Coronary Heart Disease: Difficulty with Lifestyle Modification

---

Posted 3-22-05

Key Points

- Both genetic and environmental factors contribute to risk of coronary heart disease (CHD).
- The "metabolic syndrome" is a constellation of lipid and non-lipid factors of metabolic origin that adds to the risk of CHD at any given level of LDL cholesterol.
- Both genetic and lifestyle factors contribute to the metabolic syndrome.
- Lifestyle changes are an important component of treatment for patients with the metabolic syndrome.

Learning Objectives

Participants will be able to:

- Explain the CHD risk factors that are diagnostic for the metabolic syndrome;
- Discuss the importance of lifestyle modification to treat the metabolic syndrome.

Family History Issues

Premature CHD is defined as CHD or sudden death occurring before age 55 years in a male or before age 65 years in a female. A history of premature CHD in a first-degree relative confers an approximately twofold increased risk of CHD.

Hypertension, diabetes mellitus, and hypercholesterolemia are also more likely to occur when there is a family history of these conditions.

Red Flags 

The presence of any single cardiac risk factor is an indicator for assessment of all cardiac risk factors, due to shared genetic and environmental contributors.

Case 6. A 40-Year-Old Woman who is Overweight, with Low HDL and Borderline Blood Sugar

A 40-year-old woman comes for follow-up. On a previous visit, she noted that her 62-year-old mother had just died of a heart attack, and her brother was found to have elevated cholesterol. Her fasting lipid profile showed her serum cholesterol concentration to be 203 mg/dL, LDL-C 140 mg/dL, HDL 32 mg/dL, and triglycerides 155 mg/dL. She weighed 143 pounds, with a height of 5 feet, 3 inches (body mass index, or BMI ≥25.3; see BMI calculator). Further evaluation of cardiac risk factors revealed a BP of 140/90 and fasting glucose of 120 mg/dL. You advised her to start an exercise program with daily brisk walks of 15 to 30 minutes, and gave her instructions for reducing the calories and fat content of her diet.

On her return visit, weight, blood pressure, and fasting glucose are unchanged. She notes that your recommendations were difficult to follow because she commutes an hour to work each day, leaving little time for exercise, and her husband prefers the traditional foods he ate growing up: eggs and bacon for breakfast, and dinners of meat, potatoes and gravy, with pie for dessert.

Clinical Care Issues

The patient's risk measures indicate that she meets criteria for the "metabolic syndrome," a constellation of lipid and non-lipid cardiac risk factors of metabolic origin (Table 1). In addition, her mother had early CHD. She would benefit from measures to reduce her risk of CHD.

Table 1. Identifying the Metabolic Syndrome

Risk Factor	Diagnostic Measure	
	Men	Women
Abdominal obesity	Abdominal girth >40 in	Abdominal girth >35 in
HDL cholesterol	<40 mg/dL	<50 mg/dL
Triglycerides	≥150 mg/dL	
Fasting glucose	>110 mg/dL	
Blood pressure	≥130/≥85 mmHg	

See NCEP Web site. Diagnosis is based on presence of three or more diagnostic risk factors.

These risk factors often aggregate, and most likely reflect an interaction between genetic factors (for example, genetic predisposition to insulin resistance and/or hypertension and/or dyslipidemia) and lifestyle factors such as a sedentary lifestyle. Patients with the metabolic syndrome have a higher risk of CHD at any given serum concentration of LDL cholesterol (see NCEP Web site).

The initial approach to care for this patient was appropriate: weight reduction and increased physical activity should have a positive effect on all components of the metabolic syndrome. Drug therapy might ultimately be needed to control serum concentration of LDL cholesterol, blood pressure, and/or blood glucose, but lifestyle measures are a mainstay of management and, if successful, could reduce or eliminate the need for drug therapy.

The challenge in the care of this patient is to provide her with assistance in making difficult changes in her lifestyle. Short-term CHD risk is low in women under age 45 years, so a goal of gradual improvement in lifestyle is reasonable; but without attention to the risk factors of the metabolic syndrome, CHD risk is likely to worsen with time and pose a significant risk to the patient.

Risk Assessment

Several elements of the patient's CHD risk profile indicate possible genetic contributors to risk, including her mother's premature CHD, her brother's elevated serum concentration of cholesterol, and the potential for genetic contributors to elevated blood pressure and serum concentration of glucose.

At the same time, lifestyle factors are both an important contributor to her CHD risk profile, and the key to effective management. The first goal of risk assessment in this patient is to identify modifiable risk factors and the behavioral interventions most likely to improve them.

Genetic Counseling and Testing

Although genetic factors are an important contributor to the CHD risk factors identified in this patient, she is unlikely to require genetic counseling unless further investigation of her family history suggests an inherited lipid disorder such as familial combined hyperlipidemia (FCH). [Note: Familial hypercholesterolemia (FH) is an unlikely explanation for her risk, based on her lipid profile.]

The patient may benefit from learning that genetic factors contribute to CHD risk by influencing the likelihood of developing risk factors such as hypertension or diabetes. However, counseling of this patient should emphasize that personal efforts to reduce CHD risk are helpful even when genetic CHD risk is present.

