

Treatment of coronary heart disease

Part 3: The management of coronary heart disease

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Summary

This penultimate article (Part III) reviews the management of risk factors in coronary heart disease as well as the treatment of angina.

As in all cases, the best treatment is prevention. To this end all 1st degree relatives of patients suffering with CHD must be screened for all the known risk factors, and any found must be actively treated.

Hyperlipidaemia

All patients in whom the stigmata of hyperlipidaemia is found must have their blood fats checked. These are:

- (i) a corneal arcus in patients under 40
- (ii) xanthelasmas - the yellow nodules found in the orbit
- (iii) xanthomata - these take two forms: as yellow warty lesions found around the knee and elbow, or as swellings in tendons on back of hand, soles of feet or Achilles tendon.

As hypercholesterolaemia is so prevalent in RSA, a fasting TC (total cholesterol), triglyceride (TG) and HDL should be done at least once in all white, Asiatic and coloured patients. The blood must be a fasting specimen only for TG, as the TC is not very much altered by starvation. An elevated TG is treated by a low calorie diet for mass reduction and a reduction in alcohol intake once it has been established that it is not secondary to other causes, viz. hypothyroidism, diabetes mellitus, nephrotic syndrome, pancreatitis, cirrhosis, contraceptive pills, myeloma or systemic lupus erythematosus.

Despite 'selectivity' beta-blockers should never be used in a known asthmatic

Elevation of TC is treated by a low cholesterol diet where the total cholesterol intake is reduced to 300 mg per day. This is achieved by banning saturated fats

KEYWORDS: Coronary disease; Risk factors; Angina pectoris; Surgery; Drug therapy

S Afr Fam Prac 1986; 7: 286-9

in any form. Red meat must be fat-free and taken in reduced quantities. Skimmed milk replaces whole milk, a soft margarine replaces butter and hard margarine, poly-unsaturated oil is used in cooking and eggs are restricted to three per week. Patients are encouraged to eat fish, chicken, etc.

The patient must be encouraged to stick to the diet and the appropriate blood fat is measured after a fortnight to show that the diet is effective. Regular monitoring of the fat is necessary to ensure that it comes down to below the "normal" level and stays

Calcium-blockers can be used safely together with beta-blockers

there, or so that other measures can be instituted when necessary.

Drug therapy: This is instituted if the diet is not effective in reducing the TC. A cholesterol absorbing resin is the most effective method of reducing the TC, but because of its taste and cost other medication is tried first.

A suggested stepwise approach to the problem is the following:

1. Diet and exercise and risk factor elimination
2. Diet and exercise and risk factor and Probucol or Benzafibrate
3. Diet and resin
4. Diet and Probucol or Benzafibrate and resin
5. Diet and resin and/or Probucol or Benzafibrate and Nicotinic acid
6. Invasive approach - ileal bypass surgery or plasmaphoresis.

Hypertension (HT)

HT is known as the silent killer because of its notorious lack of symptoms. The BP should be measured at least annually in all our patients and if found to be elevated must be actively treated.

Because of the beneficial effects of beta-blockers in preventing repeat infarctions, provided they are not contra-indicated, they should be first choice in patients at risk of CHD.

Smoking

As a reformed smoker I am a fanatic about cigarette smoking.

There is absolutely *no* value in cigarette smoking and *all* our patients must be urged to stop smoking and helped by all the means at our disposal.

It is annoying to see this self-destructive habit so prevalent among nurses and young doctors.

Once a patient receives bad news he often switches off and does not hear any advice that may follow

As we all know, nobody will stop a bad habit unless they are motivated to do so. Once our patients are motivated they must be helped by encouragement, nicotine chewing gum, tranquilisers or sleeping tablets where appropriate. When they succeed, they must be congratulated and encouraged.

Diabetes mellitus

This is another silent disease that is very often picked up on routine examination. Urine must be checked at least annually and when glycosuria is found, follow up with a fasting blood sugar and if necessary a repeat sugar test 2 hours after 75g of glucose.

Physical activity

Provided there are no contra-indications, patients should be encouraged to do their cardioprotective exercise on a regular basis. Some form of isotonic exercise which one enjoys and which becomes sufficiently strenuous to elevate the pulse rate to 180 minus the age and kept there for at least 20 minutes three times a week is all one needs.

Treatment of angina

The treatment of angina is different for chronic stable angina and for unstable angina.

CHRONIC STABLE ANGINA

The first thing to do is to eliminate any precipitating causes of angina, viz.:

- a) Anaemia
- b) Cigarette smoking
- c) Obesity
- d) Hyperthyroidism
- e) Hypertension

Because of the danger to life of young persons having angina, all patients under the age of 40 should be considered for angiography so that the

extent of the disease can be determined to establish whether surgery is indicated.

