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Medical Committee
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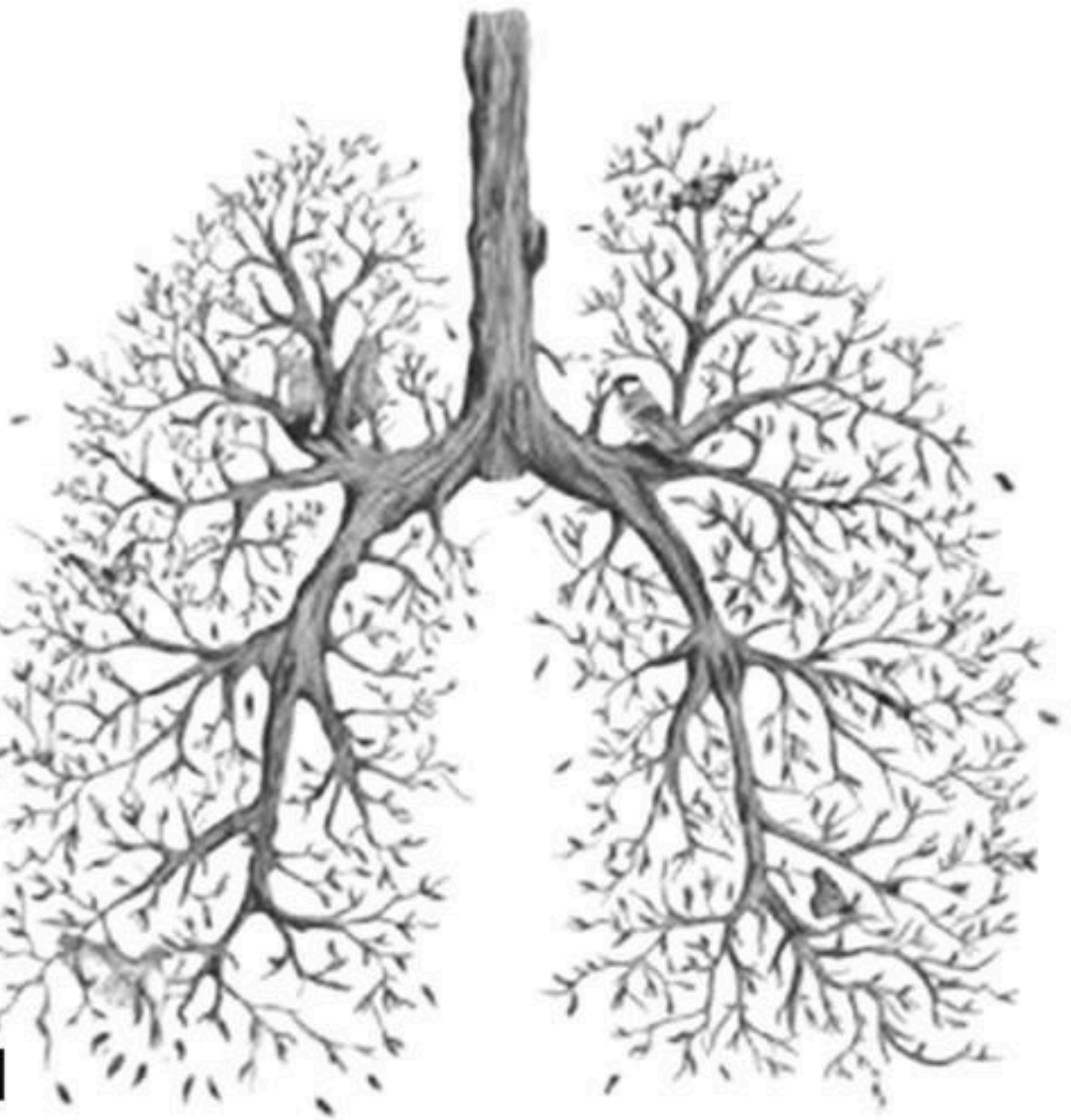
Community Medicine



Slides ■
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Doctor: Ahmad Al-Bataineh

Date:

Medical Nutrition Therapy for Hypertension

Krause's *Food & Nutrition Therapy*

Hypertension statistics

- **Top 10 leading causes of death in Jordan:**

  1. Coronary heart disease (CHD).
  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.

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.

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

Prevalence and 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
- High prevalence in African Americans
- 5% of pediatric population; prevalence increases with age
- Strong positive relationship between blood pressure and risk of CVD events

Manifestations 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

From the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: Fifth report (JNC V), *Arch Intern Med* 153:149, 1993.

Risk Factors for and Adverse Prognosis in Hypertension

Risk Factors
Black race
Youth
Male gender
Persistent diastolic pressure >115 mm Hg
Smoking
Diabetes mellitus
Hypercholesterolemia
Obesity
Excessive alcohol intake
Evidence of end organ damage
Cardiac
Cardiac enlargement
Electrocardiographic signs of ischemia or left ventricular strain
Myocardial infarction
Congestive heart failure

Fisher ND, Williams GH: Hypertensive vascular disease. In Kasper DL et al., editors: *Harrison's principles of internal medicine,* ed 16, New York, 2005, McGraw-Hill.

