

*Coronary artery diseases (CAD)

-Adult cardiac surgery has been improved in 1964 by using catheters through femoral artery or radial artery to reach the coronary artery and see where the occlusion is .

-First catheter اول قسطرة happened in 1959.

-Coronary arteries have two branches:

- 1- Right coronary artery : from the anterior root of the aorta
- 2- Left coronary artery : from the posterior aspect of the aortic root , short branch , behind the pulmonary , has two branches:
 - a- Left anterior descending artery (LAD) → on the anterior aspect of the heart , supply 2/3 of the antrioventricular septum and most of the left ventricular wall , important artery.
 - b- Circumflex artery → will round around the heart posteriorly at the left ventricular groove

John . Gibbon → 1951, discovered heart – lung machine

he took the blood from the right atrium → then put it in the heart lung machine → to get oxygenated → then returned it back to the aorta .

when we can have a problem in the arteries of the heart ?

when there is narrowing in the coronary artery , then at exercise you need more cardiac output , but the heart cant supply your body enough blood and O2, due to that narrowing.

At this point , we have imbalance between the oxygen demand and oxygen supply that can lead to → ischemic heart disease , the most important cause of this→1- artherosclerosis of the artery (it is a diffuse disease that can affect any artery in your body)

2-Embolic → emboli from the left ventricle goes to any artery that supply the heart (rare)

3-vasculitis → abnormalities of the connective tissues of the artery wall , inflammation of the artery (it is an auto immune disease)

4-spasm of the coronary artery→ due to expose to a very low temperature (happen more in winter)

5- congenital anomalies of the coronary arteries → anomalous origin of LAD artery from pulmonary artery (to rise the LAD from the right side but in a normal state it should rise from left side)

6-ostial stenosis 7- severe LVH ((didn't mention by the dr))

** the most common cause leading to death in Jordan → atherosclerosis

Atherosclerosis process:

-Cause damaging to the epithelial cells

-Cause atherosclerosis plaque → that will narrow the artery → then decrease the blood supply to the heart → that why the patient will have chest pain

What can lead to atherosclerosis plaque (thrombotic occlusion)?

■ RISK FACTORS:

Uncontrollable

•Sex → male is more affected

•Hereditary → such as the metabolism of the lipid

•Race → black and Asian are protected

•Age → the atherosclerosis plaque needs time to be formed

Controllable •High blood pressure •High blood cholesterol •Smoking(Jordanian smokers ratio is 60%)•Physical activity(level of exercise) •Obesity •Diabetes(40%of Jordanian are diabetic)•Stress and anger

Diagnosis of CAD:


1. History

2. Physical examination→ sweating , chest pain (recurrent pain) , the patient feels that there is heavy thing on your chest , this pain increases with exercise but decreases during rest , and reliefs by sublingual pill

-this pain can go up to your shoulder and to the lower left jaw

-the duration of the pain→ depends on the severity of the disease usually its 5 min but if it continuousness to 1 hr → then we expected that the patient has MI , necrosis

-also during the physical examination we can measure : BP , pulse , heart sound (arrhythmia), and see if there is sign or symptom of the peripheral arterial disease

3. ECG findings		for very severe cardiac symptoms
4. cardiac enzymes		
5-Chest x-ray		
6-FBS (fasting blood sugar)		

7-Serum lipids → very important

8-TMT → treadmill test

9-ECO

10-Cardiac CT-Scan → for usual scanning can be used, to show as if there is calcium scoring in the artery , then if there is calcium scoring at high level → then the patient must undergo coronary angiography

11-Coronary angiography (last choice)

- The patient could suffer from shortness in the breath (air hunger) that can lead to PND (paroxysmal nocturnal dyspnea) , orthopnea (causing the patient to have to sleep propped up in bed or sitting in a chair) , orthopnea happens due to weakness in the cardiac muscles
- Also, palpitation and angina → the patient may suffer from them
- In stable angina → we can give the patient a vasodilator to dilate the artery (sublingual pill), but if the patient didn't benefit from this pill , and he had sweating → at this state the patient must go to the hospital.

• There are 3 lines to management the CAD:

1- Medication

“ Nitrates “ Beta blockers “ Aspirin/PLAVIX DUAL ANTIPLATELET THERAPY “
(Plavix (clopidogrel) used for patient that has aspirin resistance , Jordanian has aspirin resistance about 20%) Ca-channel blockers(in coronary spasm) “

2- CABG → coronary artery bypass grafting

3- PTCA → percutaneous transluminal coronary artery

4- Modulation of the risk factors

- a- Control Hbc1
- b- Control DM
- c- Quit smoking
- d- Control BP
- e- Advise patients to exercise (walking)
- f- Revascularization (surgically , interventional)

Coronary artery bypass grafting (CABG)

- “Triple vessel disease → more than 70% of the artery are closed) LAD , circumflex , right coronary

- **"If main coronary artery disease** → supply the left side of the heart , the closure happened and close about 50% of the artery then we have→ critical stenosis leading to → papillary necrosis , septal necrosis (post ventricular infraction leading to sepal rapture)
- **"Anomalies of Coronary arteries**

Procedure of CABG :

- 1- Sternum is opened using critical saw
- 2- Reach pericardium , open it , then we can see the heart , we take the blood from the right atrium and sometimes from IVC and put it in the heart lung machine to get oxygenated then return it back to the aorta
- 3- Determine where is the occlusion in the coronary artery , then we do anastomosis using conduit (vein or artery) after the occlusion of the coronary

***Common vein that is used** → **great saphenous vein**

***Common arteries that are used**→ **left internal thoracic artery**
(also it is called left mammary artery) it arises from the left subclavian artery , radial artery , gastroepiploic artery

Total arterial revascularization :

***Mean that we can use any artery in our bodies (the dr said that details are not included)**

***Predicated risk of mortality after the surgery depending on the patient (if he is obese , smoker....)→ each one will have his treatment depending on the risk factor that he has) and his history**

Complications that can take place after the surgery:

- 1- If the surgery was not clean , then inflammation of the wound can take place (sternal wound complications)
- 2- Post myocardial infraction about 3%

- 3- Stroke
- 4- Arrhythmia
- 5- Systemic inflammatory response

■ About 95% of patients can improve their life after the CABG

■ Others procedure that can be used in CAD :

- 1- Balloon angioplasty
- 2- Stent
- 3- Rotational burr

Off –pumping coronary artery bypass (OPCAB)

- The heart still pumping
- The doctors use stabilizer in the surgery to stabilize the area where the doctors are going to work on it , then open the coronary artery to anastomose with another artery or vein

