

## Occasional Review

# Secondary prevention in survivors of myocardial infarction

### JOINT RECOMMENDATIONS BY THE INTERNATIONAL SOCIETY AND FEDERATION OF CARDIOLOGY SCIENTIFIC COUNCILS ON ARTERIOSCLEROSIS, EPIDEMIOLOGY AND PREVENTION, AND REHABILITATION

This report is the outcome of a meeting held on 1-2 May 1980 at Kronberg (Federal Republic of Germany) under the sponsorship of the International Society and Federation of Cardiology. The participants\* were representatives of three scientific councils (arteriosclerosis, epidemiology and prevention, and rehabilitation).

The purpose of the meeting was to formulate recommendations for doctors on the secondary prevention of coronary heart disease, particularly among survivors of myocardial infarction. Too often such patients receive inadequate follow-up after recovery from the acute illness. We believe that planned and sustained care can substantially improve their rehabilitation and prognosis.

Our advice, reached after careful and extensive discussion, represents a consensus based on currently available evidence. This is an exciting and rapidly changing field, with much research in progress and more needed. It is hoped that this research will in due course clarify some of the issues which we have had to leave in doubt, notably with regard to the use of beta-blockers and platelet-active drugs.

We wish to emphasise two points. Firstly, secondary prevention must be seen as a continuation of primary prevention, whose importance is generally heightened because these patients are at particular risk; it forms one important part of an overall control strategy. Secondly, although our report is arranged according to individual risk factors and drugs, every patient must be considered as a whole. For each survivor of myocardial infarction the doctor should plan an overall policy, both short-term and long-term.

#### Physical activity

Habitual physical activity has been associated with a decreased occurrence of coronary heart disease in several population studies; but intervention trials are difficult, and it has not been shown whether exercise alters the occurrence or progress of the disease, nor is there any evidence that it improves coronary collateral circulation in man. Dynamic exercise, however, can be recommended as a rehabilitative measure after myocardial infarction.

It may: (1) improve physical work capacity and cardiocirculatory performance and also allow individuals to function in daily activities further from their ischaemic threshold; (2) improve mood and morale; and (3) facilitate return to work. Regular physical activity may help weight control, joint mobility and stability, and neuromuscular coordination. It may also encourage patients to modify other more powerful coronary risk factors.

The training effect can result from activity sessions of 30-45 minutes' duration, repeated two to three times a week, at 70% of the highest heart rate achieved at exercise stress testing where available. In older and less fit patients low-level activities such as walking can benefit physical performance. Patients with cardiac enlargement or left-ventricular dysfunction require careful supervision of their response to exercise.

#### Smoking

Seven published studies<sup>1-7</sup> report favourable effects from cessation of smoking after myocardial infarction. Results vary in detail, but they support these conclusions: (1) the risk of fatal reinfarction or sudden death is reduced by 20-50%; (2) non-fatal reinfarction may be reduced; and (3) the benefit is apparent in the first five years after myocardial infarction; and the adverse effect of continued smoking may still be dose related.

It is mandatory that doctors should vigorously advise all their patients with coronary heart disease to discontinue all forms of smoking.

#### ADVICE ON STOPPING SMOKING

(1) Success depends on all members of the medical team adopting a committed and informed approach. Health personnel should not smoke. All health-care personnel should be concerned in advice about smoking.

(2) Advice should be provided from the start of treatment.

(3) Education of spouse and family is important.

(4) Printed material and audiovisual aids are of supplementary value in emphasising advice, in informing the patient, and in saving the time of doctors and their team members, but they cannot replace personal advice.

(5) Long-term supervision is necessary to prevent the patient from restarting the habit. It is important to emphasise the risk of smoking even one cigarette, and circumstances that encourage the resumption of smoking should be avoided, at least in the earlier, vulnerable phase of abstinence.

(6) The potential adverse effects of giving up smoking (such as an increase in weight, depression, or irritability) can usually be prevented by careful counselling; few patients require specialist attention from a doctor, dietitian, or psychologist.

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## Hypertension

Lowering raised blood pressure in patients with myocardial infarction has a favourable influence on angina pectoris and on heart function. Although it has not been shown to influence the risk of reinfarction or the prospects for survival, our knowledge of the benefits of antihypertensive treatment in the population as a whole establishes a general justification for treating patients with hypertension who have had a myocardial infarction as well.