Risk Factors for and Adverse Prognosis in Hypertension – cont.

Eyes Retinal exudates and hem-or-rhages Papilledema
Renal Impaired renal function
Nervous system Cerebrovascular accident

Fisher ND, Williams GH: Hypertensive vascular disease. In Kasper DL et al., editors: *Harrison's principles of internal medicine,* ed 16, New York, 2005, McGraw-Hill.

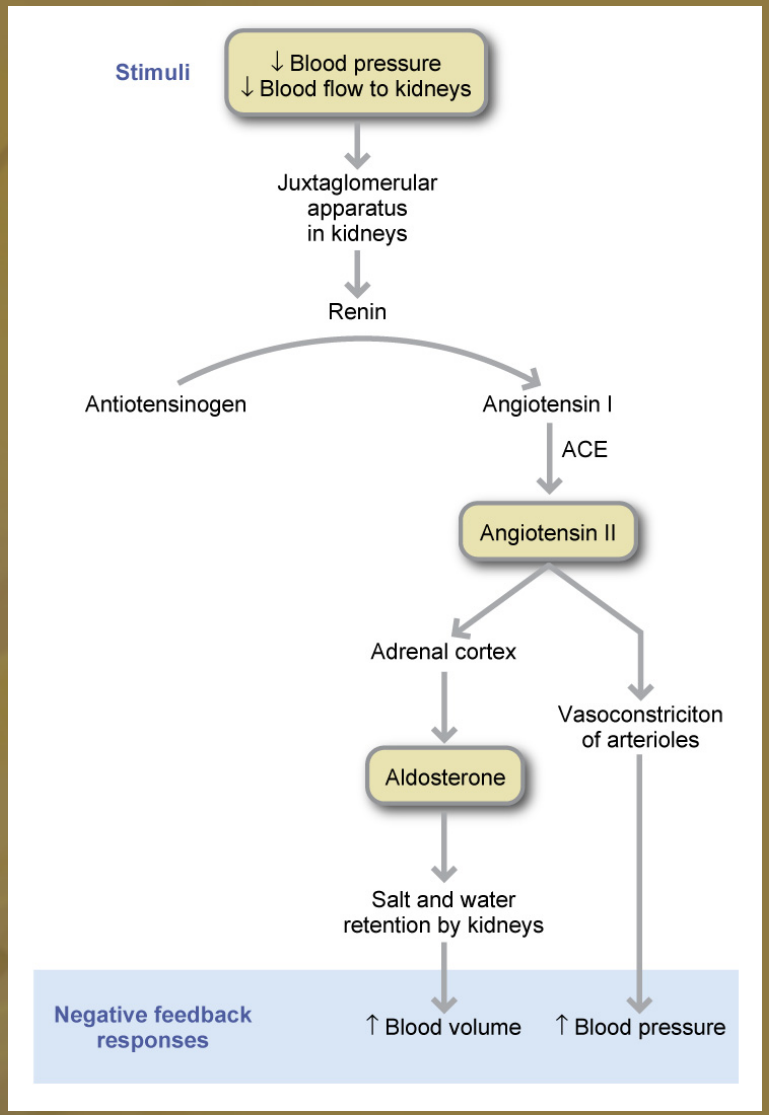
Pathophysiology

- Blood pressure is a function of cardiac output multiplied by peripheral resistance
- Affected by diameter of blood vessel
- Atherosclerosis decreases diameter, increases blood pressure
- Drug therapy increases diameter, lowers blood pressure

