Cardiovascular system (PART 4)

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Lec. 8

Cardiovascular Disorders

Hypertension

- **hypertension** is an elevation of **systolic** blood pressure **above 130 mm. Hg** &/or **diastolic** **above 80 mm. Hg**
- Normal value **120/80** mm. Hg.
- Stage 1: systolic between **130-139** or diastolic between **80-89**.
- Stage 2: systolic at least **140** or diastolic at least **90**.

Normal pressure value		
120	Systolic B.P.	Depend on cardiac output C.O.
80	Diastolic B.P.	Depend on total peripheral resistance.

It is mathematically defined as the product of cardiac output (CO) and total peripheral resistance (TPR) according to the following equation:

BP=CO * TPR

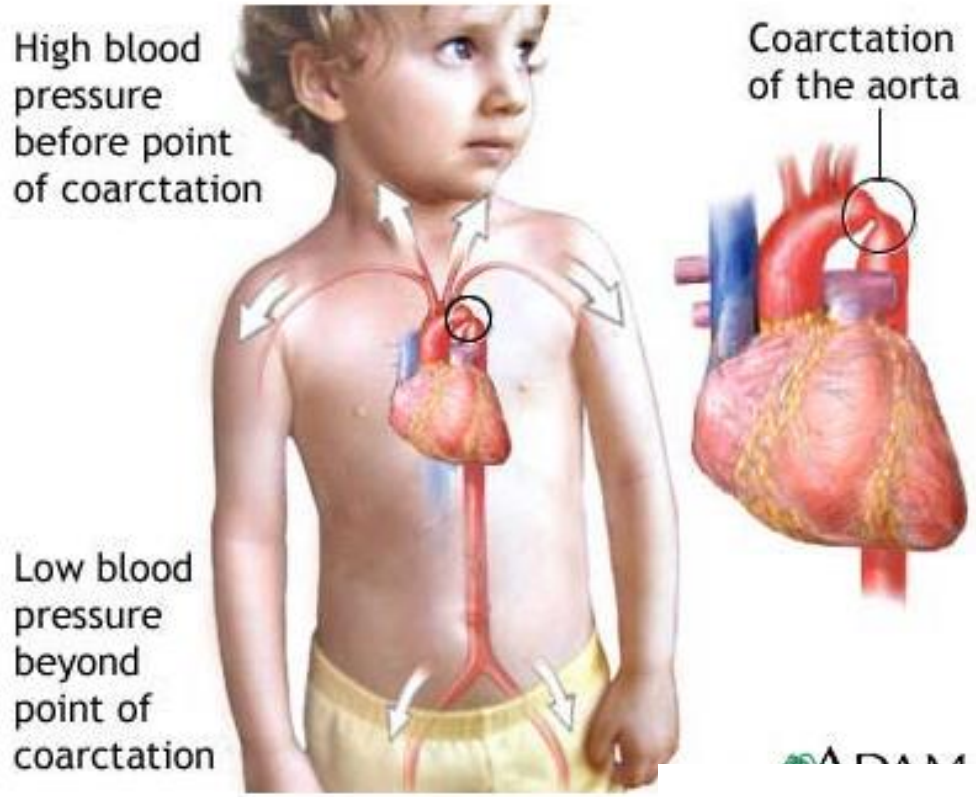
- When the stroke volume **multiplied** by the number of beats per minute (heart rate, HR) **equals** the **cardiac output** (CO):

