Lecture: CVS ANATOMY
Title: coronary circulation
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Start & good luck ^^

The heart is a **duel organ** have tow machines one is pumping the **venous blood** and one is pumped **arterial blood**.

As heart exposed to heavy work it's putting a lot of force to pump the blood and need a lot of O2 to feed the cells to work efficiently. **So the artery takes sufficient blood supply** (large amount from heart) that's why **we see infarction of the heart more than infarction of the leg**. 30% from hospital **emergency** cases is **heart attack** due to narrowing heart arteries because of deposition of cholesterol [**arteriosclerosis, atherosclerosis**].

The heart receives **tow coronary arteries**, in the **ascending aorta there are 3 sinuses or domes one anterior** and 2 **posterior** (right, left), from these domes raise vessels called **coronary arteries (left, right)**.

From the **anterior sinus → right coronary artery** it runs **forward** between **right auricle** and the **pulmonary trunk**, and to the **right** in a **depression (coronary sulcus) between the atrium and the ventricle**, and going to the **inferior** border of the heart turns back to the **posterior** wall of the heart and then it enters the **posterior interventricular sulcus** and **supplies interventricular septum, atrium and right ventricle**.

So again → in the beginning branches to the right atrium , ventricle when they reach the **lower border** they give **marginal artery** turns award the apex then turns back to the **posterior surface** of the heart of the coronary sulcus and ends in **posterior interventricular sulcus** and **supplies interventricular septum**.
Now **left coronary artery** → there are 2 aortic sinuses behind the aorta one right, one left. The left one gives **left coronary artery**.

The same story this artery runs forward between the **left auricle** and the **pulmonary trunk** then to the left runs into the sulcus between the left atrium and the left ventricle. This sulcus called **left coronary sulcus**.

It gives a branch called **left anterior descending artery** or **anterior interventricular artery**, it goes down into the sulcus, and it supplies the septum between ventricles anteriorly.

It gives **diagonal branch** runs along the wall of the left ventricle and supplies left ventricle and this artery gives branches to the left atrium and left ventricle.

The next branch called **circumflex artery** it runs to the **left coronary sulcus** and then it turns around the left border of the heart backwards and **overlaps with right coronary artery**.

**There are differences may give tow branches in posterior interventricular sulcus or it can ends in ........? And that branch from the right. But we say that it overlaps with the right coronary. (You can found this point in 15:28-15:57)**

The **circumflex artery** gives **obtuse marginal artery** or **marginal artery** comes down on the wall of the **left ventricle** and down to the lower part.

**Summary** : the heart supplied by **L/R. coronary arteries**, **R. supplies** the right side and the **L. supplies** the left side and the **septum** between them have the same supply, **anterior-posterior interventricular arteries** and the overlap between them is not sufficient when one of them closed
So there is no sufficient blood circulation to supply the infected area.

**R. coronary artery** supplies the **SA node** why? Because it's located in the wall of the R. atrium.

And it also supplies the **AV node** that located in the R. side in the atrioventricular septum close to the coronary sinus.

**So in the right side that supplied by R. coronary artery if it closed the AV,SA nodes will destroy and the electrical impulses that come from them will stop → in infarction , if the R. coronary artery closed the regulatory of contraction of the heart will destroyed. Dysfunction of SA-AV nodes due to ischemic changes during the infarction. **

Its supplies the **bottom portion of both ventricles and back of the septum.**

**L. coronary artery** gives branches → 1- **circumflex artery** supplies L. atrium, back of L. ventricle

→ 2- **L. anterior descending artery** that supplies the front and bottom of the L.V and front of the septum.
Now the **veins** in the heart, we pushed some blood to feed the atria and ventricles and it will go back HOW? By venous system.

The **main vein** called **sinus** (large vein) called [**coronary sinus**] in **posterior coronary sulcus**.

It runs in coronary sulcus behind or **posterior** to the heart and **ends** to the **R. atrium** (why the right atrium? because it's venous blood) however there are several veins which drain anterior wall and R.V and open into the R.A.

There are veins called **anterior cardiac veins** these take blood direct from **anterior** wall of the **R.V and ends into R.A**.

There is **venae cordis minimae** → small veins draining much of the heart wall (from all heart's walls) and it's **open** directly into the **cavities** of the heart [ drains blood from R.V into R.V and from L.V into L.V and from atrium into atrium and so on] , they don't have any relation to the coronary sinus.

Now back to the **coronary sinus** how it's formed? there is an **anterior interventricular vein** in the anterior interventricular sulcus it raise up and **gives great cardiac vein** it runs around the **L. border** of the heart and **gives** the **coronary sinus**. So the blood drained from 2 ventricles and move to the anterior interventricular vein and raise up to great cardiac vein and turn around L. border of the heart and receives and joints with other branch called **L. posterior ventricular vein** found behind L.V and both give **coronary sinus** and end in the R.A carrying venous blood. Behind the heart there is **posterior interventricular sulcus** there is **middle cardiac vein** and **ends** in the **coronary sinus** too.

On the **right side** there is vein called **small cardiac vein** it receives **right marginal vein** from the **front** and **turn around base** and **behind** the heart and **ends** in the **coronary sinus**.
The final tributary its oblique vein comes from L.A and ends in coronary sinus.

*Summary*: tributaries of the coronary sinus → small-middle-great cardiac veins + L. posterior ventricular vein + oblique vein.