In patients surviving a myocardial infarction the decision to treat hypertension should generally follow conventional principles. Nevertheless, care must be taken in treating patients with poor left-ventricular function and those whose blood pressure fails to rise adequately during exercise.

Although drug treatment is required in most cases, general hygienic measures are also important. These include: (1) reduction of overweight through caloric restriction; (2) limitation of alcohol consumption; (3) limitation of salt intake; and (4) a programme of regular moderate daily exercise.

There are individual differences that render it impossible to provide a strict scheme of drug treatment that can be applied to all patients with hypertension who have had a myocardial infarction. All types of drug treatment have their complications and contraindications, and this is particularly true in patients who have recovered from a myocardial infarction. In particular: (1) beta-blockers may be hazardous in the presence of poor left-ventricular function and (2) diuretics may disturb potassium and lipid concentrations.

The choice of antihypertensive drugs should also take into account other sequelae of myocardial infarction. For example, diuretics may help to prevent heart failure and beta-blockers may relieve angina or arrhythmias.

There is some evidence that an excessive drop in blood pressure may precipitate further cardiovascular events. Hence blood pressure should not be reduced to below normal levels.

## Diet and lipids

At a plasma cholesterol concentration of 4-4.5 mmol/l (160-180 mg/100 ml) the risk of coronary heart disease is small. Extensive epidemiological observations have shown no general health hazards accompanying such concentrations. Therefore a mean plasma cholesterol concentration of 4-4.5 mmol/l is probably optimal for adults.

There is now persuasive evidence that raised plasma cholesterol concentrations are causally concerned in atherosclerosis and its complications, notably coronary heart disease. Most evidence indicates that the rate of plaque progression is influenced in part by the concentration of plasma cholesterol. In patients with established coronary heart disease some but not all studies indicate that the concentration of plasma cholesterol continues to be a risk factor for recurrent myocardial infarction, albeit a weaker one than for the first attack.<sup>8-9</sup>

The evidence from controlled trials justifying plasma lipid reduction in secondary prevention is limited, but the above advice may be given in the knowledge that hypercholesterolaemia probably continues to aggravate coronary artery disease after myocardial infarction, and on the following theoretical bases:

(1) To decrease progression of atherosclerosis and to support regression of existing arterial disease.

(2) The suggested changes in dietary fat intake may diminish liability to thrombosis.

(3) To provide an educational example to relatives of the patient, who may be as yet unaffected by overt atherosclerosis but are known to share an enhanced risk of coronary heart disease.

Dietary recommendations to reduce plasma cholesterol concentrations in the population include:

(1) Caloric restriction in the obese.

(2) Reduction of saturated fat intake to about 8-10% of food energy, and of cholesterol intake to less than 300 mg/day, with a

ratio of polyunsaturated fatty acids to saturated fatty acids of about 0.75.

(3) Increased intake of foods rich in gel-forming fibre, such as pectins.

(4) An increased proportion of dietary protein to be derived from vegetable sources.

These dietary changes, which are suggested as part of a comprehensive programme of risk-factor reduction, may be regarded as appropriate both to reduce the primary risk of coronary heart disease and to reduce the long-term risk in patients with myocardial infarction, angina pectoris, and asymptomatic ischaemic electrocardiogram changes—that is, in secondary prevention. For maximum potential benefit, the recommendations should be followed throughout adult life. The extent to which they are applied should be greatest in young adults and in the absence of overt coronary heart disease; but the possible benefits of reasonable dietary modification, including obesity control, should not be withheld from patients with myocardial infarction or from the elderly.

The value of antihyperlipidaemic drug treatment in preventing coronary heart disease has not been shown, and its potential for untoward effects must be borne in mind. Such treatment is justified in patients with gross hyperlipidaemia or where there is a major risk of vascular or other serious complications, or both. When this is in doubt, a specialist opinion should be sought.

## Diabetes mellitus

The decision how to treat diabetes in a patient with coronary heart disease should follow the same principles as in patients without coronary disease. There is no added reason to treat symptomless impaired glucose tolerance. The general principles of management are also the same as in other patients, but with these special considerations:

(1) Overweight should be controlled by caloric restriction and exercise, in order to avoid if possible the need for drugs.

(2) The diet should be low in saturated fat and high in complex carbohydrates.

(3) If hypertension or cardiac insufficiency are present then restriction of salt is advisable. Thiazides must be used with care, because they may aggravate diabetes, raise serum lipid concentrations, and adversely affect the serum potassium concentration.

