By Mohamed F. Abu Alia

Medical Committee
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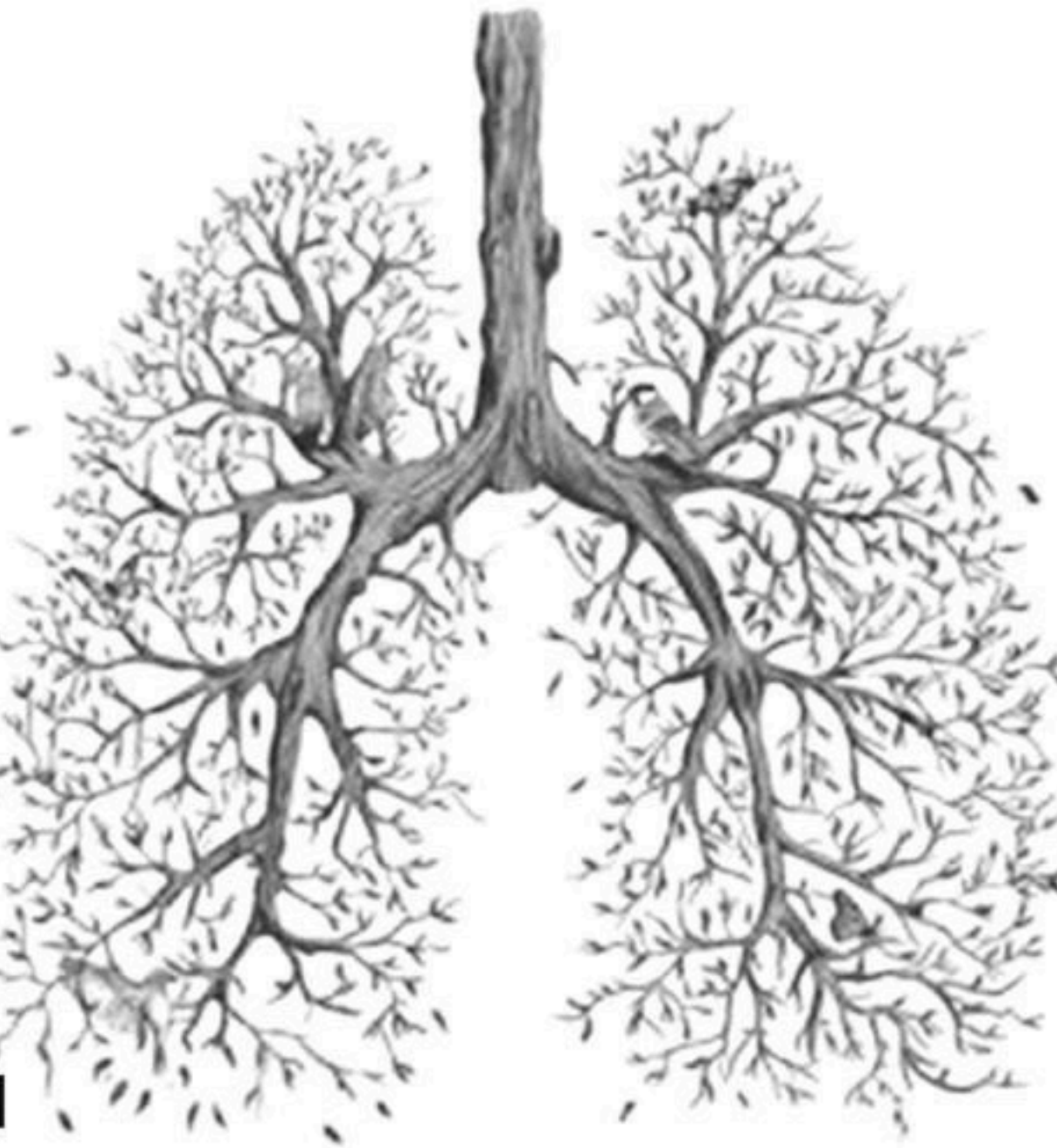
Community Medicine



Slides ■
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Doctor: Ahmad Al-Bataineh

Date:

Medical Nutrition Therapy for Cardiovascular Disease

Krause's *Food & Nutrition Therapy*

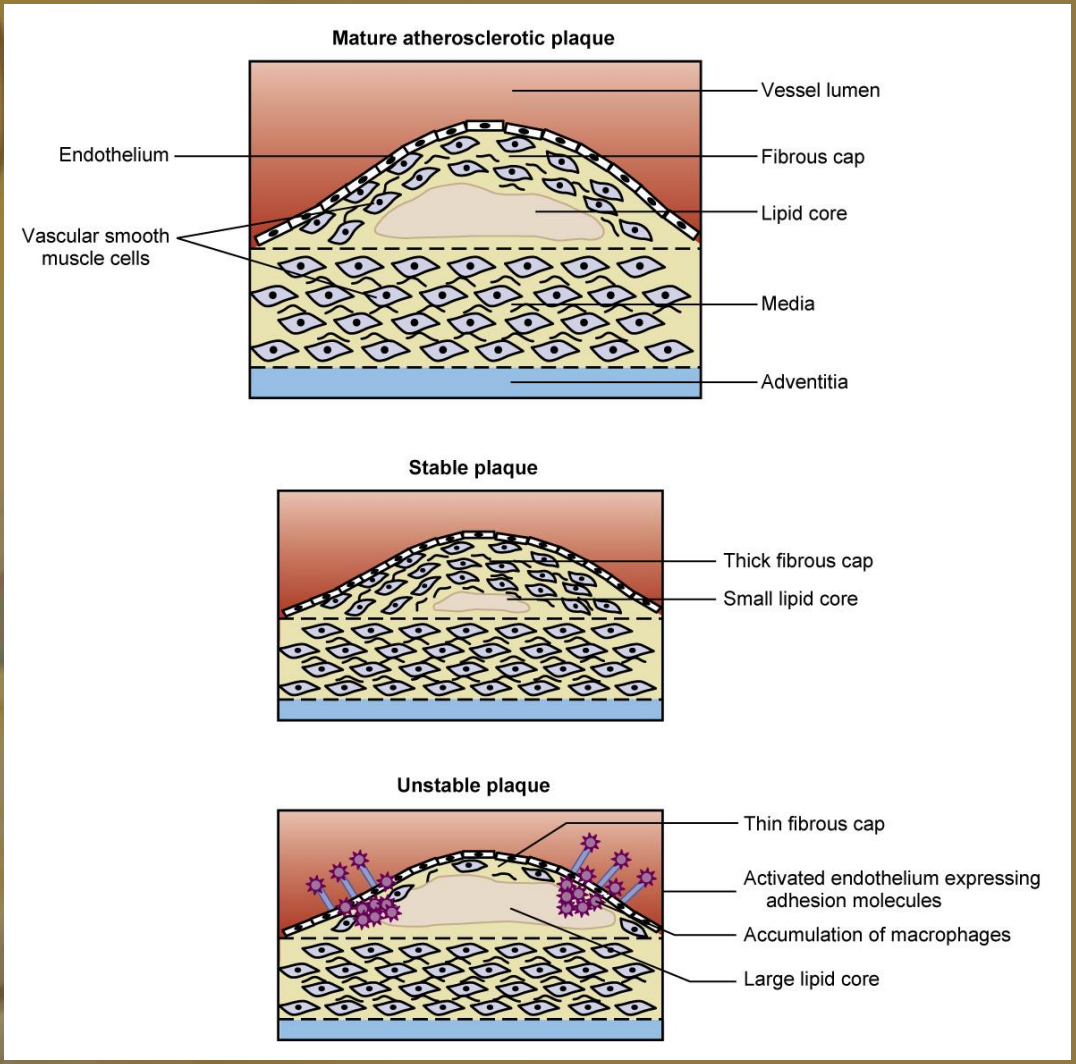
Cardiovascular Disease (CVD)

- CVD has been the leading cause of death in the United States for every year since 1900, except 1918
- Includes deaths from coronary heart disease (CHD) and stroke
- One third of deaths occur before age 65
- Risk reduction; major breakthroughs in prevention and treatment