Interventions

Care for this patient should focus on lifestyle changes aimed at increasing her physical activity and improving her diet.

Increasing physical activity. Physical Activity and Health: A Report of the Surgeon General summarizes current findings and recommendations related to physical activity. This report notes that:

- People who are usually inactive can improve their health and well-being by becoming even moderately active on a regular basis.
- Physical activity need not be strenuous to achieve health benefits.
- Greater health benefits can be achieved by increasing the amount (duration, frequency, or intensity) of physical activity.

Many different kinds of physical activities can provide a health benefit, with a longer duration recommended for less intense activities. Exercise should occur on a daily basis if possible. The Surgeon General's Report includes the following examples of daily exercise (from less to more intense; see report for additional examples):

- Washing windows or floors for 45-60 minutes
- Gardening for 30-45 minutes
- Walking 1 3/4 miles in 35 minutes (20 min/mile)
- Pushing a stroller 1 1/2 miles in 30 minutes
- Raking leaves for 30 minutes
- Walking 2 miles in 30 minutes (15 min/mile)
- Swimming laps for 20 minutes
- Jumping rope for 15 minutes
- Running 1 1/2 miles in 15 minutes (10 min/mile)
- Shoveling snow for 15 minutes
- Stairwalking for 15 minutes

In addition, the report notes that "cardiorespiratory fitness gains are similar when physical activity occurs in several short sessions (e.g., 10 minutes) as when the same total amount and intensity of activity occurs in one longer session (e.g., 30 minutes), and for people who are unable to set aside 30 minutes for physical activity, shorter episodes are clearly better than none."

Diet. NCEP guidelines include the following essential features for a diet to reduce CHD risk:

- Reduced intake of saturated fats (to <7% of total calories), cholesterol (to <200 mg per day) and total fat (to 25-35% of total calories).
- Inclusion of plant stanols & sterols (found naturally in fruits, vegetables, nuts, seeds, cereals, legumes, and vegetable oils, particularly soybean oil).
- Inclusion of 20-30 g per day of fiber, including 10-25 g per day of viscous (soluble) fiber (found naturally in oats, barley, soybeans, dried beans and peas, and citrus fruit).
- Balance of energy intake and expenditure to maintain desirable body weight.

Ethical/Legal/Social/Cultural Issues

Cultural barriers to improving diet and physical activity

Many aspects of our society make it difficult for patients to undertake the modifications in diet and exercise that would reduce their CHD risk. Full-time work and long commutes make it difficult to find time for regular exercise, particularly for women who face a "second shift" of housework when they return home. Cultural traditions may also make it difficult to change dietary patterns. A person raised on a high-fat, high-cholesterol, low-vegetable diet

may find dietary recommendations distasteful, unacceptable to family members, or contrary to family traditions.

Some strategies may help patients to overcome these barriers, including the following:

- Employing patient empowerment techniques, which engage the patient in active problem solving to identify strategies to make needed changes [Funnell & Anderson 2004]
- Assisting the patient to identify physical activities that meet other personal goals (such as gardening, raking leaves, or pushing a stroller)
- Encouraging small incremental changes over time (including short exercise sessions when time is limited)
- Encouraging the patient to read food labels to identify fat, fiber, and calorie content of foods, and, if possible, to meet with a nutritionist for assistance in modifying her diet
- Encouraging the patient to include family members in support groups, counseling, and planning efforts to improve diet and exercise — emphasizing that family members are equally likely to benefit

---

Resources

- **American Heart Association**
- **NIH National Cholesterol Education Program**
- **Physical Activity and Health: A Report of the Surgeon General**
- **GeneTests Online Medical Genetics Information Resource**

References

American College of Physicians (1996) Guidelines for using serum cholesterol, high-density lipoprotein cholesterol, and triglyceride levels as screening tests for preventing coronary heart disease in adults. Part 1. *Ann Int Med* 124:515-17 [Medline]

Berg AO, Atkins D, US Preventive Services Task Force (2001) US Preventive Services Task Force: screening for lipid disorders in adults: recommendations and rationale. *Am J Nurs* 102:91, 93, 95 [Medline]

Funnell MM and Anderson RM (2004) Empowerment and self-management of diabetes. *Clin Diabetes* 22:123-7

Hanlon P, McEwen J, Carey L, Gilmour H, Tannahill Tannahill A, Kelly M (1995) Health checks and coronary risk: further evidence from a randomised controlled trial. *BMJ* 311 (7020):1609-13 [Medline]

National Cholesterol Education Program (NCEP) (2001) Third report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) (updated 2004)

Robertson I, Phillips A, Mant D, Thorogood M, Fowler G, Fuller A, Yudkin P, Woods M (1992) Motivational effect of cholesterol measurement in general practice health checks. *Br J Gen Pract* 42:469-72 [Medline]

Strychar IM, Champagne F, Ghadirian P, Bonin A, Jenicek M, Lasater TM (1998) Impact of receiving blood cholesterol test results on dietary change. *Am J Prev Med*14(2):103-10 [Medline]