If stress testing facilities are easily available all patients under age 65 and 'young' people up to 70 years should undergo stress testing. If the test is strongly positive at a low level of exercise, angiography is indicated. If only mildly positive at a high level of exercise the patient is treated medically. There is additional benefit here in stress testing as the patient can be given a pulse rate up to which to exercise without causing angina clinically or above which changes that would reflect on an ECG, take place. We use 85% of the pulse rate at which ST changes are first noted as the exercise level.

The nature of the disease must be explained to the patient, bearing in mind the fact that once a patient receives bad news he then switches off and does not hear any advice or explanation that follows. The patient must be encouraged and told about the wide range of drugs available to us and the good outlook for stable angina. He must be encouraged to exercise up to the point of angina without actually getting angina. He must anticipate angina and prevent it by avoiding the excessive physical and emotional stresses that precipitate the pain.

He must work actively at reducing the risk factors. Even if he cannot reverse the arteriosclerosis he will prevent its progression and he is doing something active to fight his disease.

Drug therapy

Nitrates:

The short acting nitrates were traditionally the backbone of the treatment of angina. There are a variety of forms of administration of the nitrates, viz.:

- sublingual: glyceril trinitate (GTN) or isosorbide dinitrate (ISDN)
- transdermal: GTN or nitroglycerin (TNT).

Intravenous preparations which are not recommended for GP use:

Buccal spray not yet marketed in RSA.

The short acting sublingual tablets were the most commonly used medication in stable angina but they should now probably be used to supplement primary therapy with beta-blockers and calcium antagonist. The use of GTN must be explained in detail to the patient.

1. They must be used sublingually or chewed for rapid action.
2. Once the angina has settled the rest of the tablet can be spat out if headache is a problem.
3. The tablets must be fresh and carried in a dark brown bottle without cotton wool or padding in the bottle.
4. The tablets must be used prophylactically if a certain action, e.g. sexual intercourse, causes angina.
5. The tablets are cheap and effective and do not lose their effect if used in quantity and does not cause addiction.
6. Small quantities should be prescribed as once the

bottle seal is broken the tablets start deteriorating in only 8 weeks. If stored in the fridge in the brown bottle they can last for up to 6 months.

7. The tablets take 1 to 2 minutes to start to work and the effect lasts for up to 30 minutes.
8. If two tablets do not ease the 'angina' the doctor must be contacted.

The above also applies to ISDN but this has a longer onset and duration of action, acting for up to 2 hours. A fresh GTN tablet will increase the heart rate by about 15 beats per minute 10 minutes after it has been taken and an appreciable increase in heart rate persists for up to 20 minutes.

Nitrates cause venodilatation which pools blood in the peripheral veins, reducing venous return. This in turn reduces myocardial work and oxygen consumption and contributes to the prevention or relief of angina. Coronary arteries are also dilated but this contributes less than the systemic effects, except in those rare cases with mainly coronary artery spasm.

Longer acting nitrates

The longer acting vasodilators are not as effective as the sublingual nitrates and ISDN undergoes extensive and variable first-pass metabolism in the liver to the active drug isosorbide mononitrate (ISMN). However, ISDN in the oral form is very effective in a large number of patients with angina and is worth a trial. Headaches may be a problem, but they tend to disappear after a week of use. ISMN is now available and is reported to be more predictable than ISDN.

Use 85% of pulse rate at which exercise level first occur as ST changes

The transdermal forms of nitrate are available as a patch which is useful for nocturnal angina and increases compliance because of their long duration of action.

Beta-blockers

The beta-blockers reduce the heart rate, the blood pressure and myocardial contractility, therefore reducing myocardial oxygen consumption. They are invaluable in producing long-term prevention from angina when the nitrates fail. The drugs must be used with care in patients with incipient cardiac failure, peripheral vascular disease, diabetes and asthma. Other side effects are nightmares, impotence, hypotension and excessive bradycardia.

Cardioselectivity

The heart has a preponderance of beta 1 adrenoceptors whereas bronchial tissue, peripheral blood vessels the uterus and insulin secreting tissue of the pancreas contain principally beta 2 adrenoceptors (but not exclusively so) and all tissues contain blood

vessels with beta 2 receptors.

All beta-blockers antagonise beta 1 receptors competitively so all can be used to treat angina. If large doses of cardioselective beta-blockers are used bronchospasm may be precipitated because of the increased dose of beta 2 blocking activity. The lower the dose of cardioselective beta-blockers the safer the drug in patients at risk. Despite "selectivity" beta-blockers should NEVER be used in a known asthmatic. Atenolol, metoprolol and acebutolol possess beta 1 selectivity but the selectivity of acebutolol with respect to peripheral blood vessels is not clear.

