

ABC of arterial and vascular disease

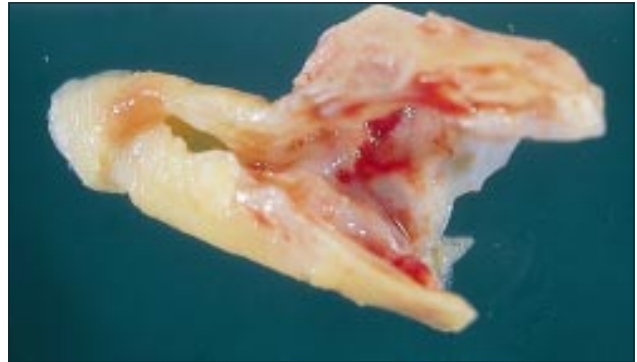
Secondary prevention of peripheral vascular disease

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Most patients with peripheral vascular disease may be reassured that, with respect to their legs, the condition usually runs a benign course. Less than one third of patients will require any surgical or radiological intervention and only 5% will have amputation. However, peripheral vascular disease is an independent predictor of increased risk of cardiovascular death. Half of patients presenting with peripheral vascular disease have symptoms of coronary artery disease or electrocardiographic abnormality, 90% have abnormalities on coronary angiography, and 40% have duplex evidence of carotid artery disease.

Symptomatic peripheral vascular disease carries at least a 30% risk of death within five years and almost 50% within 10 years, primarily due to myocardial infarction (60%) or stroke (12%). The risks are more than doubled in patients with severe disease (requiring surgery), but even asymptomatic patients (ankle brachial pressure index <0.9) have a twofold to fivefold increased risk of fatal or non-fatal cardiovascular events.

Although modification of risk factors has not been shown to prevent progression of peripheral vascular disease or loss of limbs, detection of disease mandates an aggressive approach to modifying risk factors in order to reduce the risk of fatal and non-fatal myocardial infarction and stroke. The approach to risk reduction in patients with peripheral vascular disease is based on extrapolation from results of large studies of patients with coronary artery disease.



Excised atherosclerotic plaque

All patients with peripheral vascular disease should have their risk factors for coronary artery disease assessed and, if appropriate, modified according to current guidelines

Modification of risk factors

Effective reduction of the risk of cardiovascular disease depends on coordinated and stringent modification of identifiable risk factors to prevent progression or new disease and the use of drugs to correct existing abnormalities. Stopping smoking, correction of hyperlipidaemia and hypertension, and optimisation of diabetic control are the cornerstones of secondary prevention of cardiovascular disease. Lesser benefits are also likely to accrue through weight reduction in obese patients, the institution of regular exercise, and dietary modification. Additional risk factors have been identified but are uncommon and their treatment is of unproved value.

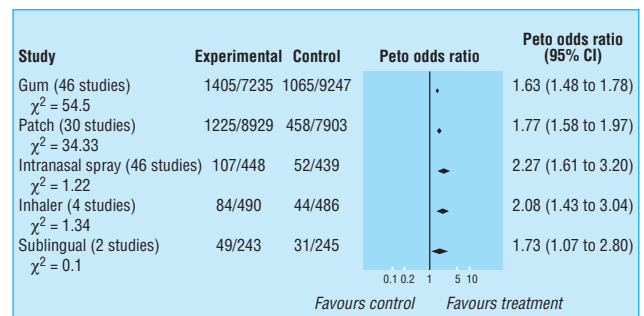
Cigarette smoking

Cigarette smoking contributes to a third of all deaths from coronary artery disease, doubles the risk of stroke, and is almost ubiquitous among patients with peripheral vascular disease. Synergy between smoking and other risk factors substantially increases the risks of cardiovascular death associated with these factors. After a myocardial infarction or stroke, the risk of recurrence is reduced by 50% in those who stop smoking (even among long term heavy smokers). Firm evidence also exists that stopping smoking increases walking distance by twofold to threefold in 85% of patients with intermittent claudication. Furthermore, in patients requiring surgical bypass, patency rates are better among those who successfully stop smoking.

