Secondary prevention of CHD

BACKGROUND Coronary heart disease (CHD) is still the single largest health problem for Australia. It is considered essentially preventable. Risk of future events is highest in those who already have manifest disease (secondary prevention) and hence are likely to benefit from aggressive therapy.

OBJECTIVE This article explores issues of management of risk factors postacute myocardial infarction using a case vignette of a woman who consults her general practitioner after discharge from hospital.

DISCUSSION The consultation allows the GP to reassess the patient's CHD risk factor management including lifestyle factors, and reinforce the need for lifelong use of proven secondary prevention drug therapies and participation in a rehabilitation program. Reflective learning from this case should assist the treating GP and her or his colleagues to help other patients avoid a similar fate.

Case history – Seema

Seema, 58 years of age, is a nonsmoking, overweight (BMI 29 kg/m2) woman originally from Goa who on her previous visit to you had:

- diabetes managed on diet alone (HbA1c 7.0%)
- no previous history of heart or other vascular disease
- mild hypertension (148/94 mmHg) on ramipril 5 mg mane and dyslipidaemia (total-C 6.0 mmol/L, HDL-C 1.0 mmol/L) on simvastatin 20 mg in the evening.

Seema is consulting you today after the previous week attending her local hospital with chest pain confirmed on electrocardiogram and cardiac enzymes to be an acute myocardial infarction. After an uneventful recovery in hospital she is discharged into a cardiac rehabilitation program with a follow up appointment for her cardiologist. She requests her usual prescriptions.

Coronary heart disease (CHD) is largely preventable but remains the single largest health problem for Australia, causing 18% of all deaths.[1] The strategy to prevent CHD is delineated by whether the patient has overt vascular disease (secondary prevention) or not (primary prevention). If disease is evident, as is the case with Seema, then she is at very high absolute risk of a subsequent heart attack or stroke and requires aggressive management of her risk factors.

At the consultation

After a history and examination seeking the symptoms and signs of CHD and its complications such as heart failure, your attention shifts to the management of her risk factors.

Mark R Nelson,
MBBS, MFM, FRACGP, FAFPHM, PhD, is Professor and Chair, Discipline of General Practice, School of Medicine, University of Tasmania. mark.nelson@utas.edu.au

Andrew Tonkin,
MD, MBBS, FRACP, is Professor and Head, CVD Prevention Unit, NHMRC Centre of Clinical Research Excellence in Therapeutics, Department of Epidemiology and Preventive Medicine, Monash University, Alfred Hospital, Victoria.

Managing modifiable risk factors and treating to target

Management of CHD patients requires aggressive drug therapy, but is still based on the lifestyle factors of **s**moking, **n**utrition, **a**lcohol and **p**hysical activity (SNAP) (*Table 1*).[2] Particular approaches depend on individual risk factors but always need attention as behavioural change can reduce overall risk and individual risk factors for CHD and other diseases. Failure to deal with them mitigate against patients reaching therapeutic goals, necessitating more medication and higher doses than is absolutely necessary, and the consequential problems of cost, compliance, drug interactions and side effects. Seema's biomedical risk factors need to be managed aggressively with appropriate lifestyle modification (*Table 2*).

Drug treatments

Most CHD patients who present in general practice have been managed at some period in a specialist environment where they are likely to have had coronary angiography and/or coronary artery revascularisation procedures. They should also have been initiated on evidence based drug therapy in addition to appropriate lifestyle measures (*Table 3*). This should be the case with Seema. The general practitioner therefore needs

Table 1. Lifestyle/behavioural risk factors and management

Motivational interviewing/behavioural change assessment: Establish goals appropriate for patient's readiness to change in accordance with patient's risk factor profile

Referral where indicated: Heartline (1300 36 27 87), appropriately trained health professional(s) (cardiac rehabilitation practitioner, dietician, psychologist)

