Lecture 8

PART 1

By: Dana Khlayfat

Community Notes

Topic: Hypertension
Dr. Ahmad Bataineh

By your colleague, Dana Khlayfat

These notes are written as bullet points from the slides with the additional notes added by the doctor next to each and every point. There is no need to study these sheets along with the slides as I have copied all the information from the slides in here.

Anything marked with asterisks (**) are of high importance. There is a good chance the Doctor would get questions from those.

Best of luck. Your feedback would be highly appreciated.

Slide1: Hypertension Statistics

- **Top 10 leading causes of death in Jordan:**
  1- Coronary heart disease (CHD): a.k.a heart disease
  2- Stroke.
  3- **Hypertension (prevalence is 32.2%)
  4- **Diabetes mellitus (prevalence is 15% - 20%)
  5- Road traffic accidents.
- According to the latest WHO data published in April 2011 Hypertension Deaths in Jordan reached 2,354 or 9.34% of total deaths .The age adjusted Death Rate is 87.30 per 100,000 of population ranks Jordan #8 in the world.

Slide2: Essential Hypertension

- The problem of hypertension
- Incidence and Nature: Hypertension, or high blood pressure, is a health problem in the lives of Jordanians. About 32.2% of Jordanian adults have high blood pressure, with the numbers increasing with age. The disease hypertension means essential hypertension. The specific cause is unknown, although injury to the inner lining of the blood vessel wall appears to be an underlying link. Hypertension has been called the **"silent" disease** because no signs indicate its presence, but it can have serious effects if not detected, treated, and controlled. It is usually an **inherited disorder;** children of hypertensive parents may develop the condition at early ages, often in their adolescent years. Hypertension occurs **more frequently in blacks than in whites**.

Important notes have been made in **Bold above.

Slide3: Hypertension

- Persistently high arterial blood pressure
- Systolic blood pressure above 140 mm Hg and/or diastolic blood pressure above 90 mm Hg
- Normotensive = 120/80 mm Hg

- Prehypertensive = 120–139/80-89 mm Hg
- Stage 1 hypertension = 140–159/90-99 mm Hg
- Stage 2 hypertension = >160/>100 mm Hg

(Doctor just read the slides here)

Slide4: Prevalence & Incidence

- **29%** of adult US population
- In Jordan the prevalence of hypertension (SBP/DBP > or = 140/90 mmHg) is **32.3%**
- Related to body mass index: the closer your BMI is to the normal range, the better shape you are in.
- High prevalence in African Americans
- 5% of pediatric population; **prevalence increases with age**
- Strong positive relationship between blood pressure and risk of CVD events

Important notes have been made in **Bold

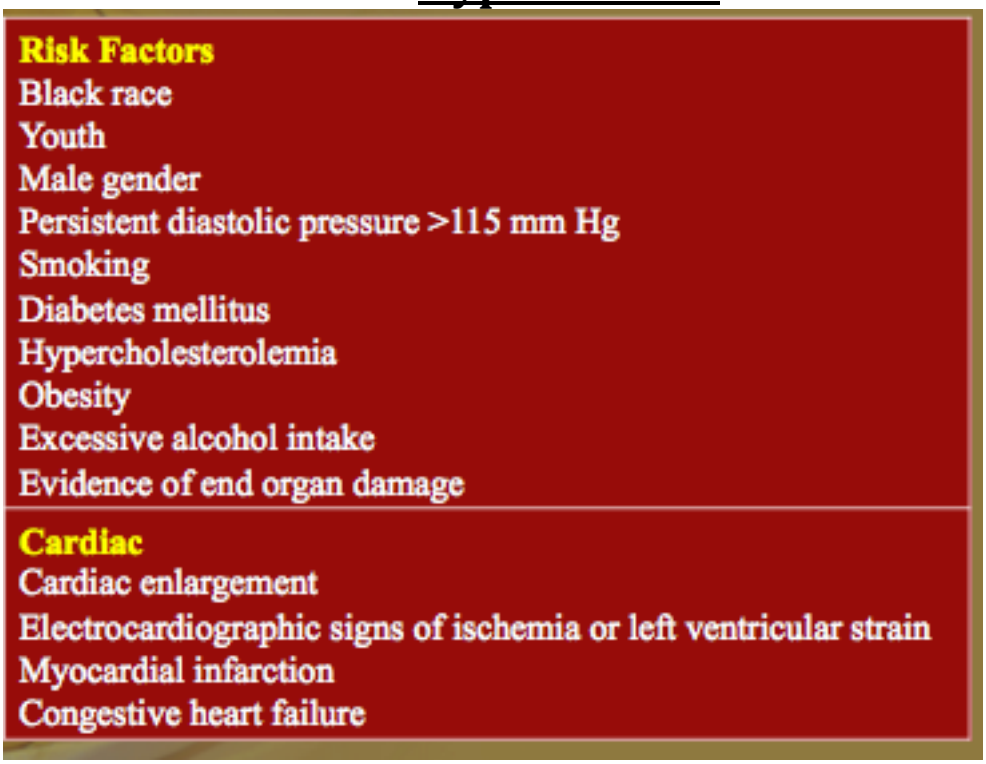
Slide5: Manifestation of Target Organ Disease from Hypertension