Because as few as 4% of established smokers in the general population successfully stop smoking without assistance, measures to improve on this are essential in the secondary

Risk factors for cardiovascular disease

- Cigarette smoking
- Hyperlipidaemia
- Hypertension
- Diabetes mellitus
- Obesity
- Physical inactivity
- Diet high in saturated fats
- Hyperhomocysteinaemia
- Raised Lp(a) lipoprotein concentrations
- Hypercoagulable states



Summary of results of meta-analysis of nicotine gum, patch, intranasal spray, and sublingual tablet versus control for stopping smoking. Maximum follow up 6-12 months

prevention of cardiovascular disease. Modern smokers are clearly able to ignore punitive taxes and health warnings on packaging. They respond better to short (5-10 minutes) counselling from doctors, particularly if they are recovering from myocardial infarction (50% success rates). Rates of stopping smoking have been increased to 70% by the addition of telephone based counselling.

Surprisingly, only half of current smokers in one study had been encouraged to stop smoking, and fewer had been specifically counselled. Hospitals caring for patients with cardiovascular disease can help by offering support programmes. The use of nicotine replacement (chewing gum or patches), which is safe for patients with stable cardiovascular disease, is effective when combined with counselling.

Hyperlipidaemia

Epidemiological data clearly indicate an association between total cholesterol concentration and the risk of cardiovascular death. Dietary measures may reduce serum cholesterol and low density lipoprotein cholesterol concentrations by about 10%, but long term compliance is poor.

The use of statins (hydroxymethylglutaryl coenzyme A reductase inhibitors) to lower total and low density lipoprotein cholesterol concentrations by 30-40% reduces the risk of cardiovascular death by up to 42% among patients younger than 70 years with established disease. The only statins licensed for secondary prevention are simvastatin and pravastatin. Statins also reduce triglyceride concentrations. Patients with severe dyslipidaemia require specialised treatment.

Although there are no published studies examining the effect of lipid reduction in patients with isolated peripheral vascular disease, patients with peripheral disease are included as a subgroup in current large trials such as the heart protection study and the Medical Research Council bezafibrate in patients with lower extremity arterial disease (LEADER) trial study. Because of their high risk of ischaemic heart disease patients with peripheral vascular disease who have a serum cholesterol concentration over 5.5 mmol/l should be treated. All patients should therefore have their lipid concentrations measured even if they do not require specific treatment for their peripheral vascular disease.

Diabetes mellitus

The adverse effect of diabetes on serum lipid concentrations and the accelerated atheromatous process in diabetic patients act synergistically with the result that 80% die of cardiovascular disease. The atheromatous process particularly affects smaller more distal vessels, which makes surgical reconstruction more difficult or impossible. Diabetic patients are therefore more likely to require amputation than other patients with peripheral vascular disease. Modification of other risk factors is particularly important in this population, and the absolute benefits of reducing cholesterol concentration are likely to be greater in diabetic patients.

Poor glycaemic control in patients with type 2 diabetes is associated with an increased risk of cardiovascular complications, but the value of tighter control in preventing major cardiac events remains unclear. However, tight glycaemic control has beneficial effects on serum lipid concentrations, and the DIGAMI (diabetes insulin glucose after myocardial infarction) study showed that improved glycaemic control benefits patients after myocardial infarction. Careful attention to

Measures to encourage stopping smoking

- Public health education
- Taxes
- Smoke free hospitals and workplace
- Advice from doctor
- Nurse case managers
- Support groups and counselling
- Nicotine replacement therapy

Dietary modifications in hyperlipidaemia

- Reduce total fat intake (<30% of total energy)
- Reduce saturated fat intake (<7% of energy) and substitute with unsaturates
- Decrease dietary cholesterol intake (<200 mg/day)
- Increase fibre intake
- Moderate alcohol intake
- Aim for ideal body mass index (21-25)



Foot of diabetic patient with peripheral vascular disease

foot care is particularly important in diabetic patients with peripheral vascular disease.

Hypertension

The rationale for treating hypertension is largely based on its adverse effects on the heart and cerebrovascular system. Conventional guidelines such as those produced by the second working party of the British Hypertension Society are applicable to patients with peripheral vascular disease. Although it might seem preferable to use vasodilators in patients with peripheral vascular disease, β blockers are safe if they are required to obtain adequate blood pressure control.

