THE STUDY OF THE PATHOPHYSIOLOGY OF THE CARDIOESOPHAGEAL JUNCTION IN RELATION TO THE HIATUS HERNIA AND GASTROESOPHAGEAL REFLUX

ESSAY

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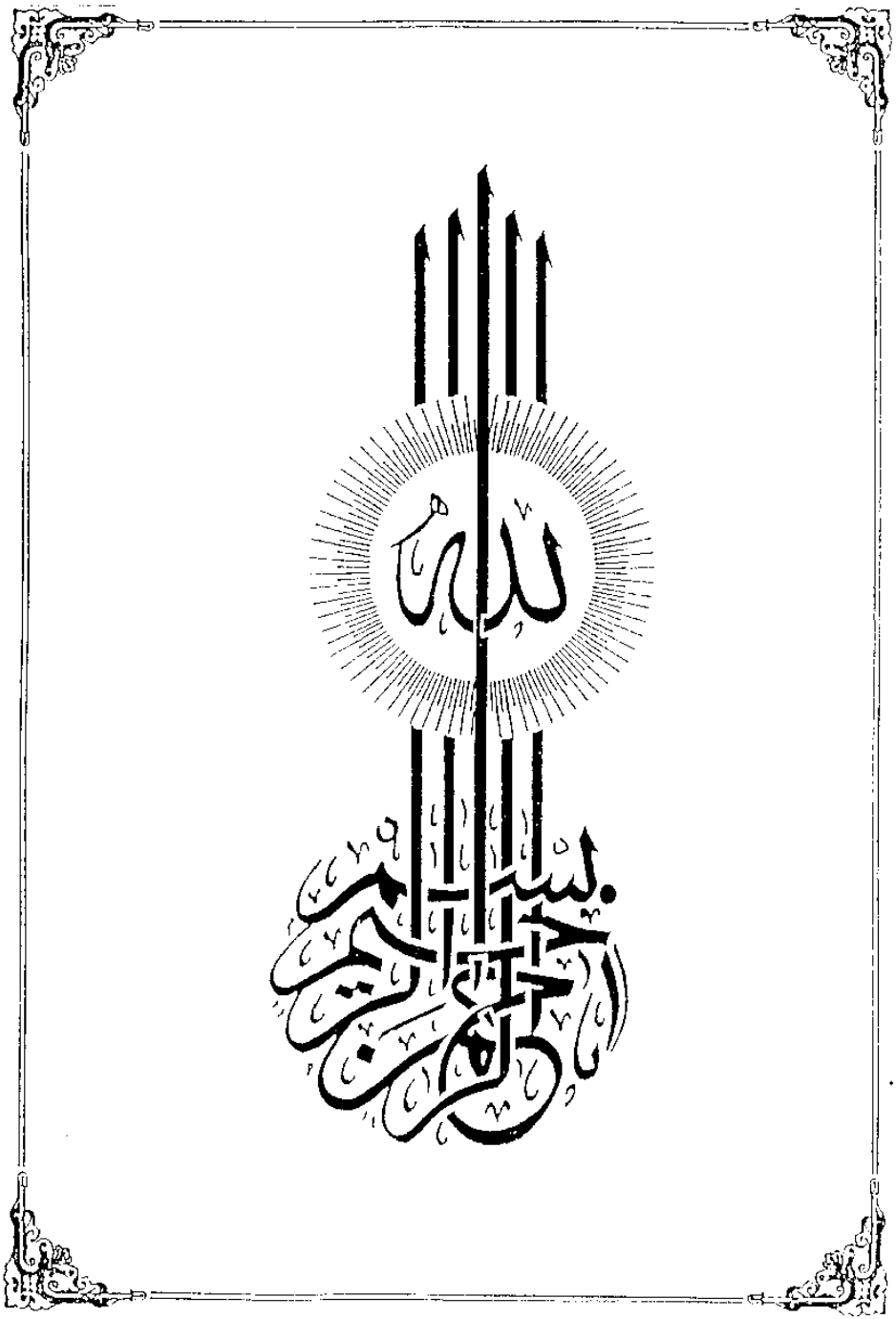
بسم الله الرحمن الرحيم

سبحانك

لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم

صدق الله العظيم

"سورة البقرة الآية ٣٢"



TO MY PARENTS

TO MY LOVELY WIFE

AND TO MY FOETUS

ACKNOWLEDGEMENT

I wish to express my deepest gratitude, thankfulness and sincere appreciation to my supervisor Ass. Prof. Dr. FAKHERY HAMID EBIED for his willing guidance and continuous help throughout the whole period of preparation of this work.

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C O N T E N T S

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ABBREVIATIONS

Throughout the text in this essay, the following abbreviations has been used:

G.E.R. : Gastroesophageal Reflux.

G.E.J. : Gastroesophageal Junction.

H.H. : Hiatus Hernia.

H.P.Z. : High Pressure Zone.

L.E.S. : Lower esophageal sphincter.

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INTRODUCTION

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Hiatus hernia is the herniation of an abdominal organ, usually the stomach through the esophagel hiatus in the diaphragm.

