Ain Shams University
Faculty of Medical
Department of Surgery

LAPAROSCOPIC VAGOTOMY

ESSAY
Submitted In Partial Fulfillment
For
The Master Degree
In
(GENERAL SURGERY)

BY

TAREK MOHAMMED EL-GHAZALY
(M.B., B.Ch.) Mansoura

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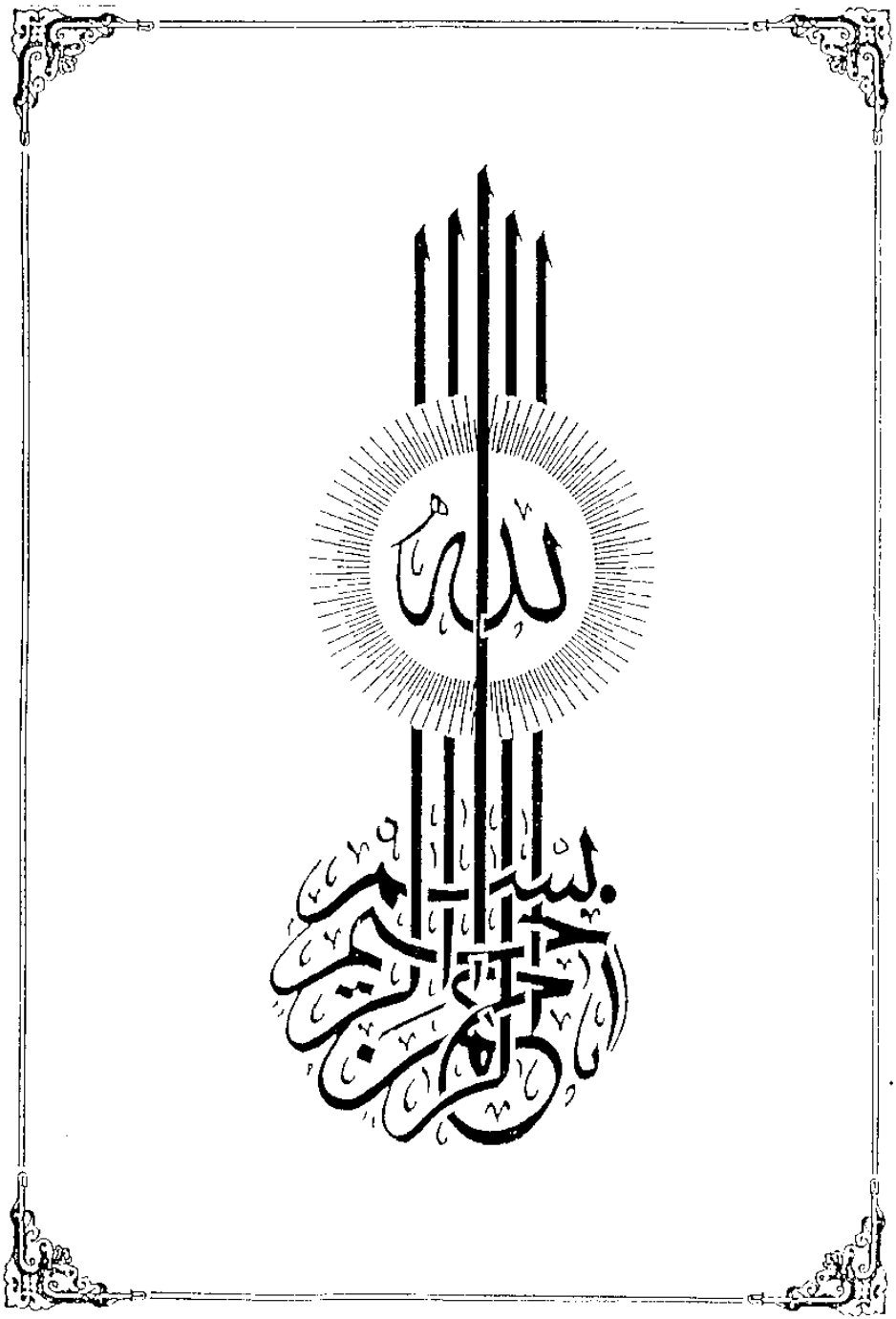

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INTRODUCTION
AND
AIM OF THE WORK

INTRODUCTION AND THE AIM OF WORK

For most patients with peptic ulcer, medical therapy is a highly effective regimen. With the use of H_2-receptor antagonists there has been a virtual demise of elective surgical management of peptic ulcer disease. With availability of Omeprazole (Losec), it is likely that more patients who are unresponsive to traditional pharmalogic therapy will be managed successfully without the need for surgery. Nevertheless, the high recurrence rate after the stoppage of H_2-receptor antagonists, along with the lack of decline in the mortality rate, indicates that a role of for elective surgery remains.

