DIAPHRAGMATIC HERNIA

ESSAY

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of The Master Degree in

General Surgery

By

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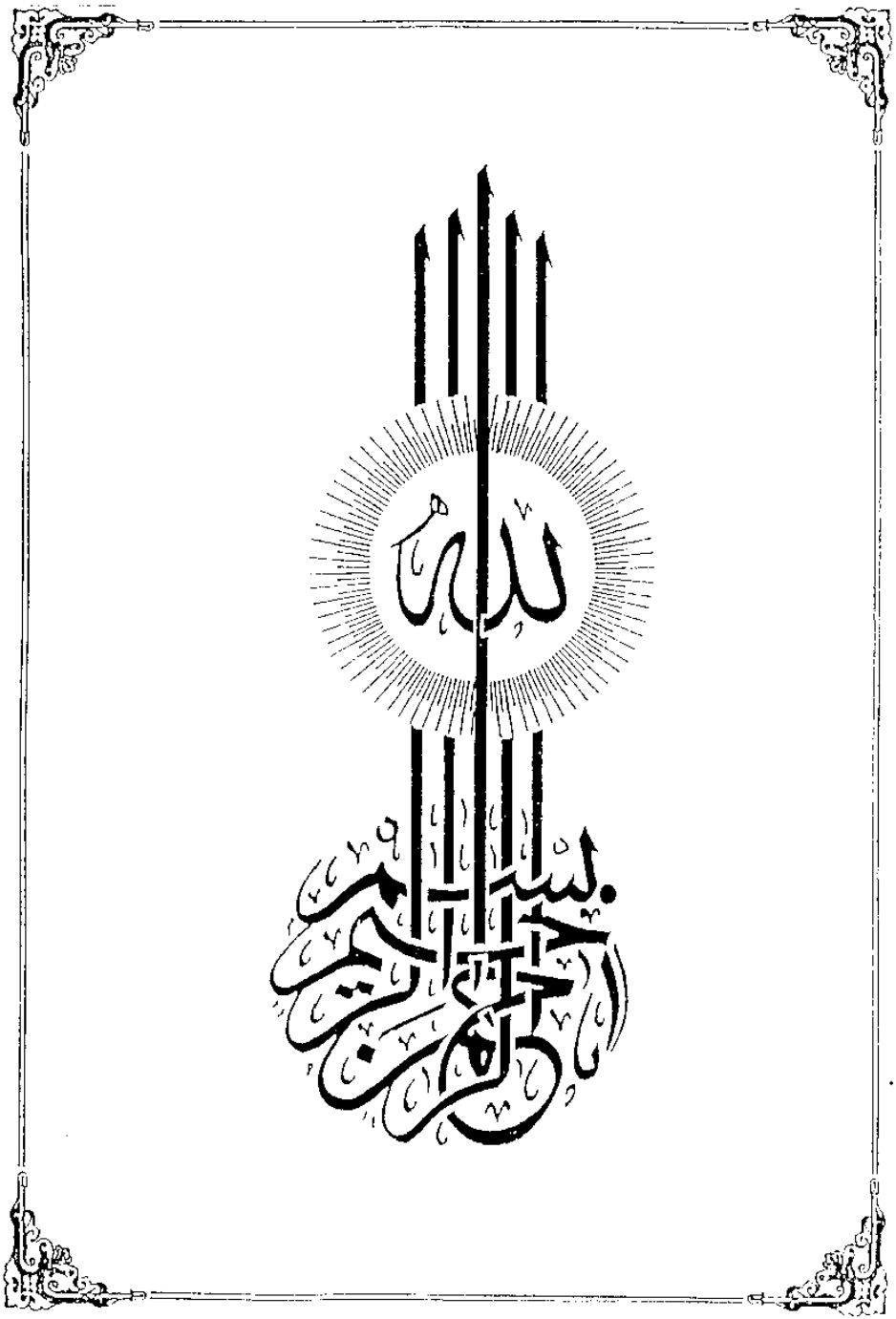
C O N T E N T



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INTRODUCTION

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The first description of diaphragmatic hernia in adults was given by Ambroise Pare in 1575. It was of trumatic origin. In 1761 Morgagni reviewed diaphragmatic hernia and discribed patient with retrosternal hernia that now bears his name. In 1789 Sir Astley Cooper not only described the pathology and symptoms of the congenital diaphragmatic hernia in some detail, but also gave a classification of the various diaphragmatic hernia which is still valid today. In 1848 Bochdalk described the embryology of the malformation and the foramen which still carries his name.