The first description of diaphragmatic hernia was given by Ambroise Paré (1510-1590), who reported cases of herniation through the diaphragm as result of trauma. Later on, Morgagni (1769), published his work describing parasternal type of diaphragmatic hernia. It was not before 1951, where Phillip Allison provided a clear description of the clinical syndrome of dyspepsia due to hiatus hernia and reported an operative procedure designed to treat such condition.

Ninety-eight per cent of diaphragmatic hernia occur through the esophageal hiatus and more than 90% of these are sliding hiatal hernia, in which the gastroesophageal junction herniates into the thorax.

Recent evidence indicates that G.E.R. may occur without hiatal hernia, and it is a common observation that a hiatal hernias may not be associated with reflux.

Current estimates are that 40% of patients develop reflux 10 years following hernia reduction, and

20% of patients develop recurrent hernias (Bombeck and Nyhus, 1980).

The mechanism of valvular junction between the esophagus and stomach is not clearly understood, and the majority of patients with sliding esophageal hiatus hernias have no symptoms. It is only supervene, when such hernia is associated with reflux esophagitis.

The aim of the present study is to review the literature regarding the G.E. Reflux and hiatus hernia from the physio-pathological, anatomical and clinical aspects.

ANATOMY OF
DIAPHRAGM AND CARDIOESOPHAGEAL FUNCTION

ANATOMY OF THE HIATUS AND CARDIOESOPHAGEAL JUNCTION

(1) **Anatomy of the diaphragm:**

The diaphragm is a thin, dome-shaped, musculotendinous structure which separates the thorax from the abdomen. It is bounded by the xiphisternal joint, the costal margin and the body of the 12th thoracic vertebra. As seen from in front, it curves up into right and left domes or cupolae, the right cupola is higher than the left. When seen from side, the diaphragm has the appearance of an inverted J, the long limb is the posterior or vertebral limb. (Snell, 1981).

The origin of the diaphragm may be grouped into 3 parts:

i. A sternal part consisting of small right and left fleshy slips arising from the posterior surface of the xiphoid process.

ii. A costal part arises from the internal surface of the cartilage and adjacent parts of the lower 6 ribs on each side, interdigitating with the transversus abdomins muscle.

iii. A vertebral or lumbar part arising by means of vertical columns or crura and lateral to the crura from the acurate ligaments medial and lateral.

The medial arcuate ligament is the thickened upper margin of the fascia covering the anterior surface of the psoas muscle while the lateral arcuate ligament is the thickened upper margin of the fascia covering the anterior surface of the quadratus lumborum muscle. (Gray, 1973).

The crural muscles are divided into right and left by the aorta, being a middle line structure. The right crus arises from the antero-lateral surface of the bodies of the 1st, 2nd and 3rd lumbar vertebrae, while the left one is attached to the 1st and 2nd lumbar vertebrae. The two crura are connected by a tendinous band, the median arcuate ligament, which areches in front of the aorta and gives origin to the fibres of the right crus.

The right crus in contrast to the left one is well developed, and wider. It spreads out to the left to be inserted into the central tendon on both sides of median plane.Through the right crus passes the esophagus. (Cunningham, 1972).

Occasionally a fleshy fasciculus from the medial side of the left crus crosses the aorta and runs obliquely through the fibres of the right crus towards the vena caval opening without passing around esophageal hiatus (Gray, 1973).

The esophageal opening or hiatus:

It lies in the muscular part of the diaphragm at the level of 10th thoracic vertebra above, in front and a little to the left of the aortic opening.

Frequently, the esophageal hiatus is formed entirely by the decussation of the right crus in form of a sling-like arrangement about the esophagogastric junction. (Collis, 1954).

Abnormal arrangement from this general pattern have been described as in 40% of cases the left crus of the diaphragm plays a variable part in the formation of the hiatus. (Du Plessis, 1975).

The average diameter of the hiatus is 2.5 cm which is just enough to comfortably permit passage of the esophagus, however, it is wider in older subjects due to weaken musculature around the hiatus. In normal adult, at laporatomy, the tips of two fingers can be admitted through the esophageal hiatus and can be pushed upward for a distance of about 1 to 2 cm. (Ville, 1967).

The esophageal hiatus is described to have a "teardrop-shape" in the right crus of the diaphragm, however, depending mainly on the architecture of the

crura, it may be round, oval or merely a slit. (Clagett, 1966).

There is a separation in the anteroposterior plan of muscle fibres composing the Rt. crus of the diaphram. This separation forms a sling anterior to the esophagus, but there is a less definite reunion of the muscle fibres posteriorly, creating a V-shaped, tapered defect. (Woodward, 1977).

The hiatus transmites the esophague, vagal trunks, esophageal branches of the left gastric vessels, and the lymphatics from the lower one third of the esophagus and phrenicoabdominal branch of the left phrenic nerve (Rohen, Bergmann, 1973).

The esophageal hiatus itself is devoid of any strong tendinous or fascial elements to give it support (Clagett, 1966). So, it is the weakest point in the diaphragm and is directly exposed to the pressure variations between the thoracic and abdominal cavities. (Ville, 1967).

With inspiration, the esophageal hiatus closes by approximation of the crural fibres, thus preventing reflux, also, stimulation of the phrenic nerve lead to contraction of the hiatus (Woodward, 1977).