-

Organ System	Manifestations
Cardiac	Clinical, electrocardiographic, or radiologic evidence of coronary artery disease; left ventricular hypertrophy; left ventricular malfunction or cardiac failure
Cerebrovascular	Transient isch-emic attack or stroke
Peripheral	Absence of one or more pulses in extremities (except for dorsalis pedis) with or without intermittent claudication; aneurysm
Renal	Serum creatinine >130 mmol/L (1.5 mg/dl), proteinuria (1+ or greater); microalbuminuria
Retinopathy	Hemorrhages or exudates, with or without papilledema

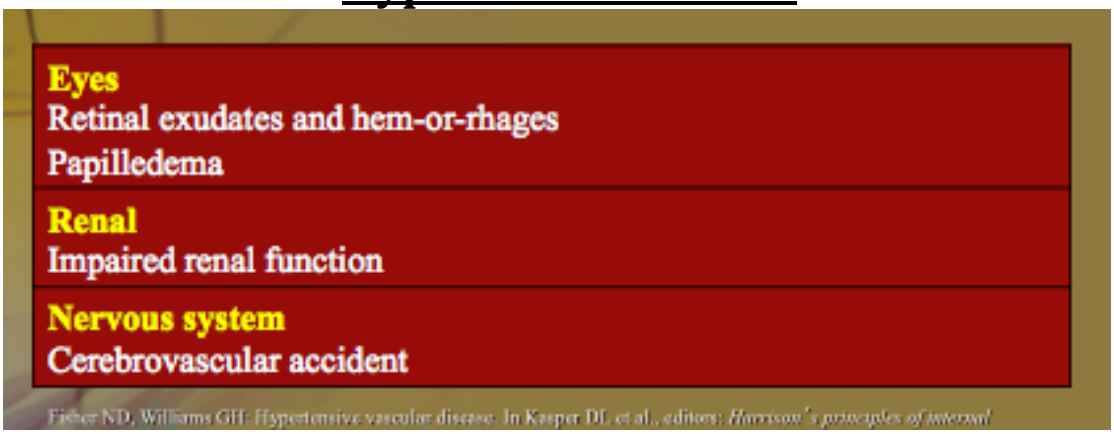
Just know the ones under the headline “organ system”
Retinopathy: relating to the eyes.

Slide6: Risk Factors for and Adverse Prognosis in Hypertension

- 

Just know the Risk Factors
No Numbers required here to memorize

Slide7: Risk Factors for and Adverse Prognosis in Hypertension – cont.

- 

-Hypertension can affect organs other than heart. Why? Because our blood vessels also feed those other organs.

Slide8: Pathophysiology

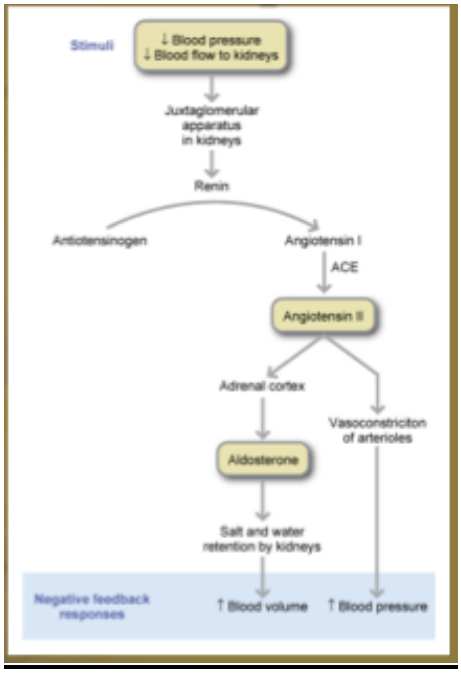
(Important slide)

