

REVIEW ARTICLE

Prevention of Ischaemic Heart Disease

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Abstract:

Prevention strategies are based on identification and modulation of cardiovascular risk factors. Targeting high risk individuals is cost-effective. More relevant to the practising clinicians is Identification of those individuals in whom intervention (life style or pharmacological) will prevent cardiovascular events (fatal and non-fatal myocardial infarction) and/or the need for interventional or surgical procedures, extending duration and quality of life (QOL). Modification of reversible risk factors (rather than interventional procedures) has been largely responsible for the decline in age-adjusted cardiovascular mortality.

Introduction:

Cardiovascular disease (CVD) is a major cause of premature death & disability. Atherosclerosis develops insidiously many years before symptoms occur. Death from CVD occurs suddenly before medical care is available. The mass occurrence of CVD relates to lifestyle & modifiable risk factors. Risk factor modification have been shown to reduce mortality & morbidity

Priorities for CVD Prevention¹

CVD prevention strategies should target people with atherosclerotic CVD, asymptomatic patient with risk factors, diabetes mellitus (DM), marked elevated single risk factor with target organ damage (TOD), Familial dyslipidaemia and family history of premature CVD.

Global Distribution of CVD death is mentioned in Table: 1²

Table-I

Disease	Male(%)	Female(%)
Ischaemic Heart Disease(IHD)	46	38
Stroke	34	37
Hypertensive Heart Disease	6	7
Rheumatic Heart Disease	1	1
Others	11	14
Inflammatory	2	2

Risk Factors for IHD:

Non-modifiable risk factors:

Age: Atherosclerosis is directly proportional with age

Sex: IHD has propensity for male gender than premenopausal women. Post menopausal women have similar risk like male counterpart.

Family History: Premature history of IHD (male <55 and female <65 years) increase the risk by 1.3 times.

Modifiable (potentially treatable) risk factors:

Hypertension: The risk is linear, graded and continuous. A reduction in blood pressure(BP) by an average of 12/6 mm Hg can be expected to reduce stroke by 40% and CHD by 20%

DM: Glycaemia, whether evaluated by fasting glucose, the two hour value from an oral glucose tolerance test (OGTT), or by HbA1c in the healthy population, is continuously related to the risk of developing CVD

Dyslipidaemia : The relation between blood cholesterol and cardiovascular risk is continuous. In the context of lipids, cardiovascular risk is principally determined by the concentrations of LDL cholesterol, and of HDL cholesterol (inversely), and to a lesser extent by the concentration of triglycerides (TG).

Smoking: Smoking increases the risk of coronary, cerebral, and peripheral arterial disease and this adverse effect is related to the amount of tobacco smoked daily and the duration of smoking

Physical inactivity: In asymptomatic people aerobic physical activity and cardio-respiratory fitness are associated, in a dose response fashion, with a significant reduction in cardiovascular and all cause mortality. Physical activity can prevent or delay the development of high blood pressure, increases HDL cholesterol concentration, and lowers the risk of developing diabetes.

Diet and Salt: At the level of individuals within each population in this international study, saturated fatty acids (SFAs) were related to coronary mortality in epidemiological studies. Randomised controlled trials in people with established coronary disease of increased fish consumption and supplementation with EPA/DHA have shown reductions in coronary and total mortality polyunsaturated fatty acids of both n-6 and n-3 classes are inversely related to risk of CHD. Trans fatty acids are usually derived from industrial hydrogenation of monounsaturated or polyunsaturated fats and in some epidemiological studies dietary intake is positively related to the risk of CVD. Fruit and vegetable consumption in a meta-analysis of epidemiological studies is inversely related to risk of CHD. A reduction of sodium intake, especially in the form of sodium chloride, will also reduce blood pressure

Alcohol: As alcohol consumption increases above 3 units per day so does systolic and diastolic blood pressure, the risk of cardiac arrhythmias, cardiomyopathy, and sudden death.

Obesity: As body weight (defined as body mass index (BMI)) increases so does the risk of CVD. In addition to total adiposity, the distribution of fat, particularly visceral fat, increases CVD risk.

Modification of Life Style:³

Diet: should consist of Protein 25%, Starch & Vegetable/ Fruit equal

Exercise: Exercise according to *FITT* principle is recommended.