(4) Beta-blockers must be used with care, because of the possible risk of masking the symptoms of hypoglycaemia.

(5) Treatment for any other risk factors is important, and should follow the same guidelines as in patients without diabetes.

## Use of drugs

### BETA-BLOCKERS

Several trials<sup>10-13</sup> have suggested that adrenergic beta-blocking drugs can substantially reduce the risk of sudden death during the first two years after myocardial infarction. Beneficial effects have been observed in patients with a high risk of sudden death after infarction—that is, in patients with extensive myocardial damage. Not all trials, however, have yielded positive findings,<sup>14-17</sup> and benefit may depend on the particular drug (with more or less beta-selectivity, intrinsic stimulating activity, or membrane-stabilising activity), on the dose level, or on the choice of patients. At present several randomised trials<sup>18</sup> with various beta-blockers are under way, and it is to be expected that clearer guidance will soon become available.

### PLATELET-ACTIVE DRUGS

The use of platelet-active drugs in survivors of myocardial infarction is under active investigation, and some promising results have been obtained.

There have been six controlled trials of acetylsalicylic acid.<sup>19-24</sup> The results were not consistent, those of the largest trial being negative. Taking the results as a whole, there was some reduction in mortality during the first one to two years after infarction.

So far only one controlled trial of sulphinyprazole has been reported.<sup>25</sup> This suggested, but did not prove, a reduction in the high risk of sudden death that characterises the early months after myocardial infarction.

At present no clear recommendations are possible on the use of platelet-active drugs.

#### ANTICOAGULANTS

Long-term anticoagulant treatment is indicated in patients who are at special risk from thromboembolic complications. For other patients the evidence from controlled trials is not entirely consistent; taken as a whole, the randomised trials in the 1960s suggested a reduction in the two-year mortality.<sup>26</sup>

The treatment is troublesome and hazardous, and for this reason it has fallen out of common use. Nevertheless, it is not unreasonable to give long-term anticoagulant treatment to patients in whom the treatment can be adequately accomplished. This might apply particularly to patients with recurrent infarction or a history of angina pectoris.

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Is there any evidence to show that smoking while driving results in an increase (or decrease) in road traffic accidents due to (a) distraction of the driver by fiddling with his cigarette or pipe; or (b) impairment of driving performance due to the effects of nicotine, carbon monoxide, or other cigarette products? Have any simple experiments been conducted in a driving simulator comparing (a) non-smoking drivers in a smoke-free environment; (b) smoking drivers; and (c) non-smoking drivers in a smoky environment?

The Automobile Association have recently considered the first problem.<sup>1</sup> They reported that Dr J de Kearney had found in France a direct relationship between smoking and road accidents. Distraction of drivers as a result of smoking appeared to be the main reason, and this is supported by case reports. For example, a 31-year-old man dropped his cigarette while driving, bent down to retrieve it, and lost control, killing a pedestrian. He was banned from driving for life. In the United States an insurance company offers a 25% premium reduction to non-smoking drivers because of the reduced risk. Their statistics suggest that these drivers have fewer accidents. Further studies into the relationship behind smoking and road traffic accidents are currently being undertaken at Southampton University (K S Cliff, unpublished information). Few satisfactory studies have been performed in a driving simulation, and the available results are

conflicting. It has been reported that in a West German study smoking in a car reduces reaction capability because of increased carbon-monoxide concentrations.<sup>1</sup> The Tobacco Advisory Council (supported by the tobacco industry), however, have found that in experiments smokers perform tasks more efficiently when smoking than when not. A reason why front-seat occupants who smoke are more often injured in road accidents can also be attributed to their reluctance to wear seat belts. A postal survey in Wessex<sup>2</sup> showed that smokers were significantly ( $p < 0.001$ ) less likely to wear seat belts (62%) than were non-smokers (34%). This is presumably symptomatic of risk taking.

- 1 Hill M. It's not the cough that carries you off, it's... *Drive* 1979; July-August:10-1.
- 2 Wessex Positive Health Team. Promoting the use of seat belts—an evaluation of integrated health education. Southampton: Wessex Regional Health Authority, 1980. (Full report.)

A 68-year-old patient with mild coeliac disease on a gluten-free diet was warned that if she stopped the diet it would not be possible to start it again. Is this true?

There is no reason why a gluten-free diet should not be started or to worry if some gluten is eaten unintentionally. I think the patient must have misunderstood the advice.