- Blood pressure is a function of cardiac output multiplied by peripheral resistance: resistance is due to the sedimentation of Cholesterol in the blood vessels making them narrow. This is also known as atherosclerosis.
- Affected by diameter of blood vessel
- Atherosclerosis decreases diameter, increases blood pressure
- Drug therapy increases diameter, lowers blood pressure

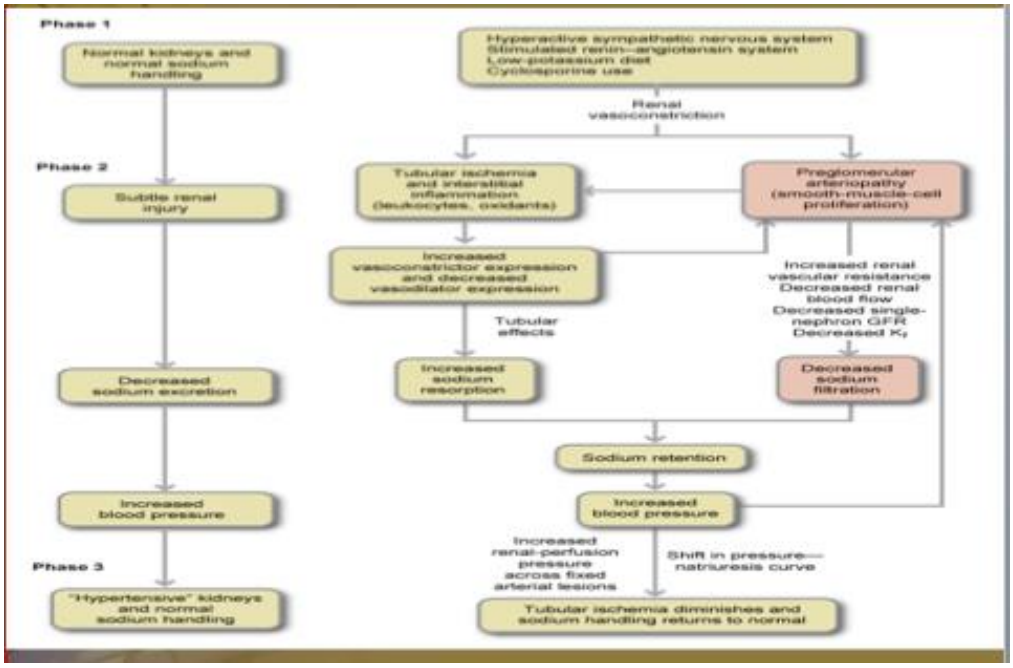
Slide9: Homeostatic Control of Blood Pressure

- Sympathetic nervous system (short-term control)
- **Kidney (long-term control): the kidneys play a major role in maintaining blood pressure.
- Causes of hypertension
  - Hyperactive sympathetic nervous system, overstimulated renin-angiotensin system, low-potassium diet, use of cyclosporine (cause vasoconstriction): THE DOCTOR WILL NOT ASK ABOUT THIS POINT.
  - Chronic inflammation
  - Multi-factorial

Slide10: Renin-Angiotensin Cascade (*Not required for exam)*



Slide11: Development of Hypertension (*not required also*)



Slide12: Primary Prevention

- National High Blood Pressure **Education** Program
- Improve quality of life
- Decrease costs associated with complications: as we have complications from hypertension, costs will be increasing.

Slide13: Lifestyle Modifications to Prevent and Manage Hypertension

Modification	Recommendation	Approximate SBP Reduction (Range)†
Weight reduction	Maintain normal body weight (body mass index 18.5-24.9 kg/m^2).	5-20 mm Hg/10 kg
Adopt DASH eating plan	Consume a diet rich in fruits, vegetables, and low-fat dairy products with a reduced content of saturated and total fat.	8-14 mm Hg
Dietary sodium reduction	Reduce dietary sodium intake to no more than 100 mmol per day (2.4 g of sodium or 6 g of sodium chloride).	2-8 mm Hg
Physical activity	Engage in regular aerobic physical activity such as brisk walking (at least 30 min/day most days of the week).	4-9 mm Hg
Moderation of alcohol consumption	Limit consumption to no more than 2 drinks (e.g., 24 oz of beer, 10 oz of wine, or 3 oz of 80-proof whiskey) per day in most men and to no more than 1 drink per day in women and lighter weight persons.	2-4 mm Hg

**You have to know only the points under the headline “Modifications”
**It is very important to know that Salt-intake must be decreased to 2.3 g to prevent or manage hypertension (NOT 2.4 as its mentioned in the diagram above)
**2.3 grams of salt for prevention ← this piece of information is EXTREMELY important.
**The other numbers are NOT required from you to memorize.