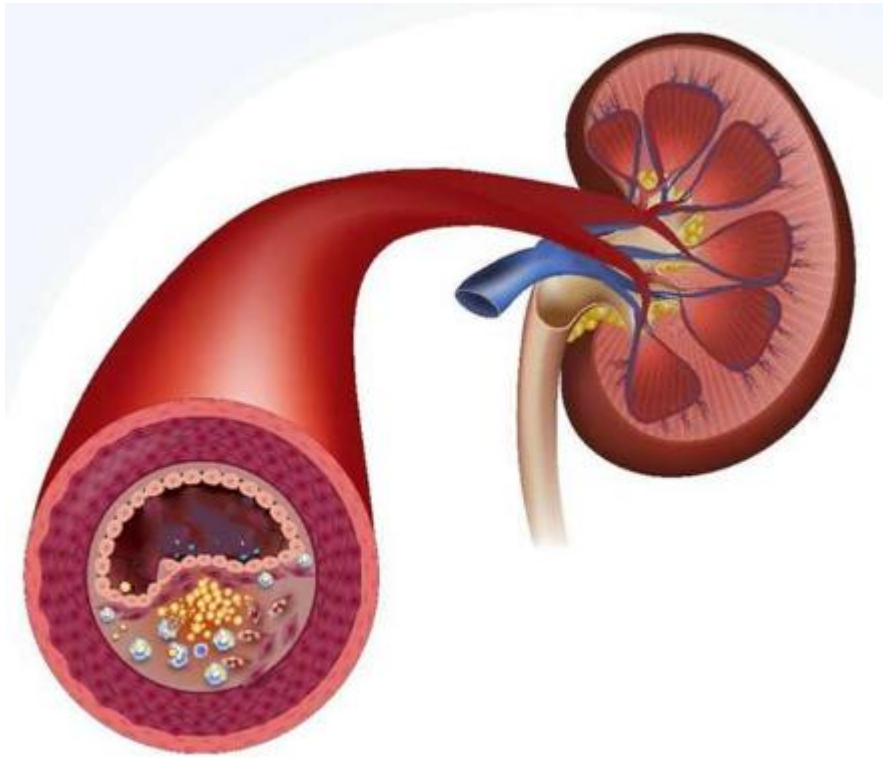
CO= SV. HR

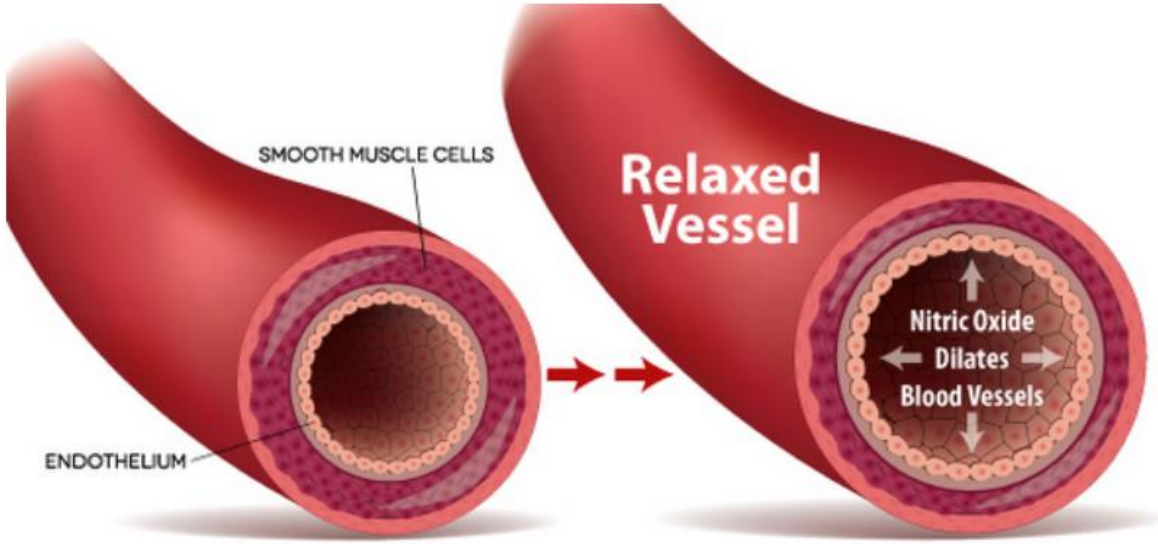
- **Stroke volume** is the volume of blood pumped out of the left ventricle of the heart **during each** systolic cardiac contraction.

Etiology of hypertension:

Primary(essential)	secondary
Most common 90-95 %	Less common 5-10 %
etiology not well known	Causses include
Genetic	• Renal artery stenosis • Coarctation of aorta • Pheochromocytoma • Primary hyperaldosteronism • Chronic glomerular disease
Start above 35 years	
The onset includes endothelial dysfunction of NO	
Environmental factors	


High blood pressure before point of coarctation
Coarctation of the aorta
Low blood pressure beyond point of coarctation




SMOOTH MUSCLE CELLS
ENDOTHELIUM
Relaxed Vessel
Nitric Oxide
Dilates
Blood Vessels

Acute coronary syndromes (ACS)

❖**Coronary heart disease (CHD) can include:-**

- angina pectoris,
- myocardial infarction (MI),
- heart failure (HF),
- arrhythmias, as well as sudden cardiac death.

Cardia arrythmia

- It is any **abnormal** heart rate or rhythm.

