

♡ Slide

PBL

Sheet ♡

Number:	1
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Corrected by:	

Before we begin:

- Sheet based on section 2 record
 - The heart doc stopped at slide no.50
 - Info in the slides that weren't mentioned start with *
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History of cardiac surgery:

- Arthur Vineberg used the left internal mammary artery to provide the heart with blood in the 1940's but caused bleeding and before him no one cut through the sternum.
- **1964-follow-up study on 140 patients 33% mortality 85% relief from angina
- Mason Sones used catheterization قسطرة from the femoral artery to reach the coronary arteries.
- The invention of heart-lung machines helped John Gibbon perform an open heart surgery to repair ASD (atrial septal defect) in 1953
- Another big step was done by a Russian doctor (Dr. Kosolov) in 1964 who thought a little and said "why not anastomosing the mammary artery with the coronary artery directly?"

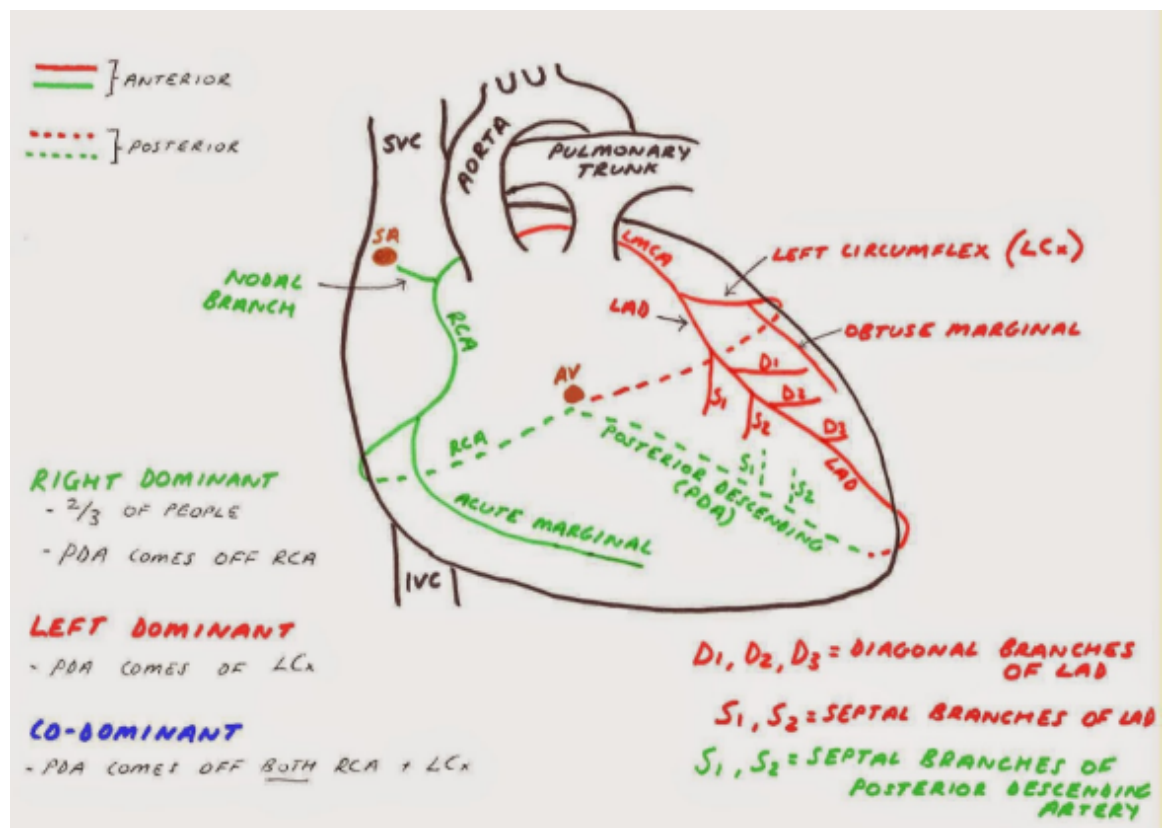
Anatomy of Cardiac arteries:

- Left coronary artery starts from posterior aortic sinus
Right coronary artery starts from anterior aortic sinus
- Left coronary artery extends for 1.5-2.5 cm to the left, then bifurcates to LAD (left anterior descending artery) and circumflex artery
The LAD gives diagonal then extends on the anterior interventricular groove, beneath it is the septum which gets septal branches, then goes all the way to the apex.

