The Cardio-VASCULAR System

- ○ Anatomy
- ○ Histology
- ○ Pathology
- ○ Pharmacology
- ○ Physiology
- ○ Microbiology
- ● **PBL**

Lec #: **3**

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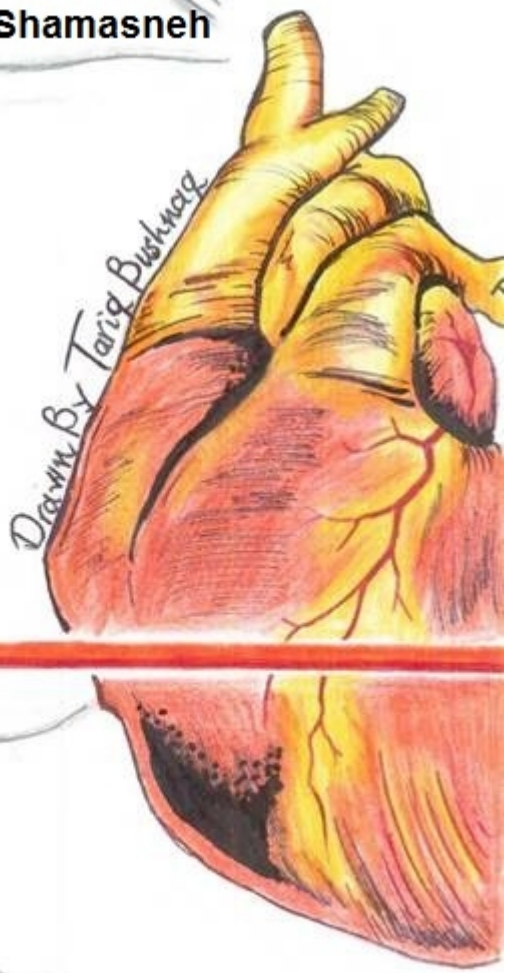
- ○ Handout
- ● Sheet
- ○ Slide



Hypertension

The doctor introduces himself and says that a lot of specialties overlap in the treatment of hypertension (cardiology, nephrology, primary care). The most important thing is the care of the patient, and the doctor believes that the science is the same with some differences from patient to another. Now you can be a hypertension specialist without being a cardiologist nor a nephrologist; if you are a primary health physician with one extra year of subspecialty in hypertension.

What is hypertension?

- Blood pressure higher than or equal to 140/90.
- Only (5%-10%) of patients has secondary hypertension.
- Blood pressure is the summation of cardiac output multiplied by the systemic vascular resistance.
- Factors affecting blood pressure are: heart rate, sympathetic and parasympathetic innervation which works on the heart and vessels (vasodilation-constriction), fluid volume achieved through renin-angiotensin system, aldosterone and ADH.

Latest updates for the JNC (Joint National Committee):

1- Optimal BP is less than (120/80).
2- Pre-hypertension is (120 to 139 /80 to 89) we don't treat it but we raise a red flag and be careful. (changing life style to a healthy life style)
3- Stage one hypertension is (140 to 159/90 to 99).
4- Stage two hypertension is (160 and above/100 and above). We have to differentiate between stage one and two because in case of stage two we start 2 drug therapy.

➢ Note: one elevated number (systolic of diastolic) is enough to diagnose hypertension; eg. (120/95) he is first stage hypertension.

➢ Note: usually patients under 50 years have isolated diastolic BP and patients above 50 have isolated systolic BP.

Types of hypertension:

Hypertension is divided into:

1. Essential "Primary" (90%-95%):

Primary hypertension (essential) we don't know exactly why some people have it and other don't but there is possibility of increasing sympathetic nervous system increase vascular resistance.

It has an association (NOT causation) with some risk factors such as smoking, obesity, age, excessive alcohol consumption, diabetes mellitus, family history and stress.

2. Secondary (5%-10%).

Secondary hypertension there is obvious cause for it like:

- Coarctation of the aorta : aortic stenosis distal to the left subclavian resulting in a large pressure difference between the upper and lower extremities → **brachiofemoral delay**.
- Renal blood flow reduction (renal diseases).
- Endocrine disorders (thyroid ..)
- Neurological disorders.

Complications of hypertension:

We recall that hypertension is a **silent killer** because most of the patients are asymptomatic and the represent complications (morbidity to mortality) such as headache, strokes, dizziness.

Hypertension is a risk factor for coronary disease and atherosclerosis.