Petite (1674-1750) described cases of acquired diaphragmatic hernia differentiated from congenital and traumatic one.

(Bow Ditchnin 1852) was the first to made ante-mortem clinical diagnosis of ruptured diaphragm and emphasized the clinical criteria for making this diagnosis.

(Rlolft 1886) repaire a laceration of the diaphragm through which omentum had prolapsed.

(Navmann 1888) operated upon a patient who had stomach herniated into chest through a traumatic diaphragmatic hernia.

Allison in(1951) was the first to attribute the cases of dyspepsia occurring in middle age due to acid reflux into oesophagus this was found in many cases accompanied by herniated of part of stomach into chest through oesophageal hiatal hernia causing specific recognized attention focused on the mechanisms that controlled reflux .

Hibert and Belsy in (1961) demonstrated abnormal amounts of reflux could occur in absence of hiatal hernias demonstrated rocentogengraphically were not accompanied by reflux and were asymptomatic,during past two decades improved rocentogenology, endoscopy, oesophageal manometry pH recording techniques have been employed, to correlate clinical presentation with pathological finding in large numbers of patients, indications for medical and surgical treatment of reflux have been defined operative techniques have been employed and have proved effeciency for specific treatment of reflux and progress have made in treating oesophageal stricture.

ANATOMY OF ADULT DIAPHRAGM

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The diaphragm is adome sheped, musculofibrous sheet which separates the thoracic from the abdominal cavity. Its convex upper surface forms the floor of thoracic cavity; while its concave lower surface froms the roof of the abdomenal cavity (Grays, 1984).

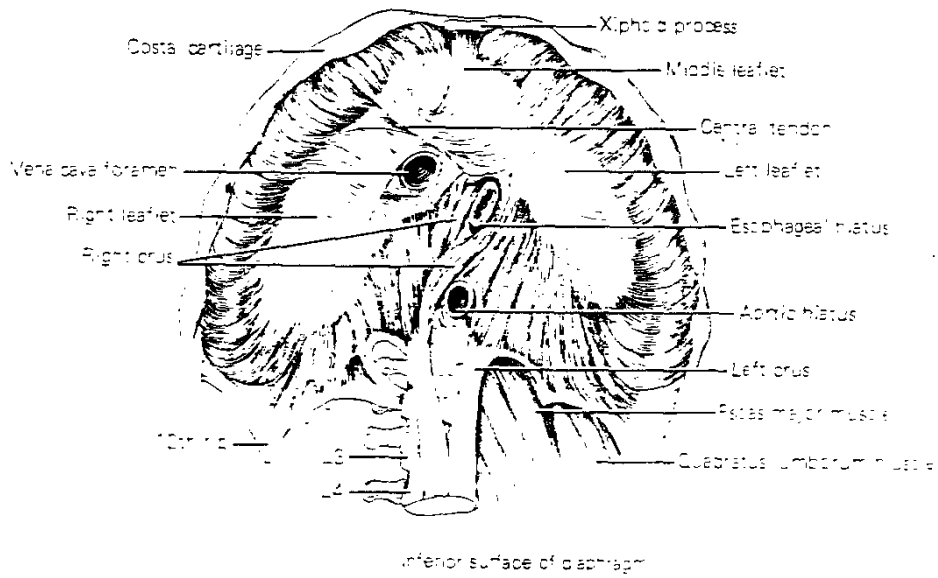
Form of the Diaphragm:

Viewed from in front the diaphragm curves up into right and left domes. The right is higher than the left, ascending in full expiration as high as the nipple (fourth space), while the left dome reaches the fifth rib.

The central tendon is in the level with the lower end of the sternum (sixth costal cartilage). Viewed from the side the profile of the diaphragm resembles an inverted J; the long limb extending up from the crura (upper lumbar vertebrae) and the short limb attached to the xiphisternum (the 8 vertebra) viewed from above the outline is kidney-shaped, in conformity with the oval outline of the body wall which is intented posteriorly by the vertebral column (Last 1981).

Origin:

The diaphragm takes origin from the circumference of the outlet of the thorax. This origin is divided into three parts:



Cameron and Higgins, (1986).

. Sternal origin: by two fleshy slips from the back of the xiphoid process.

. Costal origin: by slips from the inner surface of the lower six costal cartilages, on each side these slips interdigitates with the slips of origin of the transversus abdomins.