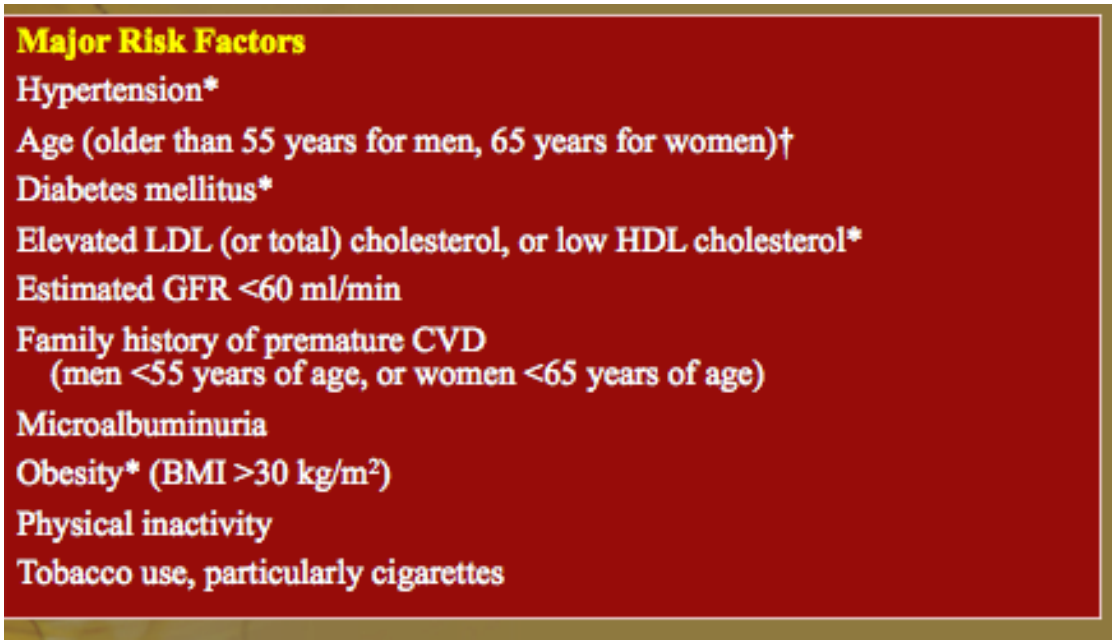
Slide14: Other Dietary Factors

- Potassium: inverse relationship: adopting a diet with potassium has a noticeable decrease in your blood pressure thus

preventing hypertension. Potassium, as well as calcium and magnesium, is good for you.

- Calcium: inverse relationship
- Magnesium: vasodilator
- Lipids: amount and type

Slide15: Cardiovascular Risk Factors



**Only the ages (for females and males) are required.. The other numbers are NOT.

-Microalbumineria: excretion of albumin via urine.

Slide16: Medical Management

- Assessment and history
- Lifestyle changes
- Pharmacologic therapy
  - Diuretics
    - b-blockers

- Other drugs

Slide17: Nutrition Management

- Lifestyle modifications (physical activity is a cornerstone of therapy)
- Weight reduction
- Changing dietary patterns
- DASH diet
- Salt restriction (**2.3 gm**/day of Na is sufficient)
- Other dietary modifications
- Minerals, lipids, alcohol, exercise

Slide18: DASH Diet

- Grains: 6 to 8 servings/day
- Vegetables: 4 to 5 servings/day
- Fruits: 4 to 5 servings/day
- Fat-free or low-fat milk and milk products: 2 to 3 servings/day
- Lean meats, poultry, and fish: 6 oz or less/day
- Nuts, seeds, and legumes: 4 to 5 servings/week
- Fats and oils: 2 to 3 tsp/day
- Sweets and added sugars: 5 or less servings/week