Frequency 5/week

Intensity : moderate

Time: 15 minute warm up, 20-30 minute conditioning, 10 minute cool down

Type: cardiovascular/ low skill

Smoking: The strategy of smoking cessation is : Ask, Brief Advice, Confidence (ABC)

A weight reducing meal consist of starch 25%, vegetable & fruit 62.5% and meat 12.5%

Benefit of 10kg weight reduction in a 100 kg subject⁴

Mortality reduction 25%

BP: Reduction of 10 mm SBP and 20 mm DBP

Lipids: 10% decrease in total cholesterol, 15% LDL reduction, 8% increase in HDL, 30% decrease in TG.

DM: 50% risk reduction of developing Type 2 DM, 50% reduction in elevated blood glucose, 15% reduction in HbA1C

Primary Prevention: ^{1,5}

Hypertension: The BP target is <140/85

DM: The blood sugar target is <6.1 mmol/L

Cholesterol: The target of total cholesterol is <5 & LDL is <3 mmol/L

Smoking: Total cessation of smoking is advocated.

BMI: The ideal BMI is < 25 kg/m² & < 23 kg/m² in South Asians.

Walking: 30 minute of brisk walking is advised at least 5 days a week.

Fruit: 5 servings of fruit/day is advised.

Waist circumference: The target waist circumference in white Caucasians <102 cm in men and <88 cm in women, and in Asians <90 cm in men and <80 cm in women

Secondary Prevention:¹

BP target: <130/80 in patients with CHD, DM & chronic kidney disease (CKD)

Cholesterol target: Total cholesterol <4 mmol/L and LDL <2 mmol/L

Smoking: total cessation of smoking is advocated.

Blood sugar target: Fasting plasma glucose <6 mmol/L & HbA1c <6.5%

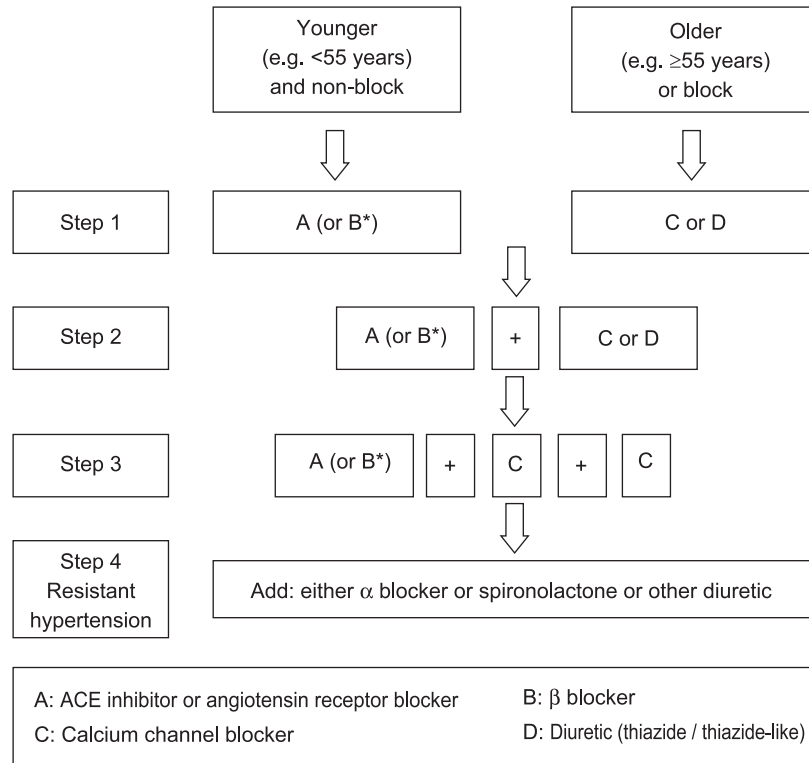
Physical activity: Regular aerobic physical activity of at least 30 minutes per day, most days of the week, should be taken (for example, fast walking/swimming)

BMI: The ideal BMI is < 25 kg/m² & < 23 kg/m² in South Asians.

Aspirin: 75mg of aspirin is advised daily.