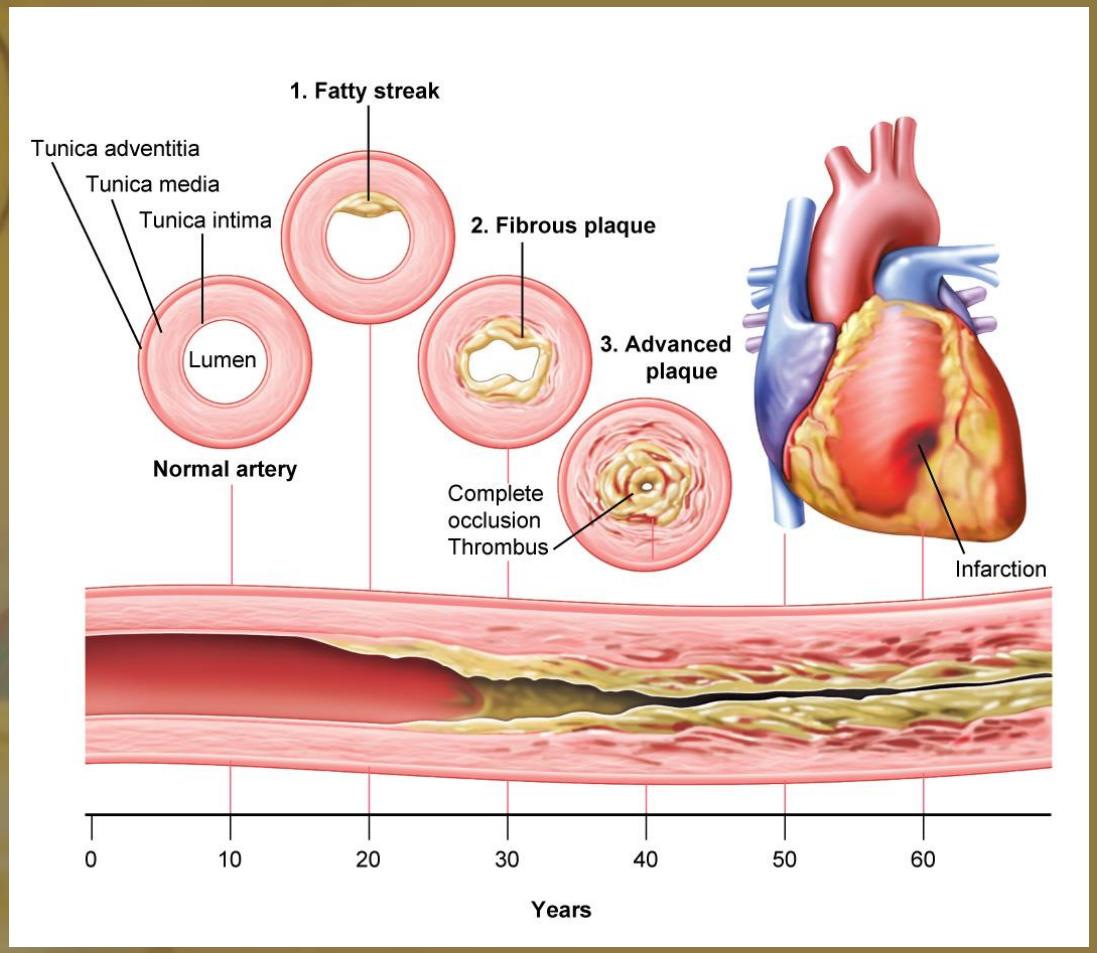
Prevalence and Incidence

- The United States ranks 13th and 17th, among industrialized nations for the prevalence of CVD in women and men, respectively
- More than 71 million Americans have at least one form of CVD (i.e., hypertension, CHD, stroke, rheumatic heart disease, or congestive heart failure)
- The incidence of CHD is high; men experience earlier incidence than women

