

PERIPHERAL VASCULAR DISEASE

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Cerebrovascular Disease and Coronary Artery Disease are closely related to Peripheral Arterial Disease (PAD). In each of these conditions, the arterial blood vessels become hardened, narrowed, or occluded, starving the brain, heart and limbs respectively of oxygen-bearing blood flow.

Peripheral Arterial Disease affects the extremities - arms, hands, fingers, legs, feet and toes. The arteries of the legs are most often affected. Peripheral arterial vessels are prone to hardening and damage by atherosclerosis, the deposition of a fatty, oatmeal-like substance on the internal walls of the arteries, particularly when the subject is overweight or leads an inactive lifestyle. This is compounded by high cholesterol levels, high blood pressure, diabetes mellitus types 1 and 2 and smoking. The atheromatous plaque narrows the vessels, reducing then occluding the blood flow.

Symptoms are often not felt or seen until the vessels are as much as 70% reduced in diameter. When symptoms are established and become severe enough, the reduced blood flow causes cramp-like intermittent claudication or ischaemic rest pain in the muscles of the lower limb. It also causes wounds that are slow to heal, ulcers, cold cyanotic skin and slow-growing toenails.

Those with PAD have a 1-in-5 chance of suffering a heart attack or stroke, or dying from a heart-related event within a year, according to Steg et al, 2007. PAD patients also suffer an increased risk of death from heart surgery or other interventional heart procedures (Zacharski et al, 2007). Experts believe that smoking is the most significant risk factor and that smoking even a very few cigarettes each day increases the risk of PAD by 2-25 times. It has been estimated that 90-95% of PAD sufferers smoke or have smoked. Type 2 Diabetes increases risk of developing PAD by 3-4 times. Hypertension doubles the risk.

Because atheroma damages the intima lining of the blood vessel leaving it rough and creating turbulence, there is a tendency for platelets to aggregate on the damaged area and form a blood clot. If a particle of atheromatous plaque or a blood clot in a vessel becomes detached it becomes an embolus which can travel until it encounters a narrower vessel. This may lodge in the lungs to cause a pulmonary embolism or the coronary arteries to cause a myocardial infarction (heart attack - death of heart muscle). An embolus lodging in a cerebral blood vessel will cause a stroke - death of an area of brain tissue. Atheroma or blood clot in an artery may shift to a narrower artery to occlude that area of tissue that the artery was feeding, resulting in local ischemia (no blood supply), and may precipitate gangrene in that area.

Peripheral Vascular Disease (PVD) is the wider group of pathologies that encompasses venous and capillary vessel and tissue perfusion disorders. Since the affected foot is vulnerable to neuropathic wounding, slow healing and ulceration, there is need to defend the foot against injury by weight redistribution where necessary and by carefully placed protective dressings and padding. The practitioner must fully appreciate the significance of peripheral vascular disease. Recognition of the signs and symptoms is essential, as is regular monitoring and recording of the neurological and vascular status. Where there is concern, referral should be swiftly made. PAD/PVD is treated by lifestyle change, exercise and drugs to dilate vessels and help blood flow in greater volume, and drugs to make blood less 'sticky'.

Functional Peripheral Vascular Disease occurs in Raynauds phenomenon, some hereditary conditions in which the arteries contract uncontrollably, or where control of autonomic nerves is compromised by disease or trauma.

References:

Steg PH, Bhatt DL, Wilson PWF, D'Agostino R, Ohman EM, Rother J. One-year cardiovascular event rates in outpatients with atherothrombosis. *JAMA*. 2007 Mar 21 2007;297(11):1197-1206

Zacharski LR, Chow BK, Howes PS, Shamayeva G, Baron JA, Dalman RL, et al. Reduction of iron stores and cardiovascular outcomes in patients with peripheral arterial disease: a randomised controlled trial. *JAMA*. 2007 Feb 14;297(6):603-10

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The questions on this sheet are based upon the above-named paper. Answers should be submitted on A4 paper and should be of sufficient length to demonstrate full understanding of the topic. Single word answers are not permissible. Try to answer in one or two short paragraphs, not more than ¼ page per answer.

- Q1. How does PAD differ from PVD?
- Q2. What other major conditions are related to peripheral vascular disease?
- Q3. Say what symptoms are felt by sufferers of PAD.
- Q4. How does smoking influence the risk of PAD?
- Q5. Discuss atherosclerosis.
- Q6. How does atheroma lead to the formation of a blood clot?
- Q7. How might a pulmonary embolus arise?
- Q8. What would be the local effect of occlusion of an artery?
- Q9. How is PAD/PVD treated?
- Q10. How does functional PVD differ from PAD/PVD?

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