**Numbers are NOT required.

Slide19: Sodium

- Processed and restaurant foods provide 80% of sodium intake

- Read labels; sodium content of different brands varies
- 10% added in cooking at home and at table; 10% naturally occurring
- Americans consume ~4,000 mg/day; 2005 Dietary Guidelines for Americans recommend <2,300 mg/day; those with hypertension, African Americans and middle-aged and elderly should consume **<1,500 mg/day**

**Doctor discussed only one idea here, and that is a person with hypertension should consume 1500 mg/day (1.5 g) and NOT 2.3 g

Slide20: Prudent Diet

	Step I	Step II
Total fat	< 30	< 30
Saturated	< 10	< 7
Monounsaturated	15-10	15-10
Polyunsaturated	10	10
CHO	50-60	50-60
Protein	15-20	15-20
Cholesterol	<300 mg/day	<200 mg/day

**The doctor loves Prudent Diets. This slide is very important, including the numbers.

Slide21: Treatment of Blood Pressure in Children and Adolescents

- Associated with obesity and intake of high-calorie, high-salt foods
- Leads to adverse cardiovascular events in adulthood
- Cut-off points for youth
- Lifestyle modifications (physical activity)

Slide22: Treatment of Blood Pressure in Older Adults

- More than half of the older population has hypertension
- Lifestyle modifications
- Trial of Non-pharmacologic Interventions in the Elderly (TONE)
- Drug treatment

Slide23: Focal Points

(*Focal points are never read by the doctor, so no questions will be asked about them)*

- Lifestyle changes can lower blood pressure and prevent or control hypertension.
- Weight control, physical activity, and a low-fat diet rich in fruits and vegetables with nonfat dairy foods and nuts incorporated have all been shown to lower blood pressure.
- The DASH diet and other nutritional therapies are useful for many individuals with hypertension
- A major reason for inadequate control of high blood pressure is poor adherence to therapy.
- The *Healthy People 2000* objective was to increase to at least 90% the number of people with hypertension who were trying to normalize their blood pressure; this goal was not achieved since 31% of subjects in NHANES III with high blood pressure were not even aware they had hypertension. Barriers to adherence need to be investigated and remedied.

Lecture 8

PART 2

By: Dana Khlayfat

Community Notes

Topic: Cardiovascular Diseases
Dr. Ahmad Bataineh

By your colleague, Dana Khlayfat

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Slide1: 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: stroke = CVA (cerebrovascular attack)
- One third of deaths occur before age 65
- Risk reduction; major breakthroughs in prevention and treatment

  -Cholesterol and atherosclerosis are the main contributors for Cardiovascular diseases.

  -There are 2 factors for controlling CVD's:

Modifiable factors:

1- Changing your lifestyle to the better.

2- Increase your physical activity.

3- not eating fatty food.

Unmodifiable factors: Factors that you cannot control

1- age

2- Sex. Males are more prone to getting CVD's (after 40 years of age, both males and females have the same chances for developing CVD's)

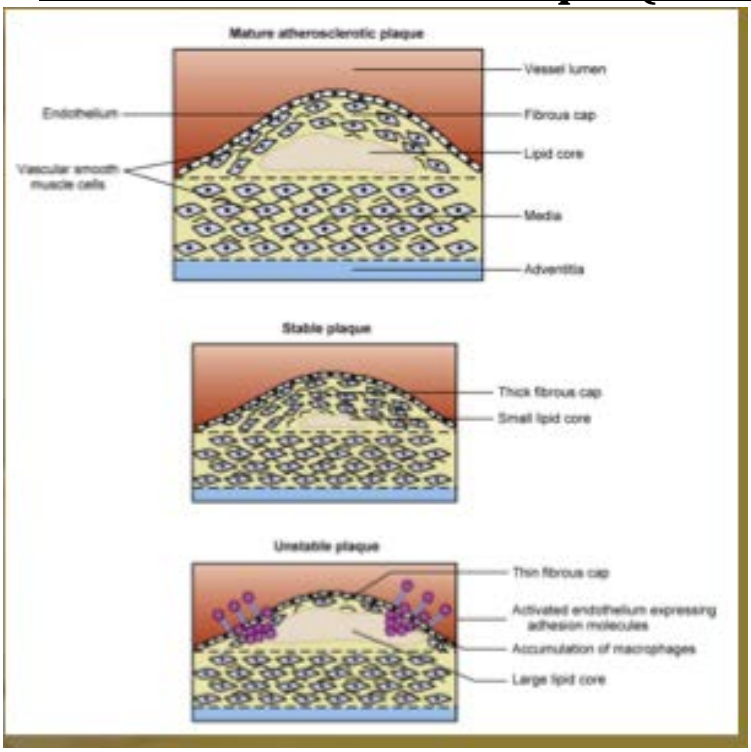
3- Genetics.

