Q2 Outline the principal anatomical features of the diaphragm that are important to its function. (March 2011)

The diaphragm is the most important muscle of respiration.

Anatomy

- Large membranous muscle separating the abdominal and chest cavities
- Consists of peripheral muscle with a central tendon of interlacing fibres continuous with the fibrous pericardium superiorly
- Complex origin:
    - Crura arise from the lumbar vertebral bodies (L1-2 on the left, L1-3 on the right)
    - 3 arcuate ligaments: median (joins the two crura), medial (a thickening over the psoas), and the lateral (a thickening over the quadratus lumborum)
    - The costal origin arises from the lower six costal cartilages
    - The xiphoid origin is from the posterior aspect of the xiphoid process
- Three major openings:
    - T8 – for the IVC
    - T10 – for the oesophagus, vagi and oesophageal branches of the left gastric vessels. Reinforced by a band of fibres from the right crus, which contributes to the integrity of the lower oesophageal sphincter
    - T12 – for the aorta, thoracic duct and azygos vein
    - Other structures passing through the diaphragm include the splanchnic nerves passing through the crura, the sympathetic trunk passing behind the medial arcuate ligament, and lymphatics.

Blood supply

- Arterial - Internal thoracic arteries, lower internal intercostal arteries, and superior/ inferior phrenic arteries
- Venous drainage – brachiocephalic and azygos veins

Innervation

- Phrenic nerves (C3-5) provides motor supply and proprioceptive information from the centre of the muscle
- The periphery of the diaphragm has its sensory supply from lower thoracic nerves

Main roles

- Important muscle of respiration – moves downward with contraction to expand the chest cavity and cause a negative intrathoracic pressure, favouring the movement of air into the lungs
- Role in maintenance of the integrity of the LOS
- Important in expulsive actions such as sneezing, coughing, vomiting