PVD in South Indian diabetics to be 3.9%[5]; at our centre it is 3.79%. in Western series the prevalence ranges between 22 – 45% [6, 7, 8]. The prevalence of PVD in diabetics increases with age increasing from 3.2% in those below 50 yrs. of age to 33% in those above 80 yrs. of age[9]. The prevalence of PVD in diabetics also increases with the duration of diabetes from 15% to 45% at 10 to 20 years respectively after the diagnosis of diabetes[10]. In India, the number of diabetic patients above the age of 80 years or with duration of diabetes more than 30 years is extremely low, thus explaining the low prevalence of PVD in diabetics. In the coming years with better disease care, longevity of our diabetics would significantly increase and it will not be surprising to see an increasing prevalence of PVD in Indian diabetics.

RISK FACTORS:

Risk factors for the development of diabetic peripheral vascular disease include genetic predisposition, age, duration of diabetes, smoking, hypertension (systolic or diastolic) , hypercholesterolaemia, hypertriglyceridaemia, hyperglycaemia, truncal obesity, hyperinsulinaemia, proteinuria, dialysis and drugs (eg. Iontrophic agents, beta blockers).

Of these risk factors, age, duration of diabetes, genetic predisposition and smoking are most important factors.

MANAGEMENT:

Exercise is undoubtedly the most effective conservative treatment for patients with intermittent claudication. The distance that can be walked before the claudication occurs, can be increased 2 to 3 times by regular walking[11].

Medical Management: Various drugs are used in the management of PVD, like pentoxifylline, aspirin and vasodilators. The major beneficial effects of pentoxifylline are because of its effect on red blood morphology. It makes red blood cells more flexible so that they can pass through a narrow blood vessel[12].

The drug does not work instantly and it may be several months before its effect is noted. Aspirin works by reducing red cell aggregation and suppressing fibrinogen synthesis[13,14]. The arteries in diabetics are sclerosed and have a very little vasospastic disease. In many cases dilation exists because of "autosympathectomy", due to autonomic neuropathy. In fact vasodilators can theoretically, worsen an ischaemic area by causing the "steal effect", in which the dilatation of the healthy vessels steals blood away from the sclerosed vessels[15].

Vascular Reconstruction : The ultimate treatment for PVD is vascular reconstruction by transluminal angioplasty, vascular stents, atherectomy and surgical bypass.

Amputation : In the diabetics, the diagnosis of PVD is invariably made at a very late stage when pregangrenous or gangrenous changes have become evident. The availability of diagnostic procedures like angiography and DSA are restricted to a few centres only. Similarly, peripheral vascular reconstruction procedures especially infrapopliteal bypass are not as well developed as coronary vascular reconstruction, obviously because the former is more difficult, time consuming and less awarding than the latter. Once gangrene sets in, the prognosis is not satisfactory. If wet gangrene is present, the aim of therapy is to convert it into dry by strict rest and control of infection. If the lesions dry up, autoamputation may occur. However, for advancing lesions major limb amputation is often required. The decision of above knee or below knee amputation is governed by the extent of the vascular lesion. Patients with advanced PVD invariably need above knee amputation unlike patients with neuropathic foot with infection who usually require below knee amputation. Diabetics pose special problems with stump especially in presence of PVD. Hence, surgeons have tended to perform above knee amputations. It heals better because of abundant muscle mass and better vascular supply than the below knee stump[16].

EARLY DIAGNOSIS

In routine clinical examination, palpation of peripheral pulses is extremely important. In every diabetic, the ankle brachial systolic index (ABI), should be measured at least once in a year. This is a simple bedside investigation and is quite informative. The ankle/brachial systolic index (ABI) is calculated by dividing the ankle systolic pressure by the brachial pressure. A hand held doppler

ultrasound probe positioned over posterior tibial or dorsalis pedis arteries is most convenient to detect the return of blood flow. Normally, the ABI > 0.9, in claudication, the ABI is 0.5 – 0.8[17] with absolute ankle pressure between 70 and 100 mmHg. In patients with rest pain ABI is usually < 0.30 with absolute pressure < 50 mmHg[18, 19].

Decreased compressibility of blood vessels due to medial calcification (Monckeberg's Sclerosis), results in falsely elevated systolic pressures. This should be suspected especially when an unusually high ABI > 1.15 is found [20]. Toe pressures can also be measured using a small cuff and is a better clue to the prognosis of primary healing of ischaemic ulcers in foot. The probability of foot ulcer healing, in diabetics, in relation to ABI, is 85%, if ABI is between 0.6 – 0.8, 4.5% if it is between 0.4 – 0.6 and nil if it is < 0.4 [18, 19, 21].

Other non-invasive diagnostic tests are pulse volume recording and transcutaneous pressure of oxygen measurement (TcpO₂) and invasive tests are digital subtraction angiography (DSA) and conventional angiography.

PROGNOSIS

The longterm prognosis of peripheral vascular disease in diabetics is poor because of generalised atherosclerosis, multisystem involvement, advancing age and associated significant coronary artery disease. The risk of major limb amputations, especially above knee and contralateral amputations is high. The mortality within 2 years, in subjects with major limb amputations is also very high.

Clinical examination of peripheral pulses, high index of suspicion and annual screening by measuring the ankle brachial pressure index are extremely important. It is essential to diagnose PVD at an earlier stage, so that an aggressive medical line of treatment and modification of risk factors can be initiated, and if indicated, vascular reconstruction (angioplasty or vascular bypass) can be offered. Irrespective whether PVD is present or not, every diabetic should be encouraged to quit smoking and exercise regularly. "Stop smoking and start walking", should be the carry home message for all the diabetic patients.

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