Smoking Goal: complete cessation Avoidance of passive smoking	• Strongly encourage patient and family to stop smoking. Provide smokers and passive smokers with appropriate facts on smoking. Even 3–5 minutes of time taken to encourage smokers to attempt to quit can increase cessation success • Refer to Quitline (131 848). Consider referral to smoking cessation program • Consider pharmacotherapy for patients smoking >10 cigarettes per day: – nicotine replacement therapy (NRT) is the first line choice of medication – if used, aim to combine pharmacotherapy with behavioural and psychosocial support – NRT patches can be used safely in smokers with less severe cardiovascular disease (eg. stable angina or a history of myocardial infarction), but is not recommended with recent myocardial infarction, unstable angina, severe arrhythmias, refractory angina or recent cerebrovascular event – although not a first line agent, bupropion can be considered as a treatment option for patients with stable cardiovascular disease. Note: safety of bupropion in patients who have had an acute coronary event has not been established – bupropion in combination with NRT can be considered for patients requiring additional assistance – consider high risk of continuing to smoke when assessing benefits and risks of pharmacotherapy
Nutrition Goal: Establish/maintain healthy eating including saturated + trans fatty acid intake no more than 8% of total energy intake	• In order to achieve this goal patients will need to follow the NHFA 'enjoy healthy eating' messages. These messages encourage patients to choose: – mainly plant based foods – vegetables, fruits and legumes (dried peas, dried beans and lentils) and grain based foods (preferably wholegrain) such as bread, pasta, noodles and rice – moderate amounts of lean meats, poultry, fish and reduced fat dairy products – moderate amounts of polyunsaturated or monounsaturated fats • ± Referral to a dietician

*Goals based mainly on evidence of increased risk of death in European populations and may not be appropriate for all age and ethnic groups

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to make sure Seema is taking her medications and is aware that, in the absence of important side effects, it is life long. A mnemonic for this therapy is ABAS where[3]:

- **A** is for antiplatelet agent (aspirin 75–150 mg per day and/or clopidogrel 75 mg where aspirin is contraindicated or not tolerated, or where the patient has had a recurrent ischaemic event) and/or anticoagulant (eg. warfarin for postacute myocardial infarction [AMI] atrial fibrillation, cardiac failure)
- **B** is for beta blocker
- **A** is for angiotensin converting enzyme (ACE) inhibitor (or angiotensin II receptor antagonist where an ACE inhibitor is not tolerated)
- **S** is for statin.

Antiplatelet therapy, beta blockers, ACE inhibitors and statins all have level 1 evidence that they reduce vascular events and mortality in the secondary prevention environment.[4–7] Hence, it is important that if the patient has manifest disease they receive this therapy irrespective of their individual risk factor status.

At the initial and subsequent consultations it is important to identify those who may have failed to have such therapies initiated or have ceased taking any or all therapies. If they are not on ABAS, it is imperative to establish if there is an absolute contraindication to such therapy and initiate it. With the exception of aspirin,

Alcohol Goal: Low risk alcohol consumption	• Assess patient medications for potential interactions with alcohol and advise as appropriate • Encourage patients with hypertension who drink alcohol to limit intake to no more than 2 standard drinks per day (men), or 1 standard drink per day (women) • It is not recommended that abstainers should take up drinking or that drinkers should increase their alcohol intake
Physical activity Goal: Establish/maintain at least 30 minutes of moderate intensity physical activity* on 5 or more days/week (ie. 150 minutes/week minimum) Can be accumulated in shorter bouts of 10 minutes duration	• Assess patient's physical activity habits together with severity of disease and comorbidities. Conditions that require clinical assessment and supervision include unstable angina, uncontrolled hypertension, severe aortic stenosis, uncontrolled diabetes, complicated AMI (within 3 months), untreated heart failure or cardiomyopathy, symptoms such as chest discomfort or shortness of breath on low exertion, resting heart rate >100 bpm • Discuss physical activity needs/capabilities/barriers and encourage the patient to be active. Together discuss and provide written guidelines for everyday physical activity tasks, including a light-moderate walking program or equivalent. General practitioners should consider using the 'physical activity module' • Begin at low intensity and gradually increase over several weeks, particularly in the postacute event period. Advise the patient to begin with one or two activities for a short time at low intensity. Gradually increase the time spent, the intensity, and the variety of activities over several weeks, toward achieving the goal and moving beyond it. Note: vigorous physical activity is generally not encouraged for people with CHD • Referral to cardiac rehabilitation program where appropriate and available. This is particularly useful in the postacute event period • Monitor progress/response to the physical activity regimen in consultation with the patient * Moderate activity will cause a slight increase in breathing and heart rate, and may cause light sweating, eg. brisk walking, lawn mowing, low paced swimming, cycling, gentle aerobics
Weight management Goals*: Waist measurement Male ≤94 cm Female ≤80 cm BMI <25 kg/m^2	• Assess and continue to monitor both waist circumference and body mass index (BMI). BMI = weight (kg)/height (m)^2 • Set intermediate, achievable goals • Encourage healthy eating and physical activity. For weight loss to occur, it is necessary to use up more energy through regular physical activity and consume less kilojoules from food and drinks