Specific therapeutic measures

Diet

Observational studies suggest that diets rich in fish, fruit, vegetables, and fibre but low in saturated fat may protect against cardiovascular disease. Dietary supplementation with fish oil (which is rich in n-3 polyunsaturated fatty acids) has recently been shown to protect against cardiovascular death after myocardial infarction in a large trial, but other trials have failed to find such a benefit.

Vitamins and trace elements may also alter cardiovascular risk through other mechanisms. Antioxidants (vitamins E and C) help prevent the oxidation of low density lipoprotein cholesterol, which is a key step in the atherogenic process. Studies in patients with peripheral vascular disease have shown no specific benefits of antioxidants, but no large scale trials have been done.

Cardiovascular risk is independently related to plasma homocysteine concentrations, and it has been proposed that dietary supplementation with folic acid (which reduces homocysteine concentrations) may aid in the primary prevention of cardiovascular disease. However, no large prospective trials have been done. Severe hyperhomocysteinaemia ($> 10 \mu\text{mol/l}$), which may respond to vitamin supplementation, should be considered in patients with premature atherosclerotic disease without other risk factors. In the absence of strong evidence for routine vitamin supplementation, the most prudent approach is to recommend a balanced diet rich in fruit, vegetables, and whole grains.

Exercise

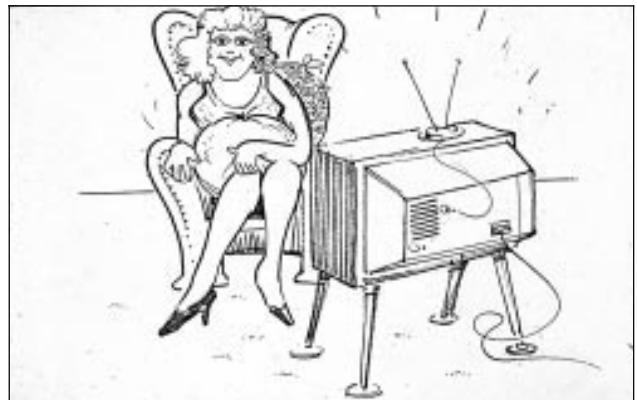
Physical rehabilitation programmes form an important part of reducing the risk of cardiovascular disease. If no supervised exercise programme is available, patients with intermittent claudication should be advised to walk for an hour a day, pausing to rest whenever claudication pain develops. This results in a 20-200% improvement in walking distance. Although it has been suggested that repeated ischaemia-reperfusion injury provoked by walking might have deleterious systemic effects, regular exercise actually reduces concentrations of serum inflammatory markers.

Antiplatelet therapy

Aspirin has been proved effective in the secondary prevention of cardiovascular events and death in patients with established atherosclerosis. Patients with peripheral vascular disease who do not have specific contraindications should receive 75 mg aspirin daily. The cost effectiveness of newer antiplatelet drugs remains to be determined.

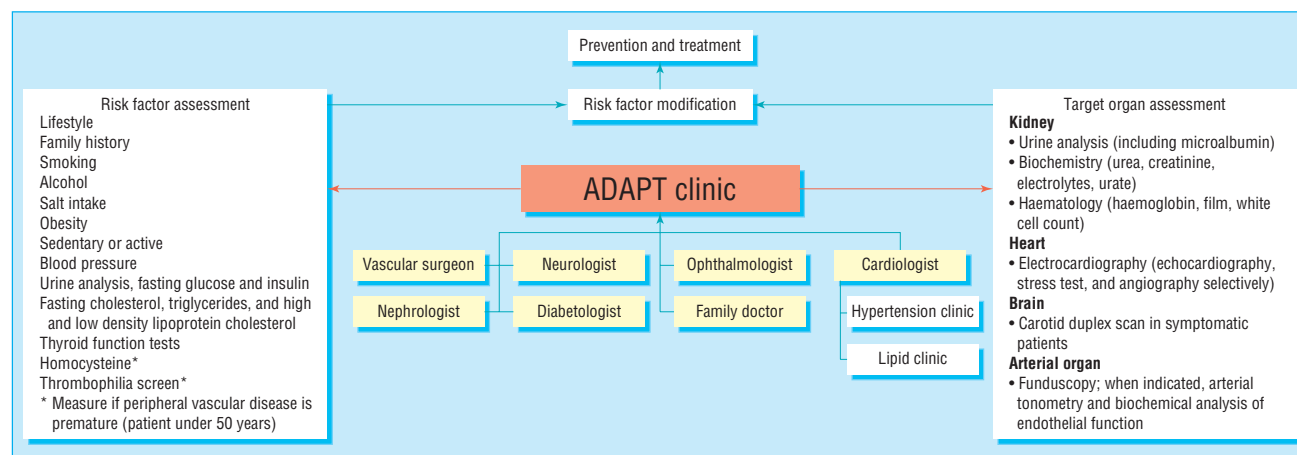


A balanced diet rich in fruit, vegetables, and fish may protect against cardiovascular disease