The LAD is called “the widow artery” as blockage there first presents with death.

The circumflex from extends on the left atrio-ventricular groove, then gives branches to the left ventricle like the obtuse marginal artery

- Right coronary artery extends between the right atrium and the right ventricle, gives branches that supplies them, gives acute marginal branch and gives the PDA posteriorly on posterior interventricular groove “makes collateral communication on the apex with LAD”, supplies posterior one third of the IV septum
- The dominant coronary artery is the one that gives the PDA, in 80% of people the right is dominant , 10% have the left dominant and the other 10% are co-dominant or balanced



Ischemic heart disease:

- It results from imbalance between oxygen demand and supply

70% and above block in a coronary artery will make significant limitation of flow and causes ischemia

The main symptom of coronary stenosis (IHD) is chest pain “angina”

- The Canadian Cardiovascular Society grading of angina pectoris:

I: No angina with ordinary physical activity “heavy exercise produces angina”

II: Slight limitation of ordinary activity “ex: walking for 500-1000m may produce angina, aka slight limitation”

III: Marked limitation of ordinary activity “walking for short distances produces angina, e.g. walking from bedroom to the bathroom”

IV: Symptoms with any activity or at rest “chest pain comes to him, at rest” eating may produce chest pain

-The most common cause for IHD is atherosclerosis while the least common cause is embolism, other causes include 1)vasculitis 2)ostial stenosis 3) Severe left ventricle hypertrophy

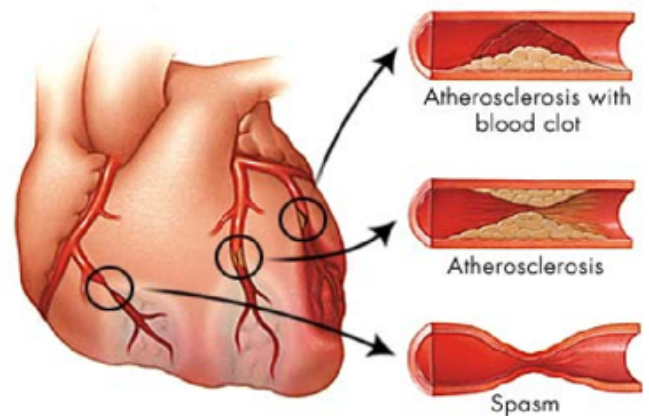
4) Anomalous origin of the left **coronary artery** from the **pulmonary artery** (ALCAPA) , the heart is receiving deoxygenated blood.

5) Coronary spasm , Prinzmetal angina is a variant angina which occurs due to coronary spasm triggered by emotional stress or exposure to cold weather.

Atherosclerosis:

Narrowing of the coronary artery lumen by either accumulation of plaques or by a muscle spasm “contraction of the smooth muscles” less relevant.

This narrowing is gradual and increases by time, yet sometimes it may increase suddenly and markedly “from 30% to 100%”, this condition is called (Acute Coronary Syndrome)



Risk factors for atherosclerosis:

Uncontrollable

- **Sex** males more than females until age of 55
- **Hereditary**
- **Race** Black people have higher chance
- **Age**

Controllable

- High blood pressure
- High blood cholesterol
- Smoking
- Physical activity
- Obesity
- **Diabetes** sometimes don't feel pain due to neuropathy
- Stress and anger

Diagnosing and treating CAD:

-Note: coronary artery disease (CAD) and IHD are the same thing

A 60 year old male comes to your clinic with pain in left shoulder and jaw , orthopnea(shortness of breath while sleeping) and nausea, blood sample test showed normal FBS (fasting blood sugar) and elevated serum lipids, what further tests will you do?

- 1) ECG
- 2) Cardiac enzymes (ex. Troponin t)
- 3) Chest X-Ray

TMT (treadmill test) and cardiac CT can also be used.

After knowing he has a history of heart block and normal blood pressure, you avoid β -blockers , CA^{+2} channel blockers and nitrates which are normally used to treat coronary artery disease and prescribe aspirin/plavix(clopidogrel) dual antiplatelet therapy, where aspirin works by inhibiting COX and plavix works on ADP receptor.

Unfortunately, he does not respond to medication so either go for catheterization or open-heart surgery but which one?

