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Primary Prevention of CVD: Treating Dyslipidemia

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Dyslipidemia, defined as elevated total or low-density lipoprotein (LDL) cholesterol levels, or low levels of high-density lipoprotein (HDL) cholesterol, is an important risk factor for coronary heart disease (CHD) and stroke.

- The incidence of dyslipidemia is high: In 2000, approximately 25 percent of adults in the United States had total cholesterol greater than 239.4 mg per dL (6.20 mmol per L) or were taking lipid-lowering medication.
- There is a continuous, graded relationship between the total plasma cholesterol concentration and ischemic heart disease morbidity and mortality. Ischemic heart disease is the leading single cause of death in high-income countries and the second in low- and middle-income countries.
- Primary prevention in this context is defined as long-term management of persons at increased risk, but who have no clinically overt evidence of cardiovascular disease (CVD), such as myocardial infarction (MI), angina, stroke, and peripheral vascular disease, and who have not undergone revascularization.

Statins have been shown to be highly effective, particularly in treating persons at high risk of CHD (at least 1.5 percent annual risk of CHD). Although effective in persons in low- and medium-risk categories, it seems that the magnitude of benefit is related to the person's baseline risk of CHD events.

In persons at medium risk of CHD (0.6 to 1.4 percent annual risk of CHD), fibrates have been shown to reduce the rate of CHD, but not of overall mortality, compared with placebo.

- We do not know whether resins are beneficial in reducing nonfatal MI and CHD death in persons at medium risk of CHD. We found no evidence relating to the effects of niacin (nicotinic acid) in persons at medium risk of CHD.
- We found no evidence that examined the effectiveness of niacin, fibrates, or resins in persons at low or high risk of CHD.
- We found no evidence on the effects of ezetimibe in persons at low, medium, or high risk of CHD events.

A reduced- or modified-fat diet may be beneficial in reducing cardiovascular events in persons at risk of CHD events.

Definition

Dyslipidemia, defined as elevated total or LDL cholesterol levels, or low levels of HDL cholesterol, is an important risk factor for CHD and stroke (cerebrovascular disease). This review examines the evidence for treatment of dyslipidemia for primary prevention of CHD. Primary prevention in this context is defined as long-term management of persons at increased risk, but who have no clinically overt evidence of CVD, such as acute MI, angina, stroke, and peripheral vascular disease, and who have not undergone revascularization. Most adults at increased risk of CVD have no symptoms or obvious signs, but they may be identified by assessment of their risk factors (see Etiology and Risk Factors section). We have divided persons with no known CVD into three groups: low risk (less than 0.6 percent annual CHD risk), medium risk (0.6 to 1.4 percent annual CHD risk), and high risk (1.5 percent or more annual CHD risk). Prevention of cerebrovascular events is discussed in detail elsewhere in *Clinical Evidence*. In the United States, the preferred method to calculate CVD risk is use of the Framingham risk equations, the best validated method from a U.S. population.

Incidence and Prevalence

Dyslipidemia is common. Data from the U.S. National Health and Nutrition Examination Survey conducted from 1999 to 2000 found

Clinical Questions

What are the effects of pharmacologic cholesterol-lowering interventions in persons at low risk of CHD (less than 0.6 percent annual risk)?	
Likely to be beneficial	Statins
Unknown effectiveness	Ezetimibe
	Fibrates
	Niacin
	Resins
What are the effects of pharmacologic cholesterol-lowering interventions in persons at medium risk of CHD (0.6 to 1.4 percent annual risk)?	
Beneficial	Fibrates
Likely to be beneficial	Statins
Unknown effectiveness	Ezetimibe
	Niacin
	Resins
What are the effects of pharmacologic cholesterol-lowering interventions in persons at high risk of CHD (1.5 percent or more annual risk)?	
Beneficial	Statins
Unknown effectiveness	Ezetimibe
	Fibrates
	Niacin
	Resins
What are the effects of a reduced- or modified-fat diet in persons at low, medium, or high risk of CHD?	
Likely to be beneficial	Reduced- or modified-fat diet in persons at low, medium, or high risk

CHD = coronary heart disease.

that 25 percent of adults had total cholesterol greater than 239.4 mg per dL or were taking a lipid-lowering medication. According to the World Health Report 1999, ischemic heart disease was the leading single cause of death in the world, the leading single cause of death in high-income countries, and second only to lower respiratory tract infections in low- and middle-income countries. In 1998, it was the leading cause of death, with nearly 7.4 million estimated deaths per year in member states of the World Health Organization, and caused the eighth highest burden of disease in low- and middle-income countries (30.7 million disability-adjusted life-years).

Etiology and Risk Factors

Major risk factors for ischemic vascular disease include increased age, male sex, raised LDL cholesterol, reduced HDL cholesterol, raised blood pressure, smoking, diabetes mellitus, family history of CVD, obesity, and sedentary lifestyle. For many of these risk factors, including elevated LDL cholesterol, observational studies show a continuous gradient of increasing risk of CVD with increasing levels of the risk factor, with no obvious threshold level. Although, by definition, event rates are higher in persons at high risk, most ischemic vascular events occur in persons with intermediate levels of absolute risk, because there are many more of them than there are persons at high risk.

Prognosis

One Scottish study found that about one-half of persons who have an acute MI die within 28 days, and two-thirds of acute MIs occur before the person reaches the hospital. Persons with known CVD are at high risk of future ischemic heart disease events, as are persons with diabetes. For persons without known CVD, the absolute risk of ischemic vascular events is generally lower, but varies widely. Estimates of absolute risk can be based on simple risk equations or tables. Such information may be helpful in making treatment decisions.

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