Slide2: Prevalence and Incidence

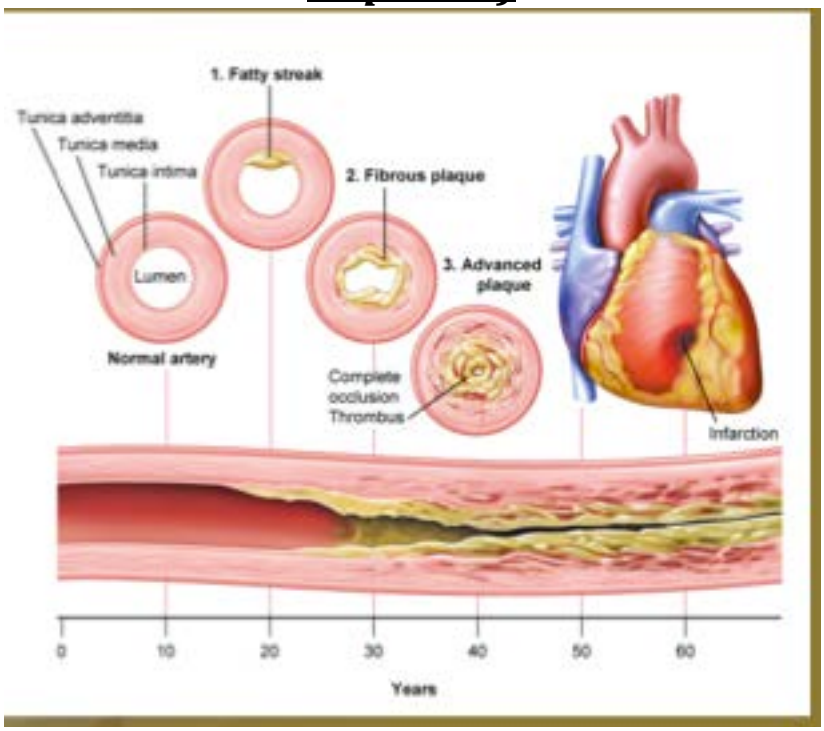
- The United States ranks 13th and 17th, among industrialized nations for the prevalence of CVD in women and men, respectively
- More than 71 million Americans have at least one form of CVD (i.e., hypertension, CHD, stroke, rheumatic heart disease, or congestive heart failure)
- The incidence of CHD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

  **Cardiovascular diseases are ranked number #1 cause of death EVERYWHERE.

Slide3: Structure of Plaque (*not required for exam*)



Slide4: Natural progression of Atherosclerosis (*Not required*)



Slide5: Plaque That Has Been Surgically Removed from Coronary Artery

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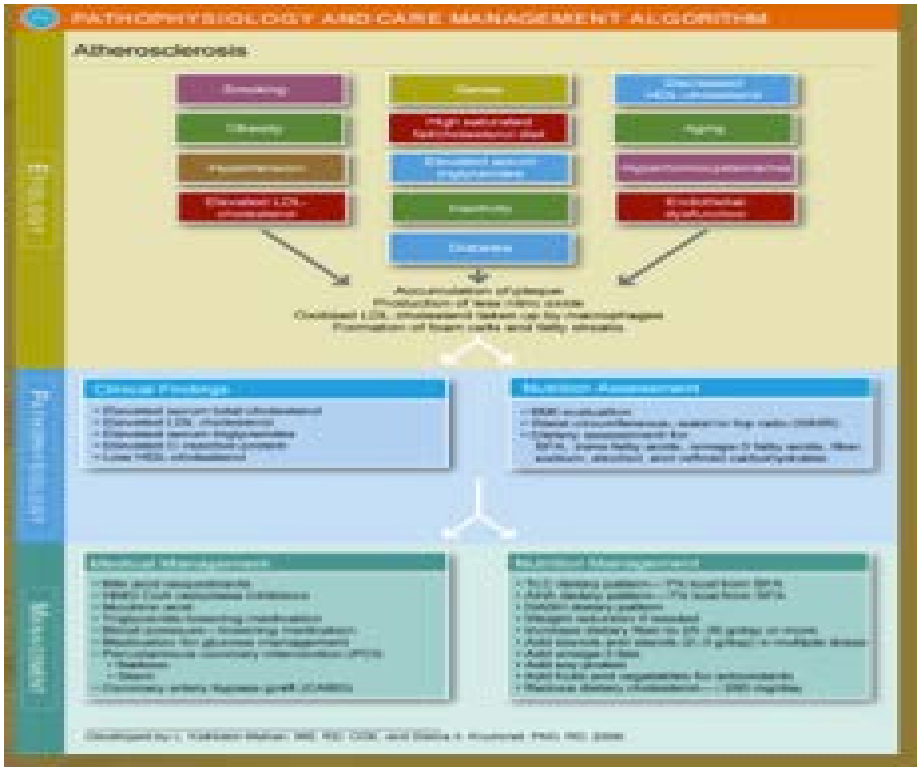
Slide6: Algorithm for Atherosclerosis *(Not required)*