Coronary Artery Bypass Grafting (CABG):

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Is done if:

- ❖ Triple vessel disease (70% block in right coronary and circumflex, 50% block in left descending artery)
- ❖ Lf main coronary artery disease (causes papillary necrosis leading to valve regurgitation)
- ❖ Unstable angina , failed therapy
- ❖ Complications of PTCA (mistake done in catheterization >_>)
- ❖ Life threatening complications of MI

- ❖ Anomalies of Coronary arteries. (no map that leads to the artery so nothing you can do but open –heart :/)

-Procedure of CABG:

- 1) Sternum is divided with a saw
- 2) Use the heart-lung machine by attaching the right atrium to one end and the aorta to the other end of the machine
- 3) Empty blood from the chambers using suction methods
- 4) Use potassium to paralyze the heart and make it flaccid, calcium would make it stony
- 5) Find the coronary artery through surface anatomy and locate the hardened part with fingers
- 6) Using mammary artery, reversed saphenous vein or radial artery as graft to supply the ischemic area, the grafts are called conduits

-Best result comes from using left internal mammary artery(LIMA) as graft to LAD

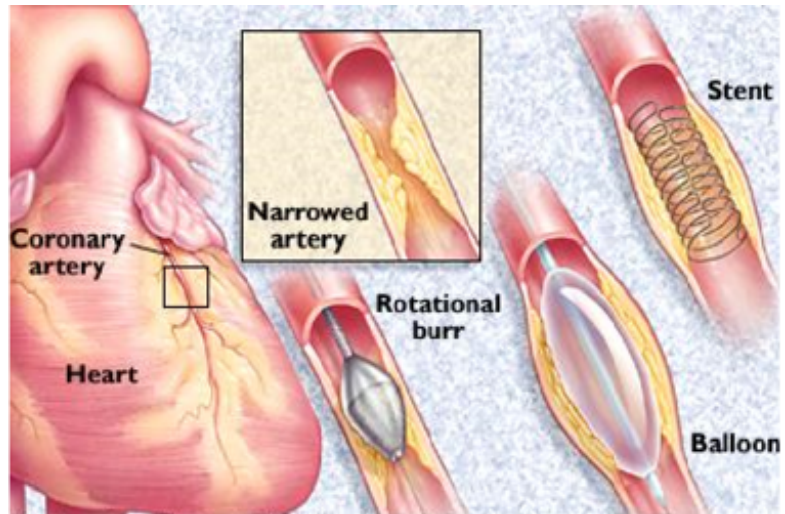
Artery VS vein as graft:

	Artery	vein
valves	X	✓
Intima forms reducing radius	X	✓
valves	X	✓
Has normal histochemicals	✓	X
flow	laminar	turbulent
pressure	withstands	Can't withstand
Fails after 10 years	X	✓

Conclusion: arteries as grafts are better than veins

Percutaneous transluminal coronary angioplasty (PTCA):

Also known as catheterization is Insertion of a catheter in a vessel to the place of stenosis and dilates it by applying pressure via inflation of a balloon (PTCA), and then a stent is placed to support and widen the narrowed artery.



Patients need dual anti-platelet therapy after PTCA as the stent is a foreign object.

Off-Pump Coronary Artery Bypass (OPCAB):

Is the same procedure as CABG except the heart-lung machine is not used, meaning that the heart is still moving and pumping blood. Here esmolol and adenosine are used instead of potassium to slow the heart rate. An octopus device and mechanical stabilizer are used to hold the heart until the surgery is done.

****The comparison of OPCAB to CABG patients showed that OPCAB had similar or better results.**

**** In another study that was presented at an Annual Meeting of the Society of Thoracic Surgeons, the following information was found**

**** The hypothesis for the study was that OPCAB surgery would reduce some of the side effects of conventional cardiopulmonary bypass.**

****There were no hospital deaths in the OPCAB group compared to nine deaths in the CABG group.**

** OPCAB surgery also reduced the average postoperative hospital stay from 5.5 days to 3.3 days.

** The most significant statistic was the reduction in the need for transfusion after the operation.

** Less than a third of the OPCAB patients (29.6 %) needed transfusions compared to more than half (56.5 %) of the CABG group.

CABG is considered the safest.

Recovery for all patients after heart surgery:

- ❖ Quitting smoking
- ❖ Treating high cholesterol
- ❖ Managing high blood pressure and diabetes
- ❖ Exercising regularly
- ❖ Maintaining a healthy weight
- ❖ Eating a heart-healthy diet
- ❖ Participating in a cardiac rehabilitation program
- ❖ Following up for regular clinic visits