The effect of hypertension on the vital organs:

1- On the heart: MI, HF, left ventricular hypertrophy.
2- On the brain: ischemic and hemorrhagic strokes, dementia.
3- On the kidney: proteinuria, hematuria and renal failure
4- On the eyes retinal hemorrhage.

If a patient came to you to measure his pressure you should measure it twice in one week and the patient should be calm. We use both hands and the higher BP is taken in consideration (we measure the pressure for left and right hands of the patients). You should tell the patient to measure his BP at home and bring the measurements with him because that gives us more reliable measurements as some patients might get stressed at the hospital (white coat syndrome) → more adrenaline → higher pressure readings.

Recently the guide lines of the treatment targets have changed, people over 60 years the treatment goal is (150/90) bp and that's accepted, people younger than 60 years the treatment goal is (140/90). If the patient is diabetic or has chronic kidney disease the BP should be less than (140/90) regardless of his age

DASH diet (Dietary Approach to Stop Hypertension) it's a diet that is rich in fruit, veges, whole grains and low fat dairy foods and sodium.

That is the first part of the lecture; now let's begin with the second part:

The second part of the lecture has a small relation with the secondary hypertension and the problems to be faced and solved.

How to find out secondary hypertension:

1- If the age is less than 30 or more than 50.
2- If we try drugs and none of the drugs work.
3- If we find certain findings in the lab like (K^+ in too low, epigastric bruit (vascular murmur in the epigastric area heard by the stethoscope), differential BP, episodic hypertension, flushing, palpitation.

Causes of sec hypertension:

- Common: diabetic nephropathy, polycystic kidney disease, renovascular hypertension.
- Uncommon: excess corticosteroid, Cushing, coarctation of the aorta, hyperthyroidism and hypothyroidism.

Renal disease is the most common cause of sec hypertension (2%-5%), hypertension is both a cause and a consequence of renal diseases, the effect is multi factorial as a result of disturbances in sodium-water balance.

Types of renovascular diseases: (This is one important etiology)

1- In young female we call it FMP (fibromuscular dysplasia), affects mid and distal part of the media of the renal artery (stenosis then aneurysm) "على شكل المسبحة" , we treat it with balloon angioplasty.
2- In older patients (males or females): atherosclerosis affects the proximal part of the renal artery and the treatment is pda stent, it's more common.

- When there is renal artery stenosis that will lead to renin-angiotensin system activation → high blood pressure.

Patients with high BP and **epigastric bruit** their hypertension is more likely to be caused by **renal artery stenosis**, because that's where you can hear turbulence of flow caused by the stenosis segment. In ultra sound you will see small kidney as a result of hypo-perfusion. You'll also see asthenia

Patients with primary hyperaldosteronism caused by adrenal adenoma or bilateral adrenal hyperplasia, maybe asymptomatic or it can cause polyuria. There are no signs clinically only by labs tests: any increase in aldosterone causes hypokalemia and fluid retention → elevated blood pressure. Treatment is by surgical removal of the tumor, aldosterone antagonist (Spironolactone).

Obstructive sleep apnea (OSA):

Especially in **obese** people with **short necks**. Usually the pulmonologist takes them to sleep labs where they sleep and get their brain waves and the oxygen levels recorded in order to calculate their apnea index.

OSA relation with the heart:

1- Resistance secondary hypertension
2- Congestive heart failure
3- Atrial fibrillation

O_2 in needed during night and patients with OSA will suffer from hypoxia during sleep so they can't sleep well during night, and he comes to your clinic with symptoms of **daylight sleepiness and loss of concentration**, how do you manage? by putting continuous positive airway pressure (CPAP) during sleeping.

Pheochromocytoma:

It's an adrenal medullary tumor that results in hypersecretion of catecholamines. Clinical features include palpitations, sweating, abdominal pain, hypertension, irritability and anxiety. There are certain things that stimulate it like (wine, cheese, drugs). The patient suffers from resistant secondary hypertension. Diagnosis is done by testing plasma metanephrine, 24 hour urinary collection for catecholamine. Treatment is done by surgical removal of the tumor, beta blocker but they must be used carefully.

Cushing syndrome:

High cortisol level (moon face, skin very fragile "abdominal striae", muscle weakness, buffalo hump, diabetes, proximal muscle weakness, acne and hirsutism) and these patients suffer from secondary hypertension at a young age. Screening tests include blood sugar and cortisol levels, low-dose dexa suppression test, 24 hour for cortisol in urine, MRI of the pituitary. Treatment is done by reduction of corticosteroid use, surgery, medication and radiation therapy.

the end.....

sorry for any mistake

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