Treatment of BP:⁶ Control of hypertension is achieved by reducing salt intake, regular physical activity, weight reduction, cessation of smoking and use of antihypertensive medications. Limit intake of salt to <100 mmol/l per day (<6 g of sodium chloride or <2.4 g of sodium per day). Treatment by drugs is divided into 4 steps shown in Figure 1. The A(B)/CD treatment algorithm is suggested to advise and assist practitioners on logical sequencing and combinations of drug therapy for the treatment of hypertension (Figure 1)¹

Treatment of Dyslipidaemia: The treatment target is LDL. Statin is the mainstay of treating LDL. If anyone is intolerant to statin ezetimibe can be prescribed. TG is treated with fibrate and omega 3 fatty acid (fish oil). With each doubling of statin dose further 6% cholesterol is reduced.



*Combination therapy involving B and D induces more new onset diabetes compared to other combination therapies

It is important that lifestyle modification such as avoidance of atherogenic diet and smoking, weight reduction, moderate physical exercise and control of pre-diabetic stage (impaired fasting glucose and impaired glucose tolerance) and diabetes contributes favourably to lipid management and is important part along with drug treatment. Figure 2 shows an outline of lipid management in asymptomatic people without CVD.

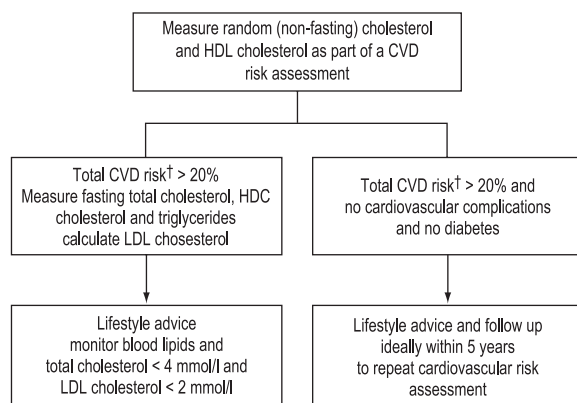


Figure 2: Risk thresholds and targets for blood cholesterol in asymptomatic people without CVD. †Assessed with CVD risk chart.¹

Metabolic Syndrome: People with the metabolic syndrome (Table 2) as defined are inevitably at higher risk of CVD because this syndrome is based on several interrelated CVD risk factors.

Table-II⁷

Metabolic Syndrome:

Clinical identification of the syndrome can be made if 3 of the following are met

Central obesity: waist circumference >88 cm (women) and >102 cm (men) in caucasians

Blood pressure ≥130/e[†]85 mm Hg

Fasting glucose ≥6.1 mmol/l

Serum triglycerides ≥1.7 mmol/l

HDL cholesterol <1.3 mmol/l (women) and <1.0 mmol/l (men)

Prime emphasis is on therapeutic lifestyle changes (TLC) to target obesity, sedentary lifestyle and atherogenic diet improvements of which can result in significant benefit of all the metabolic factors involved. Metformin is approved for pre-diabetes and can be considered for those at highest risk with progressive hyperglycaemia despite TLC.⁸

The concept of Absolute and Relative Risk:¹

Absolute Risk: Total CVD risk for an asymptomatic individual is estimated from several risk factors and is expressed as a probability (percentage chance) of developing CVD 10 years. This is the number of cardiovascular events which would be expected over 10 years in 100 men or women. In clinical practice the term “total risk” is synonymous with the epidemiological term “absolute risk”. So when a person asks the doctor what are his or her chances of developing CVD the answer is an estimate of that person’s “total CVD risk”—for example, 20% over 10 years—in other words a one in five chance.

Relative risk: The relative CVD risk for one individual compared to another is the ratio of their respective total or absolute risks. So when a person asks what are his or her chances of developing CVD compared to someone of the same age who has no risk factors for CVD, the answer is that person’s relative risk—for example, three times the chance of developing CVD compared to someone with no risk factors

Who is a High Risk Asymptomatic Individual?¹

Total CVD risk more than 20 (assessed by risk chart)

DM

BP: 160/100 or TOD

Total Cholesterol: HDL cholesterol 6

Familial dyslipidaemia

Family H/O premature IHD

Renal dysfunction /diabetic nephropathy

Summary: The following mnemonic is useful to remember risk modification and treatment targets in the prevention of IHD⁵: 035 140 530

0 Smoking (no smoking)

3 walking (at least 3 days a week)

5 fruits & vegetable (at least 5 servings/day)

140 SBP (<140 SBP)

5 Total cholesterol (<5 mmol/L)

3 LDL (<3mmol/L)

0 avoidance of overweight & diabetes

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