. Vertebral origin: From the lumbar vertebrae by the crura and arcuate ligament.

(1) The Crura:

These are a pair of conical fleshy masses which takes origin from the bodies of the lumbar vertebrae.

. The right crus is larger than the left and arisses from the bodies of the upper three lumbar vertebrae and the discs between them,

. The left crus is smaller and arises only from the bodies of the upper two lumbar vertebrae and interventing disc. Muscle fibres radiate from each crus, overlap and pass vertically upwards before curving forwards into the central tendon some of the fibres on the abdominal surface of the right crus slope up to the left and surround the oesophageal orifice in a sling like loop. (Last, 1981).

(2) Arcuate ligaments:

- Median arcuate ligament: A tendinous arch which connects the two crura in front of the descending aorta at the level of the lower border of the last thoracic vertebra. No muscular fibre arise from it.

- The medial arcuate ligament: Is a thickening tendinous arch (one on each side) in the fascia covering the upper part of the psoas major; medially; it is continuous with the lateral tendinous margin of the corresponding crus, and is attached to the side of the body of the first (sometimes the second) lumbar vertebra; laterally, it is fixed to the front of the transverse process of the first lumber vertebra.

- The lateral arcuate ligament: It is a thickened band in the fascia covering the quadratus lumberum, arches across the upper part of that muscle, and is attached, medially, to the front of the transverase process of the first lumbar vertebrae, and laterally, to the lower margin of the twelfth rib near its mid point. (Gray's 1984).

The muscle of the diaphragm arises along the side of the crus from the medial and lateral arcuate ligament. Further laterally adigitation comes from the tip of the 12th rib, thence around the costal margin adigitation arises from each costal cartilage up to the 7th.

These muscular slips all arise from within the costal cartilages, interdigitating with the slips of the origin of the transversus abdomins. Finally, in front , the muscle sheet is completed by fibres that pass backwards from the xiphisternum to the central tendon. These are the shortest muscle fibres of the diaphragm; the longest fibres are those which arise from the 9th costal cartilage. (Last 1981).

Central tendon:

The fibers converge from their origin to be inserted into the central tendon of the diaphragm. This is a thin; but strong aponeumortic tendon formed of interlacing fibers which run in different directions. It is trifoliate in shape (semi-lumnar slip) consisting of three folia seperated by slight indentation the middle leaf has the form of an equilateral triangle, the apex directed towards the xiphoid process.

The right and left folia (cupolae) are tongue shaped and curved laterally and backwards, the left being a little narrower. The central part of the diaphragm is depressed inferiorly than lateral parts (cupolae) . The central area of the tendon consists of four well marked diagonal bands

radiating from a thick central point of decussation is a thick node of compressed tendinous strands situated in front of the oesphogeal aperture , and to the left of the vena caval opening. (Gray's, 1984).

Relations:

- Superiorly:

The right cupola is related to the right pleura and base of the right lung.

The median lobe of the central tendon is related to the pericardium and the heart.

The left cupola is related to the left pleura and base of the left lung.

- Inferiorly:

The right cupola is related to the right lobe of the liver, right kidney and right suprarenal gland.

The left cupola is related to the left lobe of the liver, fundus of stomach, spleen, left kidney and left supra renal gland.

Vertebro-Costal triangle:

This is a triangular gap between the costal and vertebral origins of the diaphragm. The base of this triangular gap is the lateral part of the

last rib. This gap lies behind the kidney. It is filled by fat and areolar tissue which separate the kidney from the pleura. It is usually larger on the left side.

This triangle represents the site where the pleura and peritoneum were continuous together during development (pleuro peritoneal canal.)

The Diaphragmatic Apertures: (Grey's 1981).

The diaphragm is pierced for the passage of structures between the thorax and abdomens three large opening the aortic, the oesophageal and the vena caval - and a number of smaller ones exist.

The aortic aperture: is the lowest and most posterior of the large openings; it is at the level of the lower border of the twelfth thoracic vertebra and the thoraco-lumber intervertebral disc, slightly to the left of the median plane strictly speaking, it is an osseo-aponeurotic opening lying between the diaphragmatic crura laterally, the vertebral column posteriorly and the diaphragm anteriorly. It therefore lies behind the diaphragm and more specifically, its median arcuate ligament when present.

Occasionally some tendinous fibres from the medial parts of the crura also pass behind the aorta, and convert the opening into a fibrous ring.