Cardiovascular disease is a leading cause of death in the United States.

Several risk factors contribute to the development of cardiovascular disease and hypertension, many of which are preventable by improved food habits and lifestyle factors.

Other risk factors are nonmodifiable, such as age, gender, family history, and race.

Coronary Heart Disease

Atherosclerosis

Acute cardiovascular disease

Chronic heart disease

Atherosclerosis

Disease process

- Fatty fibrous plaques develop into fatty streaks on inside lining of major blood vessels
  - Fatty streaks largely composed of cholesterol
  - Thickens, narrowing the interior part of the blood vessel

- If affected vessel is major artery supplying heart muscle, result could be myocardial infarction
• Local area of dead tissue is an infarct

• Atherosclerosis, cont’d

• Disease process, cont’d
  — If affected vessel is major artery supplying brain, result could be cerebrovascular accident
    • Common name, “stroke”

• Atherosclerosis, cont’d

• Disease process, cont’d
  — Identified as coronary heart disease
    — Common symptom is angina pectoris, chest pain usually radiating down the arm, sometimes brought on by excitement or physical effort

• Atherosclerosis, cont’d

• Disease process, cont’d
  — Key terms related to Atherosclerosis:
    • Myocardial infarction
    • Cerebrovascular accident
    • Coronary heart disease
    • Angina pectoris
    • Lipids

• Atherosclerotic Plaque in Artery

• Atherosclerosis: Relation to Fat Metabolism

• Elevated blood lipids associated with coronary heart disease
— Triglycerides: Simple fats in body or food

— Cholesterol: Fat-related compound produced in body; also in foods from animals

— Lipoproteins: “Packages” wrapped with protein that carry fat in the bloodstream

• Atherosclerosis:
  Types of Lipoproteins

• Very-low-density lipoproteins (VLDLs)
  — Carry large load of fat to cells

• Low-density lipoproteins (LDLs)
  — Carry two thirds of total plasma cholesterol to body tissues

• High-density lipoproteins (HDLs)
  — Carry less total fat and more protein

• Cholesterol and Lipoprotein Profile Classification

• Risk Factors in Cardiovascular Disease

• Lipid risk factors
  — LDL cholesterol >130 mg/dl
  — HDL cholesterol <40 mg/dl
  — Total cholesterol >200 mg/dl
  — Triglycerides >150 mg/dl
  — Atherogenic dyslipidemia
Risk Factors in Cardiovascular Disease, cont’d

Nonlipid risk factors

— Nonmodifiable

• Male gender
• Age (men >45 years, women >55 years)
• Heredity (including race)
• Family history of premature cardiovascular disease

Risk Factors in Cardiovascular Disease, cont’d

Nonlipid risk factors, cont’d

— Modifiable

• Cigarette smoking
• Hypertension (>140/90 mm Hg or on antihypertensive medication)
• Physical inactivity
• Obesity (body mass index >30 kg/m2) and overweight (body mass index 25 to 29.9 kg/m2)
• Diabetes mellitus
• Metabolic syndrome
• Atherogenic diet

Risk Factors in Cardiovascular Disease, cont’d

Emerging risk factors

— Emerging lipid risk factors

• Elevated lipoprotein remnants
• Elevated lipoprotein(a)
• Small LDL particles
• Elevated apolipoprotein B
• Low apolipoprotein A1
• High total cholesterol/HDL cholesterol ratio

• Risk Factors in Cardiovascular Disease, cont’d

• Emerging risk factors, cont’d
  — Emerging nonlipid risk factors
    • Hyperhomocysteinemia
    • Thrombogenic and hemostatic factors
    • Inflammatory markers such as C-reactive protein
    • Impaired fasting glucose

• Diagnosing Metabolic Syndrome

• Dietary Recommendations for Reduced Risk

• Dietary Guidelines for Americans, 2005
  — Reduce total amount of fat: no more than 30% of total energy (kilocalories) intake from fat
  — Reduce use of animal fat: no more than one third of total fat kilocalories from saturated animal fat
  — Reduce intake of cholesterol: limit to 300 mg/day