Structure of Plaque



Natural Progression of Atherosclerosis

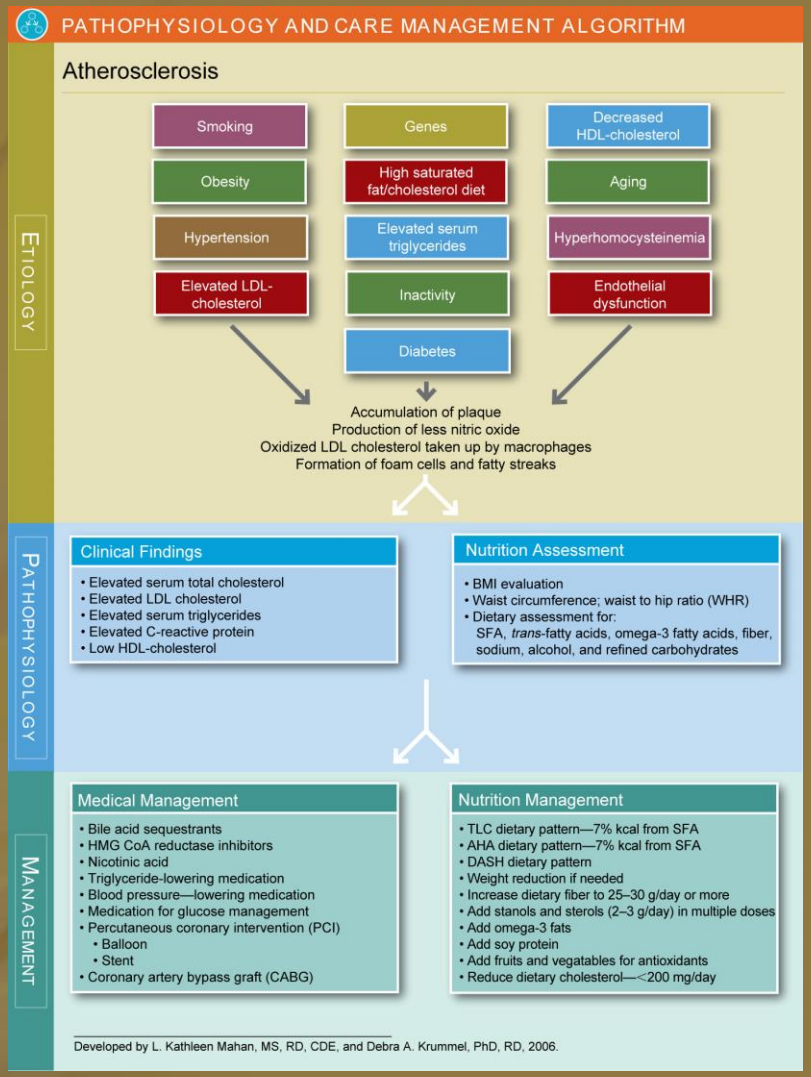


(From Harkreader H. Fundamentals. Philadelphia: W.B. Saunders, 2000)

Plaque That Has Been Surgically Removed from Coronary Artery

Courtesy Ronald D. Gregory and John Riley, MD.

Algorithm for Atherosclerosis



Blood Lipids and Lipoproteins

- Total cholesterol: amount in all lipoprotein fractions
- Total triglyceride: hypertriglyceridemia
- Chylomicrons: transport dietary fat and cholesterol from small intestine to liver and periphery
- VLDL: transport endogenous triglyceride and cholesterol
- LDL: major cholesterol transport lipoprotein
- HDL: reverse cholesterol transport

Genetic Hyperlipidemias

- Familial hypercholesterolemia
- Polygenic familial hypercholesterolemia
- Familial combined hyperlipidemia
- Familial dys-betalipoproteinemia

Cardiovascular Risk Factors

Markers in Blood
Lipoprotein profile
- Low-density–lipoprotein cholesterol
- Total triglycerides
- High-density–lipoprotein cholesterol

Inflammatory Markers
Fibrinogen
C-Reactive protein

Lifestyle Risk Factors
Tobacco
Physical inactivity
Poor diet
Stress
Excessive alcohol consumption

Related Diseases/Syndrome
Hypertension
Diabetes
Obesity
Metabolic syndrome

Prevention of CHD and Stroke

- Alerting risk factors toward healthy patient profile
- Lipid targets—NCEP ATP III—focus on LDL
- Therapeutic lifestyle changes
- Prevention begins in children ages 2+

Assessing Risk

- Counting risk factors and using algorithms
- Very high risk, high risk, moderate risk, low risk
- Imaging tools
- National Screening for Heart Attack Prevention and Education (SHAPE) Program

Blood Markers for CHD

- Lipoprotein profile
  - Total cholesterol >200 mg/dl
  - LDL cholesterol >130 mg/dl
  - HDL cholesterol <40 mg/dl
  - Triglycerides >150 mg/dl
- Inflammatory Markers
  - Fibrinogen
  - C-reactive protein
  - Homocysteine