If the patient has no contra-indications to beta blockade a small dose of propranolol (e.g. 20mg) is started and slowly increased until it gives symptomatic relief.

Calcium antagonists

Calcium channel blocking agents interfere with the entry of calcium ions into the cell and so may reduce the formation and conduction of the cardiac impulse, reduce myocardial contractility and produce vasodilatation, reducing the myocardial oxygen consumption. They improve exercise tolerance and prolong both the time to onset of angina and the time to the onset of ST depression during exercise testing.

Although, traditionally, beta-blockers have been the first line of treatment in angina, there is increasing evidence that the calcium blockers are as effective in all respects. They are particularly useful in patients unable to tolerate beta-blockade or in whom beta-blockers are contra-indicated. Of the three calcium blockers available (Diltiazem, Verapamil and Nifedipine) Diltiazem is the most selective, producing least peripheral vasodilatation and being the least myocardial depressant - it is much less likely to precipitate cardiac failure than are the beta-blockers. Nifedipine causes more vasodilatation than the other two and is therefore useful in hypertensive patients, while Verapamil and Diltiazem produce equal effects on the atrioventricular node. However, Verapamil, being a more potent vasodilator than Diltiazem, is a more effective hypotensive agent.

The choice of calcium blocker depends therefore on the particular patient. Calcium blockers can be used safely together with beta-blockers and indeed, are useful adjuncts in those patients whose angina is not adequately controlled by beta-blockers alone.

Bear in mind that when more than one agent has to be used, the need for coronary artery bypass grafting (CABG) must be considered.

When using Diltiazem or Verapamil with beta-blockers care must be taken to avoid undue bradycardia or AV block.

Surgical treatment

Where medical treatment with combinations of beta-blockers, calcium antagonists and long acting nitrates fail to keep the angina controlled so that the patient can continue his employment, then angiography must be considered.

A stress test on full medication that reveals a strongly positive result is an extra indication.

Contra-indications to surgery are functional age, severe left ventricular dysfunction or severe disease in another organ system. The risks of coronary angiography are slight in experienced hands viz: a 24-hour mortality of 0,11% and very low morbidity due to MI of 0,25% and local damage to the femoral or brachial arteries of 0,7%.

The information is valuable to statistically determine whether the patient will benefit from mechanical treatment for his obstruction.

Some lesions, particularly when proximal and isolated may be amenable to Percutaneous Transluminal Coronary Angioplasty (PTCA), where a balloon catheter is inserted during angiography and the obstruction reduced by inflating the balloon. Early experience indicates an initial success rate of 80% with 10% needing to proceed to urgent bypass surgery. Mortality rates are less than 1%. At 6 months the relapse rate was 33% but those who remained patent did so for 18 months. Repeated dilatations are possible.

Coronary artery bypass grafting (CABG) is performed on patients who have left main stem disease (improving the cumulative survival from 62% for medically treated cases to 93% in surgically treated cases in a 5-year study) or triple vessel disease with impaired left ventricular function in which 95% survived 5 years compared with 85% in a medically treated group. For both these indications there is an increase in survival rate.

If CABG is performed for obstruction to two coronary arteries in the face of impaired LV function the survival figures are slightly improved, and the quality of life is substantially improved in those who are properly selected for surgery.

Angina is relieved soon after operation in about 70%

of patients, and improved in a further 20%. Pain returns in about 50% of patients after 7 years when saphenous vein grafts are used. Survival of internal mammary artery grafts is far superior being more than 12 years. This emphasises that the operation is essentially palliative.

Recurrence is due to both graft occlusion and progression of distal coronary artery disease. Improved exercise tolerance allowed over two thirds of patients in a Scottish study to return to work. CABG does not reduce the subsequent incidence of myocardial infarction in patients with stable or unstable angina. The operative mortality at 30 days varies between 1,3% and 2,3%. The morbidity is low - 5% of patients develop new ECG Q waves.

UNSTABLE ANGINA

Unstable angina runs an unknown course. The chances of infarction are given as about 1 in 7. It is therefore a medical emergency. It is the one situation where real good can be done: myocardium can be preserved by aborting an infarction. The patient must be admitted to hospital for strict bed rest. If an ICCU is available he should be admitted to that ward.

Nitrates are necessary for pain relief and ISDN 5 mg sublingually 4 hourly is appropriate. Unless contra-indicated short acting beta-blockers (Propranolol, Metoprolol) should be used immediately. Calcium antagonists are a useful alternative if pain persists despite 4 hourly subling nitrates and beta-blockers. I.V. TNT can be used and the patient transferred to a unit capable of performing angiography and CABG. He should also be transferred if he does not settle on adequate medical treatment in 48 to 72 hours. PTCA is often very useful in this setting.

The last article (Part 4) will deal with the treatment of myocardial infarction and give a complete bibliography.

Angina

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