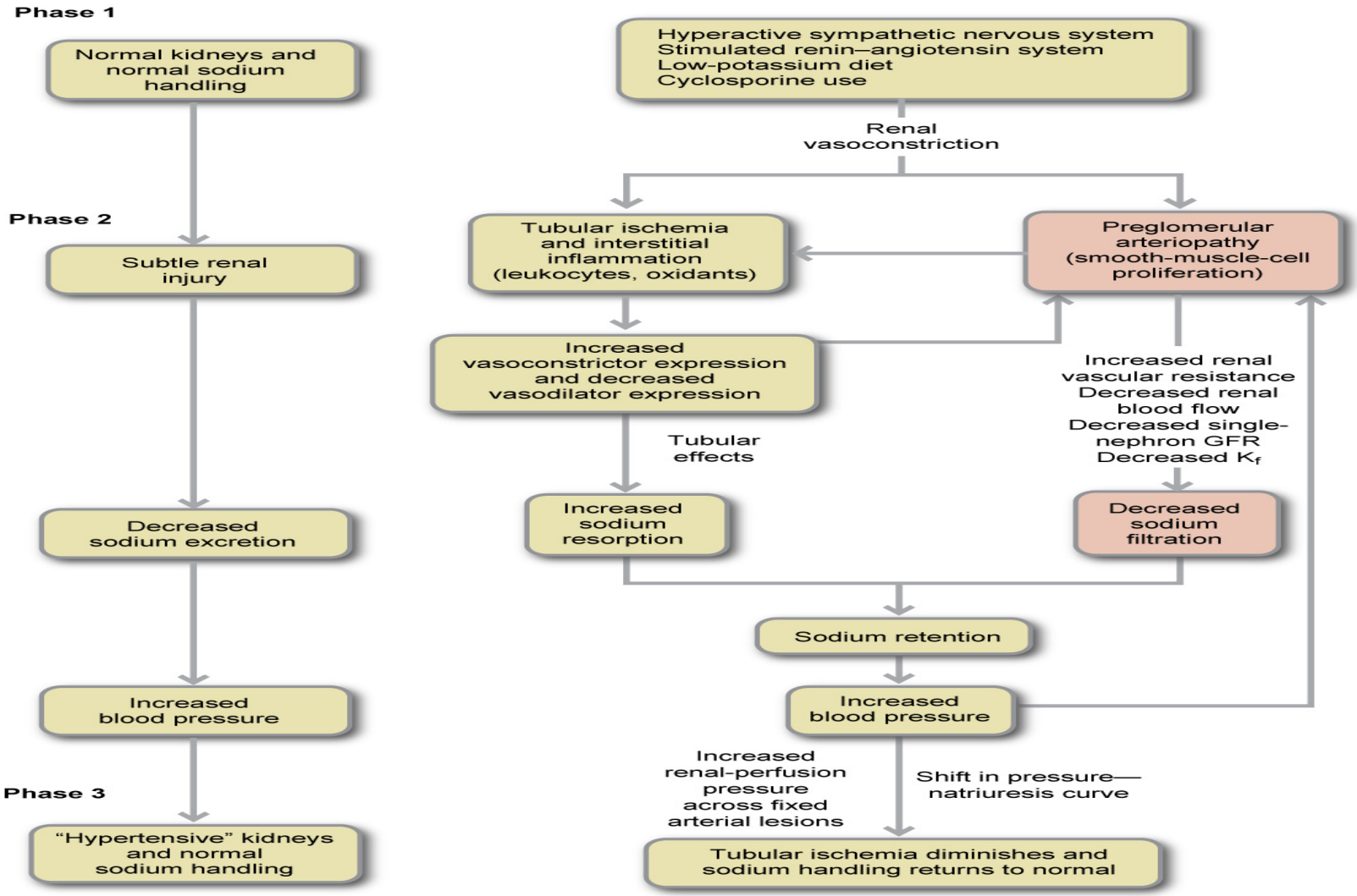
Homeostatic Control of Blood Pressure

- Sympathetic nervous system (short-term control)
- Kidney (long-term control)
- Causes of hypertension
  - Hyperactive sympathetic nervous system, overstimulated renin-angiotensin system, low-potassium diet, use of cyclosporine (cause vasoconstriction)
  - Chronic inflammation
  - Multi-factorial

Renin-Angiotensin Cascade



Development of Hypertension



Primary Prevention

- National High Blood Pressure Education Program
- Improve quality of life
- Decrease costs associated with complications

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

From National Institutes of Health, National Heart, Lung, and Blood Institute National High Blood Pressure Education Program: The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure, NIH Publication No. 04-5230, August 2004.

DASH, Dietary Approaches to Stop Hypertension; *SBP,* systolic blood pressure.

*For overall cardiovascular risk reduction, stop smoking.

†The effects of implementing these modifications are dose and time dependent and could be greater for some individuals.

Other Dietary Factors

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

Cardiovascular Risk Factors

Major Risk Factors

Hypertension*

Age (older than 55 years for men, 65 years for women)†

Diabetes mellitus*

Elevated LDL (or total) cholesterol, or low HDL cholesterol*

Estimated GFR <60 ml/min

Family history of premature CVD
(men <55 years of age, or women <65 years of age)

Microalbuminuria

Obesity* (BMI >30 kg/m^2)

Physical inactivity

Tobacco use, particularly cigarettes

Modified from National Institutes of Health, National Heart, Lung, and Blood Institute National High Blood Pressure Education Program: The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure, NIH Publication No. 04-5230, August 2004.
BMI, Body mass index; *CVD,* cardiovascular disease; *GFR,* glomerular filtration rate; *HDL,* high-density lipoprotein; *LDL,* low-density lipoprotein.
*Components of the metabolic syndrome. Reduced HDL and elevated triglycerides are components of the metabolic syndrome. Abdominal obesity also is a component of metabolic syndrome.
†Increased risk begins at approximately 55 and 65 years of age for men and women, respectively. Adult Treatment Panel III used earlier age cut points to suggest the need for earlier action.

Medical Management

- Assessment and history
- Lifestyle changes
- Pharmacologic therapy
  - Diuretics
  - β-blockers
  - Other drugs

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

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

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

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

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)

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

Focal Points

- 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.