Vagotomy has become the cornerstone of the surgical treatment of peptic ulcer. Vagotomy has the advantage over Cimetidine or Ranitidine of exerting profound and permanent effects on gastric secretion of acid and pepsin. Because of the intrinsic disadvantages of open conventional surgery, vagotomy performed via laparoscopic procedures in now an alternative and promising new tool in the management of peptic ulcer disease.

The aim of this work is to compare the various treatment modalities of peptic ulcer versus laparoscopic vagotomy which may be a promising new tool in the management of peptic ulcer.

SURGICAL ANATOMY OF THE ABDOMINAL VAGUS NERVES

Surgical Anatomy of the Abdominal Vagus Nerves

The vagus nerves to the abdomen derive from the esophageal Plexuses in the thorax and they exhibit cosiderable variability[1]. In their descent through the thorax, each vagus passes behind the lung root, here giving off a large contribution to the pulmonary plexuses. The nerves then enter into the esophageal plexus on the posterior surface of lower esophagus. In the plexus, they become mixed and the right and the left vagal trunks as they leave the plexus, contain fibres from each vagus[2]. The fibres of the esophageal network reunite at a variable distance above the esophageal hiatus to form two main trunks. Both nerve trunks, as they descend along the abdominal esophagus, tend to run to the right of the midlongitudinal axis of the esophagus. At a level just above the cardia, the most proximal branches of the left and right vagal nerve trunks to the stomach are found. Occasionally these proximal gastric branches arise well above the cardia and even above the esophageal hiatus[3]. The embryonic rotation of the stomach accounts for the considerable variation in the position of the vagi at the hiatus (Fig. 1). Some of the vagi

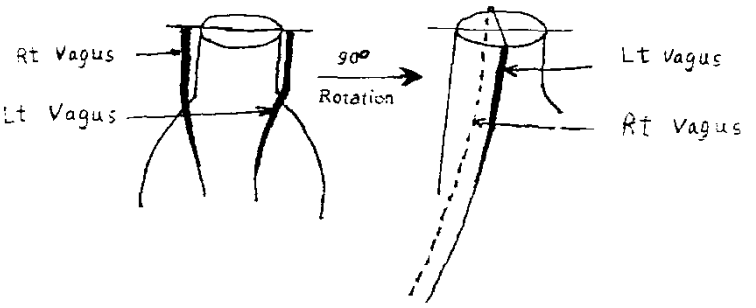

Fig.(1): Effect of embryologic rotation of the stomach on the ultimate position of the vagal trunks in the adult.

may lie well away from the esophagus, for example, the anterior trunk may lie closer to the left hiatal and the posterior trunk may lie closer to the aorta than the esophagus. To the surgeon planning a vagotomy, the pattern of the vagus nerves at the esophageal hiatus is important. In a study of vagal structures in 100 cadavers, the following was found[5]:

1- Two vagal trunks only "88 percent" (Fig. 2). This will be the anterior and posterior vagal trunks, which have not split yet to form the four typical divisions. Both trunks are usually to the right of the midline of the esophagus. The posterior trunk lies closer to the aorta than to the esophagus (Fig. 3).

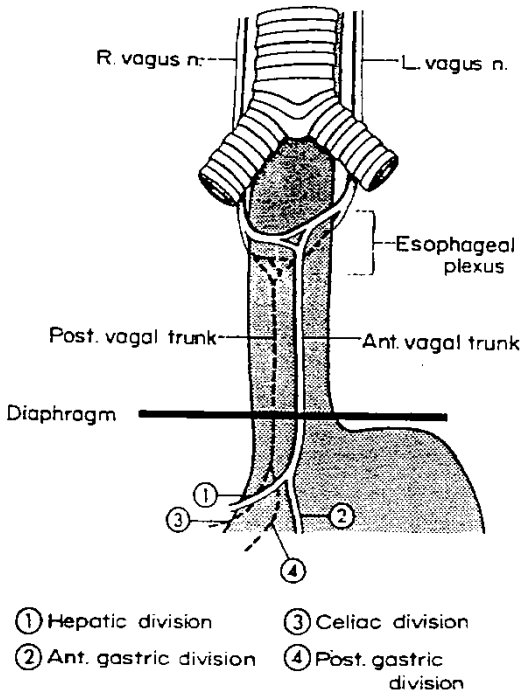

Fig.(2): The vagus nerves in the thorax and abdomen. In this example, two vagal trunks pass through the hiatus to enter the abdomen.