Table 2. Biomedical risk factors/medical management

Lipids Goal: LDL-C <2.5 mmol/L TC <4.0 mmol/L HDL-C >1.0 mmol/L Triglyceride (TG) <2.0 mmol/L	• Lifestyle: All patients should receive healthy eating advice • As statins have been shown to be beneficial in patients with CHD regardless of their total or LDL cholesterol level, and as very early initiation of therapy has been shown to be safe and possibly beneficial: – statin therapy is recommended for all patients with CHD (apart from in exceptional circumstances) and in hospitalised patients should be commenced during that admission • The benefit of treatment in other high risk groups, eg. those with diabetes and other manifestations of atherosclerosis such as previous stroke has been confirmed • Statins are the agents of choice for LDL-C lowering • Fibrates are effective TG lowering / HDL-C raising agents • The combination of statins and a fibrate is potentially hazardous, and specialist advice should be sought if this regimen is to be considered • To lower TG in combined hyperlipidaemia, fish oils may have a role in combination with statins. However, it is uncertain whether the use of fish oil capsules provides any benefit above the inclusion of a moderate consumption of fish • ± Referral to dietician, ± referral to Heartline (1300 36 27 87)
Blood pressure Adults ≥65 years (unless they have diabetes and/or renal insufficiency and/or proteinuria ≥0.25 g/day) Clinic goal: <140/90 mmHg	Diagnosis of hypertension • If SBP ≥140 or DBP ≥90 mmHg on several occasions, consider diagnosis of hypertension • Investigate as appropriate: exclude secondary hypertension • Referral to specialist for SBP ≥180, or DBP ≥110 mmHg, or if secondary hypertension suspected or difficult to manage hypertension Urinary protein • In those without diabetes with hypertension: if proteinuria detected on urinalysis, determine 24 hour urinary protein excretion or protein/creatinine ratio on a spot urine sample (consider when ≥1+ on dipstick) • In people with diabetes with hypertension, knowledge of urinary albumin excretion determines the intensity of antihypertensive therapy. The best screening test (if available) is the urinary albumin/creatinine ratio on a 'spot' urine. In patients with values at least in the microalbuminuric range, a 24 hour urine collection should be obtained for accurate quantification

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where the therapeutic response does not improve above 150 mg per day but the side effects do, such medication often needs to be increased over time to ensure therapeutic targets are reached and maintained.[8]

Seema was on an ACE inhibitor and a statin before her AMI but may need higher doses depending on contemporary blood pressure and lipid measurements after changes to her therapy in hospital (eg. addition of a beta blocker). Seema should also have a short acting nitrate to use on an 'as required' basis and a written action plan for chest discomfort (*Table 4*). The need to act according to this plan after future episodes of chest discomfort not responding to nitrates should be stressed. Ventricular fibrillation and sudden death is more common in the first hour after an AMI, and the benefit of reperfusion therapy is time dependent.

Psychological factors

It is also important to ascertain Seema's mental state. Whereas anxiety and job stress have not been shown conclusively to be a significant risk factor for CHD, depression, social isolation and lack of quality social support have. Depression is a frequent bedfellow of CHD as an aetiological factor or outcome. It is amenable to cognitive behavioural therapy and selective serotonin re-uptake inhibitor (SSRI) drug therapy.