- 

Slide7: Blood Lipids and Lipoproteins

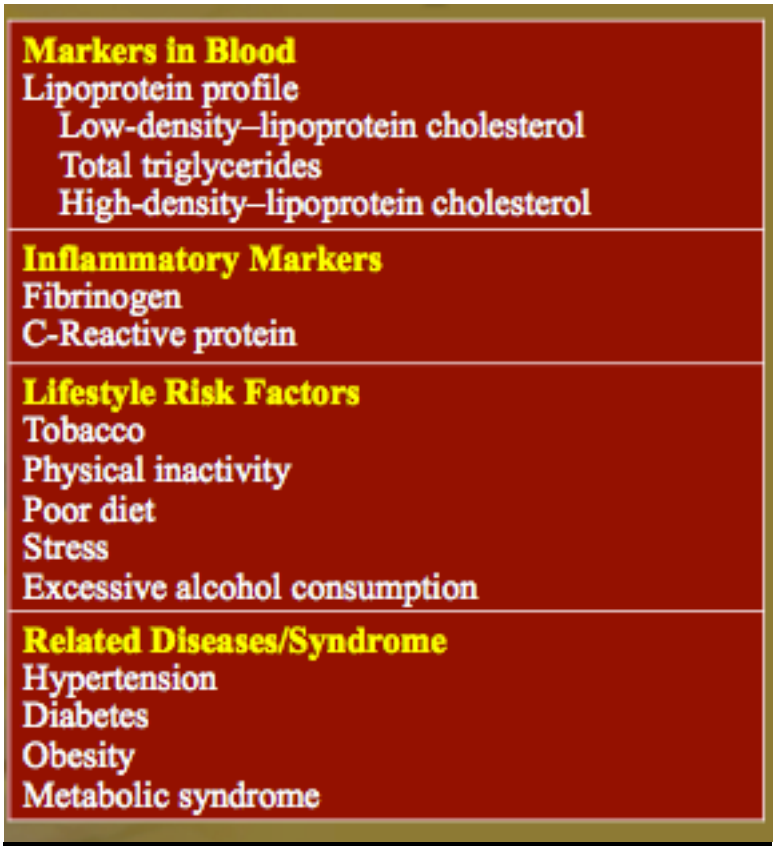
- Total cholesterol: amount in all lipoprotein fractions
- Total triglyceride: hypertriglyceridemia
- Chylomicrons: transport dietary fat and cholesterol from small intestine to liver and periphery
- VLDL [very-low-level density lipoprotein]: transport endogenous triglyceride and cholesterol
- **LDL [low-density lipoprotein]: major cholesterol transport lipoprotein (the BAD cholesterol.. Responsible for CVD)
- **HDL [high-density lipoprotein]: reverse cholesterol transport (the GOOD cholesterol.. Protects us from CVD)

Slide8: Genetic Hyperlipidemias

(Just read)

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

Slide9: Cardiovascular Risk Factors



-Markers in Blood: there are tests performed to know the levels of cholesterol and triglycerides in the blood; if the tests show an increase in any of the levels, then that is a sign for CVD.

-Same thing for inflammatory markers: an increase in the levels of fibrinogen and c-reactive proteins tells us there is inflammation; thus, indicating a problem like CVD.

****This diagram is important**

Slide10: 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+

-There are different strategies adopted by countries to prevent CVD, like screening and ATP (Adult Treatment Panel)
-We have to have a national health program to educate people about Diabetes Mellitus, Hypertension and other CVD.