❑**Norma rhythm should have:**

- 1. **Heart rate** between 60-100 per mint.
- 2. **Origin** should be from S.A. node.
- 3. **Cardiac impulse** should be propagated through the normal pathway and with normal velocity.

- **Abnormal rhythm:**

1. Less than 60 beat/mint. Which called brady-arrythmia.

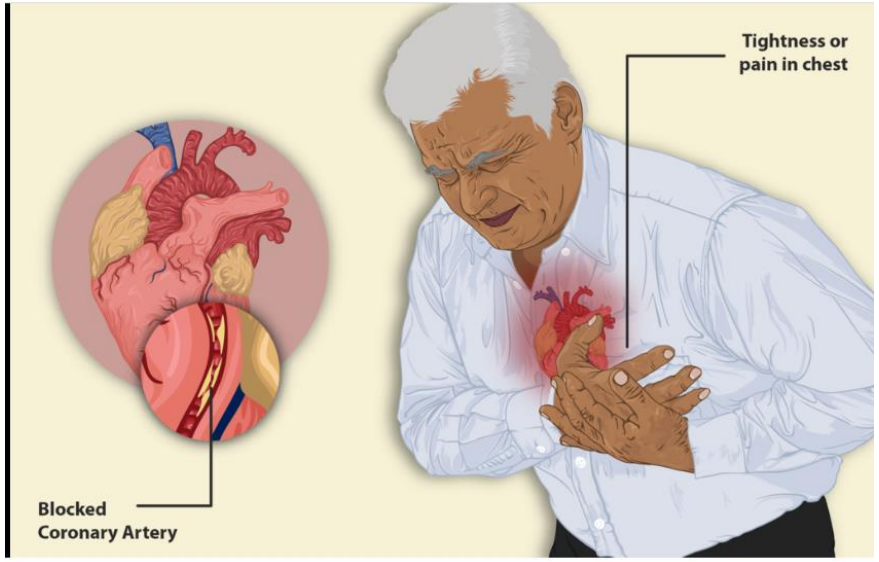
2. Above than 100 beat/mint. Which called tachy-arrythmia.

Type of arrythmia	
above	Fibrillation
350	Flutter
250	Paroxysmal tachy-arrythmia
150	Simple arrythmia
100	**Normal rhythm**
60	
40	Mild Brady-arrythmia
20	Moderate Brady-arrythmia
0	Severe Brady-arrythmia

- # **Other type of classification of arrythmia:**
- 1. Sinus arrythmia (S.A. node).
- 2. Atrial arrythmia.
- 3. Junctional arrythmia (nodal arrythmia).
- 4. Ventricular arrythmia.

- ***# Note:*** *the first 3 number above is called togather* ***supraventricular*** *arrythmia.*

Angina



- Angina clinically syndrome **resulting** from imbalance **between the** myocardial oxygen requirement **and** myocardial oxygen supply.
- The mean cause of angina is **myocardial ischemia** and the most common cause is **coronary atherosclerosis**.

Types of angina:

- 1. Stable angina/pectoris
- 2. Unstable angina
- 3. Variant angina

Stable angina/pectoris

- **Chronic stable angina characterized by chronic** and **predictable occurrence** of chest discomfort due to **transient** myocardial ischemia **with physical exertion** or other conditions that increase oxygen demand.

Unstable angina

- **Unstable angina : (occurs at rest)** patient experience new-onset angina or a change in their angina intensity, frequency, or duration.
- It often reflect underlying atherosclerotic **narrowing**.

Variant or (Prinzmetal)

- **Variant or (Prinzmetal)** angina occurs in patients **without** CHD; it is caused by a spasm of the coronary artery *that decreases myocardial blood flow*.

Heart Failure

- Heart failure (HF) “is a **complex clinical syndrome** that can result from any structural or functional cardiac **disorder** that *impairs the ability of the ventricle to fill with or eject blood*.”

❖**Heart failure** occurs when the heart is unable m to supply adequate blood flow and therefore oxygen delivery to peripheral tissues and Organs.

❑**Mild heart failure is manifested as:-**

- Reduced exercise capacity and
- the development of shortness of breath during physical activity (**exertional dyspnea**).

❑In more severe forms of heart failure:-

- a patient may have virtually **no** capacity for physical exertion
- and will experience **dyspnea** even while at rest.
- Furthermore, the patient will likely have **significant** pulmonary or systemic edema.