Lifestyle Risk Factors

- Tobacco use
- Physical inactivity
- Poor diet
- Stress
- Alcohol consumption

Diseases and Syndromes Related to CVD

- Hypertension
- Diabetes
- Obesity (especially abdominal obesity)
- Metabolic syndrome

Metabolic Syndrome

- **Metabolic syndrome** is a disorder of energy utilization and storage, diagnosed by a co-occurrence of three out of five of the following medical conditions: abdominal (central) obesity, elevated blood pressure, elevated fasting plasma glucose, high serum triglycerides, and low high-density cholesterol (HDL) levels. Metabolic syndrome increases the risk of developing cardiovascular disease and diabetes mellitus. The prevalence of metabolic syndrome in USA is 34%.

Non-modifiable Risk Factors

- Menopausal status
- Age
- Family history

AHA 2006 Diet Recommendations for CVD Risk Reduction

- Balance calorie intake and physical activity to achieve or maintain a healthy body weight.
- Consume a diet rich in vegetables and fruits.
- Choose whole grain, high-fiber foods.
- Consume fish, especially oily fish, at least twice a week.
- Limit intake of saturated fat to <7% of energy, *trans*-fat to <1% of energy, and cholesterol to <300 mg/day by:
  - Choosing lean meats and vegetable alternatives.
  - Selecting fat-free (skim), 1%-fat, and low-fat dairy products.
  - Minimizing intake of partially hydrogenated fats.
- Minimize your intake of beverages and foods with added sugars.
- Choose and prepare foods with little or no salt.
- When consuming alcohol, do so in moderation.
- When eating food that is prepared outside of the home, follow the American Heart Association Diet and Lifestyle Recommendations.

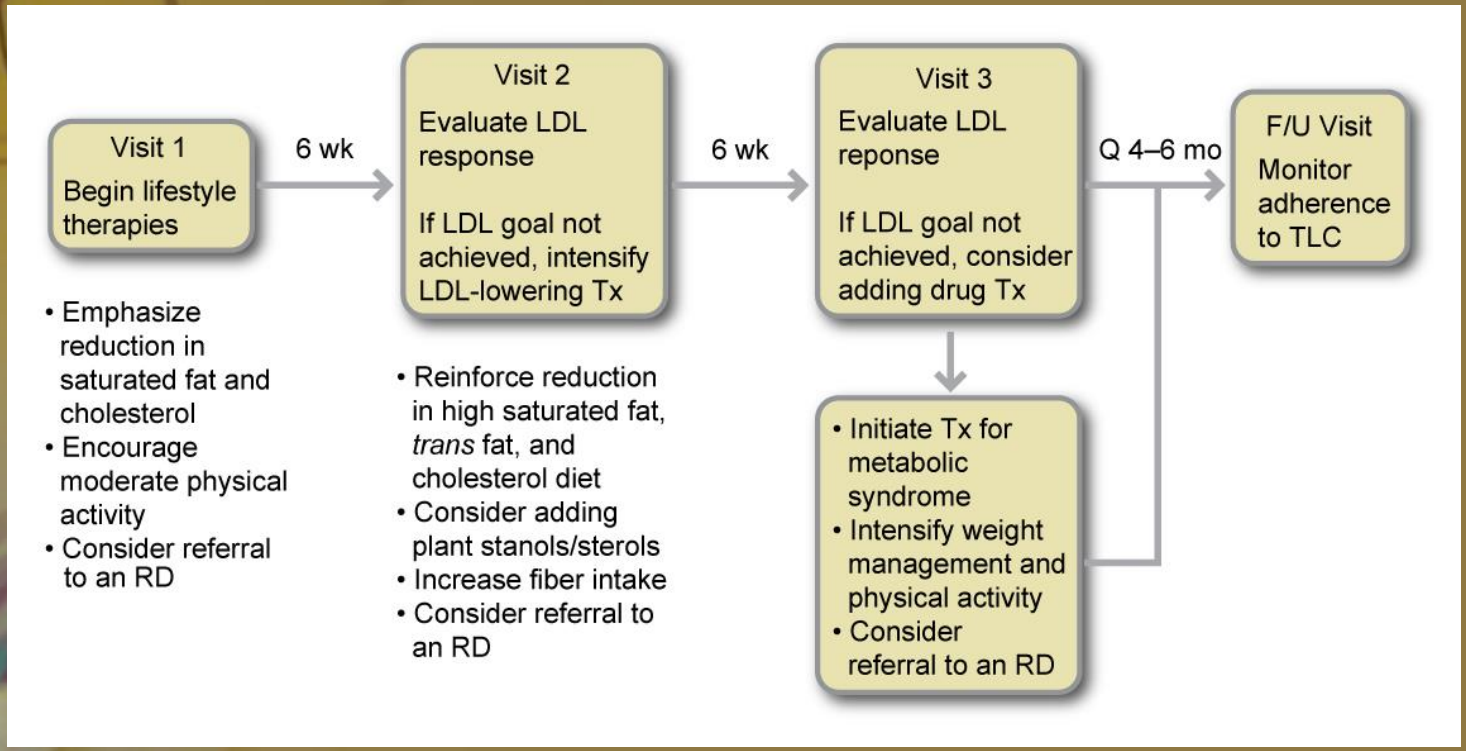
Modified from Lichtenstein AH et al: Diet and lifestyle recommendations revision 2006: a scientific statement from the American Heart Association Committee, *Circulation* 114:83, 2006.

