What is Coronary Circulation?

Worksheet

Coronary circulation is the blood supply to the heart wall, delivered by the left and right coronary arteries branching from the aorta and drained by cardiac veins into the coronary sinus, which empties into the right atrium.

Questions

1. Which vessels branch first off the aorta?

A) Pulmonary arteries
B) Coronary arteries
C) Carotid arteries
D) Renal arteries

2. Where does the coronary sinus drain?

A) Left atrium
B) Right atrium
C) Left ventricle
D) Pulmonary artery

3. During which phase of the cardiac cycle does most coronary perfusion occur?

A) Systole
B) Diastole
C) Isovolumetric contraction
D) Atrial kick

4. The left anterior descending artery mainly supplies which region?

A) Right atrium
B) Anterior wall of the left ventricle
C) SA node exclusively
D) Posterior right ventricle

5. At rest, coronary blood flow is about 5% of total cardiac output. If cardiac output is 5,000 mL/min, how much blood flows through the coronary arteries?

6. The left anterior descending (LAD) artery supplies roughly 50% of the left ventricle's mass. If the LV weighs about 200 g, how much myocardium depends on the LAD?

7. A patient has a heart rate of 75 bpm, and diastole occupies about two-thirds of each cardiac cycle (coronary flow happens mainly in diastole). How long is diastole per beat?

8. Define: What is coronary circulation?

9. Define: What are the two main coronary arteries?

10. Define: Where do coronary veins drain?

Answer Key

1. B) Coronary arteries - The left and right coronary arteries are the first branches off the aorta, just above the aortic valve.

2. B) Right atrium - The coronary sinus collects venous blood from the heart and empties it into the right atrium.

3. B) Diastole - During diastole the myocardium relaxes, allowing coronary arteries to fill without being compressed.

4. B) Anterior wall of the left ventricle - The LAD runs down the front of the heart, supplying the anterior wall and much of the interventricular septum.

5. Coronary flow = 5% Cardiac output Coronary flow = 0.05 5,000 mL/min Coronary flow = 250 mL/min

6. Myocardium supplied = 50% 200 g Myocardium supplied = 100 g This is why LAD occlusion is nicknamed the 'widow-maker' - it can knock out half the LV's pumping muscle.

7. Cycle length = 60 s / 75 beats = 0.8 s per beat Diastole (2/3) 0.8 s 0.53 s At faster heart rates, diastole shortens more than systole, which is why very high heart rates can reduce coronary perfusion time.

8. The blood supply to the heart muscle itself, via coronary arteries and veins.

9. The left coronary artery (splitting into LAD and circumflex) and the right coronary artery.

10. Into the coronary sinus, which empties into the right atrium.