Further reading

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Arterial disease assessment, prevention, and treatment (ADAPT) clinics provide a common strategy for all patients with cardiovascular disease regardless of target organ affected

Conclusion

Although individual specialties tend to treat arterial lesions in isolation, this approach ignores the real risk to patients from the effects of the same disease on other vascular beds. Although simple measures (diet, exercise, stopping smoking) may be adequate for some, the management of many patients is complex. Patients at high risk of cardiovascular disease are best managed in an integrated fashion, and the concept of an arterial disease assessment, prevention, and treatment clinic to overcome the often haphazard management of risk factors seems the best way forward. Precise risk can be determined by using a computer program based on history, examination, and laboratory results and a specific programme of modification instituted and monitored. This holistic approach to the management of cardiovascular disease is the best way to minimise the risk of disease progression and premature death in patients with peripheral vascular disease.

The meta-analysis data on nicotine replacement therapy were taken from Silagy et al. *Cochrane library*. Issue 4. Oxford: Update Software, 1999.

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The ABC of arterial and venous disease is edited by Richard Donnelly, professor of vascular medicine, University of Nottingham and Southern Derbyshire Acute Hospitals NHS Trust (richard.donnelly@nottingham.ac.uk) and Nick J M London, professor of surgery, University of Leicester, Leicester (sms16@leicester.ac.uk). It will be published as a book later this year.

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The health benefits from collecting for Christian Aid

The World Health Organisation has defined health as a state of physical, mental, and social wellbeing, not merely the absence of disease. House to house collection of charity envelopes is an exercise that can be done in three health promoting rounds. The first round is the mental health promotion exercise. Find and locate the right roads and work out the shortest way to go round them. Should I do one side at a time or cross the road at strategic junctions? Get the rules clear. Who does the corner house? Is it me or the unknown person who may be collecting from the other road? Should gates be left open or shut and what do I do about those dogs? Then how do I respond to the little notice as I walk to a front door that says, "You are being photographed"? Should I brush my remaining hair and try to look suitably smart or cover my face and run past? The next brain teaser is searching for letter boxes, the variation in letter box locations is truly amazing. I discover that a doctor who I know professionally has no letter box; it is a good way of avoiding unwanted junk mail or bills.

Next on the list is physical exercise. This combines the walk round with door bell hunting, door hammering, and being able to beat a smart retreat when appropriate. It is also good exercise in being rejected, lectured at—"charity begins at home" or "if those lazy so and soes would do some work they would not need any charity"—or being welcomed by someone with a promptly opened door, a smile, and the envelope ready. With a bit of luck there is some weight lifting before the end as the collected

envelopes begin to weigh you down. A five pound note does not weigh too much but 2p coins and 20 large washers do.

Social exercise comes with the last round. It is part of the rules of the game that envelopes should be opened and counted by at least two people. A good neighbour comes across the road. Tea and talk as the piles of coins grow. Foreign coins and other extraneous objects go to one side. Counting pennies into the little plastic bags is a skill that should be easy, but even easier to get wrong. Counting done and the tea drunk. Was it worth it? Am I any healthier as a result? I hope so, but it has informed me of the great generosity of many people who live in this area; and what other form of exercise can be so beneficial for those nameless ones far away whose health may depend on the money raised?

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We welcome articles of up to 600 words on topics such as *A memorable patient, A paper that changed my practice, My most unfortunate mistake*, or any other piece conveying instruction, pathos, or humour. If possible the article should be supplied on a disk. Permission is needed from the patient or a relative if an identifiable patient is referred to. We also welcome contributions for "Endpieces," consisting of quotations of up to 80 words (but most are considerably shorter) from any source, ancient or modern, which have appealed to the reader.