Nutrient Composition of the Dietary Pattern

Nutrient	Recommended Intake
Saturated fat*	Less than 7% of total calories
Polyunsaturated fat	Up to 10% of total calories
Monounsaturated fat	Up to 20% of total calories
Total fat	25%-35% of total calories
Carbohydrate†	50% to 60% of total calories
Fiber	25-30 g/day
Protein	Approximately 15% of total calories
Cholesterol	Less than 200 mg/day
Total calories (energy) ‡	Balance energy intake and expenditure to maintain desirable body weight/prevent weight gain

From National Heart, Lung, and Blood Institute: *Detection, evaluation, and treatment of high blood cholesterol in adults* (adult treatment panel III), Final report, U.S. Department Of Health and Human Services, NIH Publication No. 02-5215, Bethesda, Md, September 2002.
**Trans*-fatty acids are another low-density–lipoprotein raising fat that should be kept at a low intake.
†Carbohydrate should be derived predominantly from foods rich in complex carbohydrates, including grains, especially whole grains, fruits, and vegetables.
‡Daily energy expenditure should include at least moderate physical activity (contributing approximately 200 kcal/day).

Steps in Therapeutic Lifestyle Changes



Therapeutic Lifestyle Changes

- ATP (Adult Treatment Panel) III dietary pattern
- AHA (American Heart Association) recommendations
  - SFA <7% kcals, total fat 25% to 35% kcals, low *trans*-fatty acids
- Increase physical activity and decrease energy intake for weight loss
- DASH pattern
- Very–low-fat diets

Dietary Factors

- Fat
- Saturated fatty acids
- Monounsaturated fatty acids
  - *Trans* fatty acids
- Polyunsaturated fatty acids
- Omega-3 fatty acids
- Amount of dietary fat
- Dietary cholesterol

Dietary Factors–cont'd

- Fiber
- Antioxidants
- Soy protein
- Stanols and sterols
- Weight loss

Medical Intervention

- Percutaneous coronary intervention (PCI)
- Coronary artery bypass graft (CABG)

Myocardial Infarction (MI): Coronary Infarction, Coronary Thrombosis, or Heart Attack

- Some part of coronary circulation blocked
- Ischemia leads to muscle destruction
- Diagnosis: ECG; blood levels of enzymes such as LDH and CPK

Myocardial Infarction (MI)

- Post-infarction nutrition

1. 1st 24 hrs: no caffeine, liquid diet (nausea and choking are common)
2. Small frequent meals; soft or liquid diet
3. Na^+ restriction if BP and fluid status indicate
4. Consistent diet information
5. Drugs that cause nausea—digitalis, morphine

Focal Points

- Lifestyle changes, with medical nutrition therapy at the cornerstone, are pivotal to maintaining cardiovascular health.
- In the past the focus has been on lipid lowering; however, more research is uncovering the role of diet in inflammation and endothelial dysfunction, which are involved in atherogenesis.
- LDL-C levels are the primary target for medical nutrition therapy.
- The AHA, TLCe, and DASH dietary patterns are recommended in both the primary and secondary prevention of CVD.