Supplementary to lectures 2 and 3

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Here I will give you a brief idea about cor pulmonale which is one of the complications of COPD and several other lung diseases. This is an extremely important subject in your clinical years.

Cor Pulmonale

Definition: right ventricular hypertrophy and dilation caused by pulmonary hypertension due to primary lung disorders. This can result in right sided heart failure.

Note: right sided heart failure can be caused by left ventricular failure or congenital heart disease. These are more common causes of right heart failure than cor pulmonale.

Pulmonary hypertension: is high blood pressure in the pulmonary vessels. The pathogenesis involves narrowing of blood vessels within the lungs. This makes it harder for the heart to pump blood through the lungs. Over time, the affected blood vessels become fibrotic which makes them stiffer and thicker. This further increases the blood pressure within the lungs and impairs their blood flow.

These changes cause increased workload for the right side of the heart. The right heart operates normally under low pressure so it cannot cope with higher pressures, and although right ventricular adaptations (hypertrophy and increased contractility of the heart muscle) initially help to preserve stroke volume, ultimately these mechanisms fail.

Any lung disease that causes hypoxia will cause pulmonary hypertension. This is because hypoxia causes constriction of the pulmonary arteries. This is called *hypoxic pulmonary vasoconstriction* and it is a protective mechanism that aims to stop too much blood flowing to areas of the lung that are damaged and do not contain oxygen. When the alveolar hypoxia is severe and prolonged, this vasoconstriction occurs across a large portion of the pulmonary vascular bed and leads to an increase in pulmonary arterial pressure, with thickening of the pulmonary vessel walls contributing to the development of sustained pulmonary hypertension.

Causes of cor pulmonale:

1. Acute respiratory distress syndrome
2. Pulmonary embolism
3. COPD
4. Primary pulmonary hypertension
5. Interstitial lung diseases
6. Cystic fibrosis
7. Sarcoidosis
8. Pulmonary arteritis
9. Bronchiectasis

Please do not memorize these as a list!!! It is obvious that any lung disease which results in hypoxia will cause cor pulmonale.

Please note that ARDS and pulmonary emboli are acute events, so they cause an acute form of right sided failure whereas the rest of the causes are chronic and will result in chronic cardiac failure.

NOTE:
In one of the handouts I mentioned that inspiration is passive and expiration is active. Of course this is wrong. Try to breathe and you will realize it is a mistake!!!!!

THANK YOU