Adults <65 years Adults with renal insufficiency and/or diabetes and/or proteinuria 0.25–1.0 g/day Clinic goal: <130/85 mmHg Adults with proteinuria >1 g/day (ie. people with and without diabetes) Clinic goal: <125/75 mmHg	Management of hypertension • Lifestyle: weight management, physical activity, limit alcohol intake to no more than 2 standard drinks per day (men), 1 standard drink per day (women) • Unless there are good reasons for an alternative choice, ACE inhibitors are recommended as first line antihypertensives in patients with pre-existing cardiovascular disease, including CHD, stroke and peripheral vascular disease, or in diabetic patients who are hypertensive • In diabetic patients with proteinuria, commence treatment with either an ACE inhibitor or angiotensin II receptor antagonist (ARA), if ACE inhibitor intolerant • Most individuals need appropriate drug combinations to reach blood pressure goals. Combination therapy can also minimise adverse effects • For those who demonstrate significant 'white coat' effect, base management on 'home' or 'ambulatory' rather than clinic readings • ± Referral to dietician, ± referral to Heartline (1300 36 27 87)
Diabetes Goals: identify those with previously undiagnosed type 2 diabetes. In patients with diabetes maintain optimal BSL (HbA1c ≤7%) Definition of diabetes: Fasting plasma glucose ≥7 mmol/L or 2 hour post 75 g oral glucose load ≥11.1 mmol/L Definition of impaired glucose tolerance: Fasting plasma glucose <7.0 mmol/L and 2 hour post glucose load ≥7.8 and <11.1 mmol/L Definition of impaired fasting glucose: Fasting plasma glucose 6.1 – 6.9 mmol/L	Diagnosis • All people with CHD should be screened for diabetes. Acute coronary syndromes (ACS) often unmask glucose intolerance or diabetes • Finger prick glucose testing is not recommended for diagnosis of diabetes • Measure plasma glucose on a fasting venous sample. Analysis should be undertaken by an accredited laboratory • For fasting plasma glucose levels 5.5–6.9 mmol/L (random 5.5–11.0 mmol/L) perform an oral glucose tolerance test • A definitive diagnosis of previously undiagnosed type 2 diabetes should not be made during an acute cardiovascular event and results suggestive of undiagnosed diabetes should be confirmed 2 months after the acute event Management of type 2 diabetes • First line management of hyperglycaemia is in most cases, lifestyle intervention, physical activity, healthy eating and weight management. Then if required, addition of appropriate hypoglycaemic therapy to achieve near normal levels of glycaemia, as indicated by HbA1c • Treatment of other risk factors including dyslipidaemia, hypertension, overweight/obesity, and smoking is particularly important for patients with diabetes • Tight glucose control with insulin for 3 or more months should be considered in patients with diabetes with acute coronary syndromes • In people with diabetes with proteinuria, commence treatment with either an ACE inhibitor or ARA, if ACE inhibitor intolerant

Cardiac rehabilitation

Cardiac rehabilitation involves specific measures and collaboration between health professionals to return an individual to an active and satisfying life and to prevent a recurrence of cardiac events.[9] There is level 1 evidence that such programs work.[10] It is therefore important to reinforce the need for Seema to participate in her cardiac rehabilitation program.

After the consultation

After the consultation there is an opportunity for reflective learning from every patient who has incident CHD. Such a strategy is performing a critical event audit for the management of Seema's CHD risk factors up to her event. Her known positive risk factors before her AMI were:

- diabetes
- overweight
- hypertension
- dyslipidaemia
- south Asian origin.