• Dietary Recommendations for Reduced Risk, cont’d

• National Cholesterol Education Program Guidelines
  — Energy intake should reflect energy expenditure
  — Total fat intake no more than 25% to 35% of total kilocalories
  — Carbohydrates comprise 50% to 60% of total energy intake per day
Total protein intake should be 15% of total energy intake

Less than 200 mg dietary cholesterol per day

• American Heart Association and NCEP Recommendations for Lowering Cholesterol

• ATP III LDL Cholesterol Goals and Cut Points for TLC and Drug Therapy

• Acute Cardiovascular Disease

• Objective: Cardiac rest

• Principles of diet therapy
  — Energy intake
  — Texture
  — Fat
    — Sodium (2 to 4 g/day)

• Chronic Heart Disease

• Objective: Control of pulmonary edema
  — Fluid shift mechanism
  — Hormonal alterations

• Principles of diet therapy
  — Sodium restriction
  — Fluid restriction
  — Texture
  — Small meals
  — Alcohol

• Chapter 19

Lesson 19.2
• Key Concepts

• Hypertension, or chronically elevated pressure, may be classified as essential (primary) or secondary.

• Hypertension damages the endothelium of blood vessels.

• Key Concepts, cont’d

• Early education is critical for the prevention of cardiovascular disease.

• Essential Hypertension

• Incidence and nature
  — 23% of American adults have high blood pressure (hypertension)
  — Injury to inner lining of blood vessel wall appears to be underlying link to cause
  — Secondary hypertension is symptom or side effect of another primary condition
  — Hypertension called the “silent disease”

• Types of Hypertensive Blood Pressure Levels

• Prehypertension
  — Focus on lifestyle modifications

• Stage 1 hypertension
  — Diet therapy and drugs as needed

• Stage 2 hypertension
  — Diet therapy and vigorous drug therapy

• Drug-Nutrient Interaction
The grapefruit conundrum

- Calcium channel blockers
  - Gastrointestinal complaints such as constipation and nausea
  - Headache
  - Flushing
  - Bradycardia or reflex tachycardia
  - Skin rash

Drug-Nutrient Interaction, cont’d

The grapefruit conundrum, cont’d

- HMG-CoA reductase Inhibitors
  - Gastrointestinal complaints such as constipation, diarrhea, stomach pain, heartburn, gas
  - Headache
  - Muscle pain
  - Increased risk of myopathy
  - Skin rash

Classification of Blood Pressure for Adults

Principles of Nutrition Therapy

- Weight management: Lose weight and maintain appropriate weight for height
- Sodium control
- Other minerals: Calcium, magnesium
- DASH diet: Lower blood pressure through diet alone
- Additional lifestyle factors
• Education and Prevention
  Practical Food Guides

• Food planning and purchasing
  — Control energy intake; read labels
  — Eat fresh foods with small selection of processed foods

• Food preparation
  — Use less salt and fat
  — Use seasonings instead (herbs, spices, lemon, onion, garlic, etc.)

• Special needs

• Education Principles

• Start early
  — Prevention begins in childhood, especially with children in high-risk families

• Focus on high-risk groups
  — Direct education to people and families with risk of heart disease and hypertension

• Use variety of resources
  — National organizations, community programs, registered dietitians

• Summary

• Coronary heart disease is the leading cause of death in the United States. Its underlying blood vessel disease is atherosclerosis.

• The risk for atherosclerosis increases with the amount and type of blood lipids (fats), or lipoproteins, available. Elevated serum cholesterol is a primary risk factor for development of atherosclerosis.

• Summary, cont’d
Current recommendations to help prevent coronary heart disease involve a low-fat balanced diet, weight management, and increased physical activity.

Dietary recommendations for acute cardiovascular disease (e.g., heart attack) include measures to ensure cardiac rest (e.g., energy restriction, and small meals, modified in fat, cholesterol, and sodium).

Summary, cont’d

Persons with chronic heart disease involving congestive heart failure benefit from a low-sodium diet to control pulmonary edema.

Persons with hypertension may improve their condition with weight control, exercise, sodium restriction, and adequate calcium and potassium intake.