Slide11: 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

-Risk assessment is according to age and gender. We add up scores for each patient according to his/her age and gender for example, and then add up the scores to see where this patient stands in CVD's. Is he/she at a high risk or low risk?

Slide12: 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

**Numbers are not required.

Slide13: Lifestyle Risk Factors

- Tobacco use

- Physical inactivity
- Poor diet
- Stress
- Alcohol consumption

Slide14: Diseases and Syndromes Related to CVD

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

Slide15: 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 (a score of 3/5 is a strong indicator for having metabolic syndrome): 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%** and **30% in Jordan**.
  -Metabolic syndromes increases risk of CVD's and Diabetes Mellitus.

Slide16: Non-modifiable Risk Factors

- Menopausal status

- Age
- Family history

  -As mentioned before, they are factors that we cannot control.

Slide17: AHA 2006 Diet Recommendations for CVD Risk Reduction

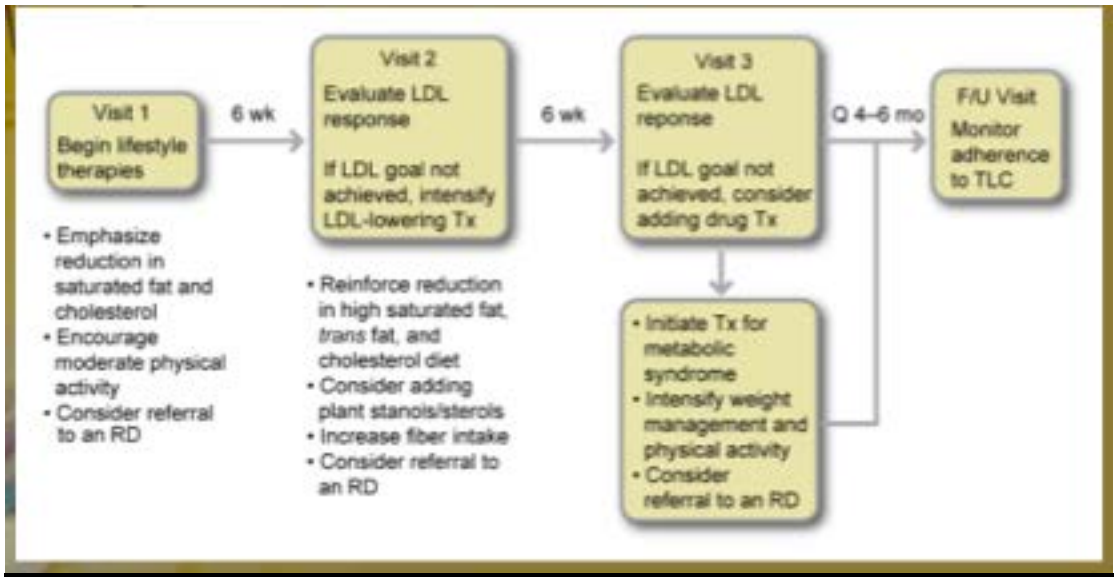
- Balance calorie intake and physical activity to achieve or maintain a healthy body weight.
- Consume a diet rich in vegetables and fruits.
- Choose whole grain, high-fiber foods.
- Consume fish, especially oily fish, at least twice a week.
- Limit intake of saturated fat to <7% of energy, *trans*-fat 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.

Slide18: 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

this slide is **extremely important

Slide19: Steps in Therapeutic Lifestyle Changes (*Not required*)



Slide20: 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

Slide21: 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

Slide22: Dietary Factors–cont'd

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

A VERY important reminder:
**there are 4 kinds of antioxidants:
1- Vitamin A
2- Vitamin E
3- Vitamin C
4- Selenium

Slide23: Medical Intervention

- Percutaneous coronary intervention (PCI)
- Coronary artery bypass graft (CABG): a heart surgery done to fix the coronary heart vessels.

Slide24: 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
  ECG: electrocardiography. Graphing of the heart. An increase in the ST level is a good enough indicator CVD.
  LDH: lactate dehydrogenase.
  CPK: creatine phosphokinase
  (an increase in those 2 enzymes indicates CVD)
  Ischemia: loss of blood supply that will lead to necrosis of the myocardium.

Slide25: Myocardial Infarction (MI)

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

Slide26: 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.