The calculation at her penultimate visit of her absolute CVD event risk for the next 5 years using the New Zealand Cardiovascular Risk Calculator would have identified her as at a 20–25% risk of a subsequent CVD event over the next 5 years.[11] Given Seema's

Table 3. Pharmacological management

Antiplatelet agents	• All patients should be taking aspirin 75–150 mg/day unless contraindicated • There is evidence that among patients with unstable angina, clopidogrel produces additional benefits when combined with aspirin. Clopidogrel is an alternative when aspirin is contraindicated and should be considered in combination with aspirin in patients who have recurrent cardiac ischaemic events • There is evidence that clopidogrel, 75 mg/day, should be prescribed for up to 12 months after stent implantation, depending on the particular type of stent and circumstances of implantation
ACE inhibitors	• Treat all patients unless contraindicated. Start early postmyocardial infarction in high risk patients • Use ARAs for patients who develop unacceptable side effects on ACE inhibitors
Beta blockers	• Start in most post-ACS patients unless contraindicated and continue indefinitely, especially in high risk patients. Use as needed to manage angina, arrhythmia or hypertension in all other patients • Carvedilol, bisoprolol and metoprolol (extended release) have been shown to provide additional survival benefit to patients with mild to moderate chronic heart failure already receiving background ACE inhibitor therapy
Statins	• Statin therapy is recommended for all patients with CHD (apart from in exceptional circumstances), and in hospitalised patients should be commenced during that admission (see lipids)
Anticoagulants	• Warfarin is recommended in survivors of myocardial infarction at high risk of systemic thromboembolism because of atrial fibrillation, mural thrombus, congestive heart failure, or previous embolisation. It may sometimes be combined with aspirin but in this circumstance patients should be observed closely for signs of bleeding
Other considerations	
Anti-arrhythmics	• Due to the potential fatal pro-arrhythmic effects of anti-arrhythmic agents, the routine usage of these drugs postacute coronary syndrome is not recommended, especially in patients with depressed left ventricular function. Carefully balance benefits and risks. Avoid use to suppress ventricular ectopic activity. Patients with documented sustained ventricular tachycardia should usually be referred for specialist opinion. Amiodarone is often chosen to treat symptomatic ventricular tachycardia, and may reduce the incidence of arrhythmic death in patients post-AMI, but has no effect on total mortality
Calcium channel blockers	• Calcium channel blockers of the nondihydropyridine group (diltiazem, verapamil) may be used as anti-anginal agents for patients in whom beta blocker therapy is contraindicated, provided there is no evidence of chronic heart failure. There is no evidence however that calcium channel blockers prevent a secondary event
Oestrogens and progestins (or oestrogen alone in women who have had a hysterectomy)	• Should not be prescribed for primary or secondary prevention of CHD. If hormone therapy is prescribed for other conditions, risks and benefits must be considered
Antioxidants (vitamin A, vitamin C, B-carotene, vitamin E)	• There are no large scale trial data to recommend antioxidant supplements for the prevention or treatment of CHD

Table 4. Chest pain/discomfort action plan

Patient name_____

Issued by Dr _____ Date _____

1) Rest and take <insert short acting nitrate here> under your tongue
2) Take a half or whole aspirin
3) Call an ambulance (dial 000). Call hospital/clinic on <insert number here>* if the chest pain/discomfort is not completely relieved in 10–15 minutes

*For areas where ready access to an ambulance service is unavailable

Indian ancestry it is recommended her risk be increased one level. Hence, she had a very high 25–30% risk of an event and would very likely have benefited from more aggressive premorbid therapy such as lifestyle counselling and getting her blood pressure and cholesterol to goals, and adding low dose aspirin.

This case would make a good presentation at a practice meeting where in a nonthreatening environment all can learn from this adverse event. Your medical indemnity company will encourage you to do this.

Women and CHD

This particular case vignette was chosen to illustrate that sometimes the management of women with CHD is less aggressive than in men.[12] Women are at lower risk of CHD relative to men, but a woman and a man of equal absolute risk in the primary prevention setting or with established CHD warrant equally aggressive therapy. As an example, diabetes essentially neutralises the biological advantage of women over men for future events.[13]

Conclusion

Coronary heart disease management in general practice is based on attention to behavioural, biomedical and psychological factors and reinforcement of adherence to evidence based drug and nondrug therapies. General practitioners are in a unique position to provide ongoing advice, support and counselling to such patients with established CHD who require life long risk factor management.

Conflict of interest: none declared.

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Email: afp@racgp.org.au