



UNIVERSITY OF
MEDICAL SCIENCES
ONDO STATE, NIGERIA

Pulmonary Circulation; Architecture of the pulmonary vasculature, structural and functional adaptation

Adeyomoye O.I

Department of Physiology
University of Medical Sciences, Ondo



Pulmonary vessels

- The pulmonary artery extends 5cm beyond the apex of the right ventricle
- It divide into right and left branches that supply the lungs
- Pulmonary artery is thin (thickness one-third that of the aorta.
- Pulmonary arterial branches very short



Pulmonary vessels

- Pulmonary arteries, smaller arteries and arterioles have larger diameter compared to systemic arteries and arterioles.
- Pulmonary vessels are thin and distensible
- Pulmonary arterial tree large compliance averaging 7ml/mmHg.
- Large compliance allows it to accommodate stroke volume output of the right ventricles.



Pulmonary vessels

- Pulmonary capillaries are large with multiple anastomosis
- Pulmonary capillary pressure (PCP) 10mmHg
- Oncotic pressure 25mmHg
- Inward directed pressure gradient of 15mmHg
- When PCP is greater than 25mmHg, it may be due to backward failure of the left ventricle leading to pulmonary congestion and edema
- Patients with mitral stenosis also have progressive rise in PCP

Pulmonary vessels

- Pulmonary veins like pulmonary arteries are also short
- They empty the blood into the left atrium to be pumped by left heart through the systemic circulation



Bronchial vessels

- Blood flows to the lungs through small bronchial arteries that originate from systemic circulation
- This amount to 1-2% cardiac output
- Bronchial arterial blood oxygenated
- Pulmonary arterial blood deoxygenated
- BA supplies the supporting tissues of the lungs including connective tissue septa , large and small bronchioles



Bronchial Vessels

- B Vessels after supplying the tissues of the lung, is emptied into the pulmonary vein and enters the left atrium bypassing the right atrium.
- Anastomosis between the bronchial capillaries and pulmonary capillaries (Physiologic shunt)
- Flow into the left atrium and left ventricular output is 1-2% greater than the right ventricular output



Blood Volume of the lungs

- Blood volume of the lungs is 450mL about 9% of the total blood volume of entire circulatory system
- About 70mL of the blood volume is in the pulmonary capillaries while the reminder is divided equally between the pulmonary artery and veins



Lungs as blood reservoir

- Under various physiological and pathological conditions, quantity of blood in the lungs can vary from as little as one half to normal up to twice normal.
- Blowing a trumpet 250mL can be expelled from pulmonary circulation
- Loss of blood from systemic circulation by hemorrhage partly compensated for by automatic shift of blood from lungs to systemic vessel

Thank you