2- Four vagal structures "7 percent" (Fig. 4-A). These will be the four divisions of the vagal trunks. Division has occurred above the diaphragm.

3- More than four vagal structures "5 percent". This may be:

a. Divisions and branches of divisions (Fig. 4-B) (the anterior and posterior vagal trunks lie entirely within the thorax.).

b. Elements of the esophageal vagal plexus (Fig. 4-C). (the anterior and posterior trunks lie entirely within the abdomen).

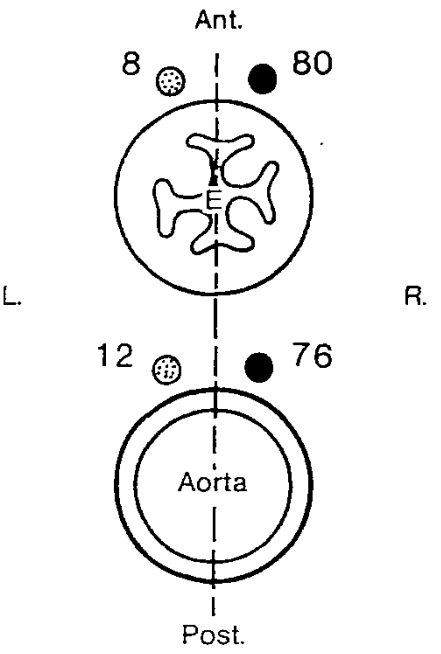

Fig.(3): The relation of the anterior and posterior vagal trunks to the aorta and esophagus. The trunks are usually to the right of the midline; the anterior trunks are closer to esophagus (E) than are the posterior trunks.

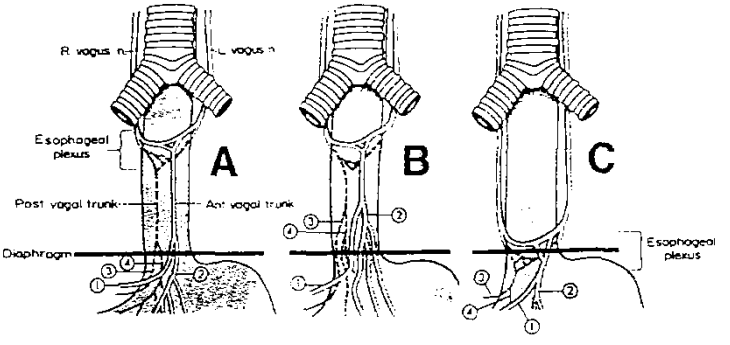

Fig. (4): Where four or more vagal structures emerge through the hiatus, they may be A. divisions that separated just above the diaphragm, B. divisions and their branches that arise above the diaphragm, and C. elements of the esophageal plexus that extend below the diaphragm.

The anterior vagal trunk

The anterior vagal trunk is formed from the esophageal plexus and contains fibres mainly from the left vagal nerve. In 20% of cases it is double[2]. Most commonly it forms a single trunk as it passes through the hiatus, but occasionally two or even three trunks are found[1]. It divides into two divisions:

I. The anterior nerve of Latarjet

It is the larger division of the anterior trunk. This nerve continues parallel to the lesser curvature of the stomach about 1 cm or more into the lesser omentum[1]. It gives 2 to 12 branches to the anterior gastric wall and usually terminates at a variable point on the antrum without reaching the pylorus. At a point 5-7 cm proximal to the pylorus, the anterior nerve of Latarjet usually divides into branches, the appearance of which has been described as the (crow's foot), most of these branches supply the pyloric antrum[6]. The point where the anterior nerve of Latarjet crosses onto the antral musculature on the lesser curve is close to the antrum-corpus boundary[7]. It has been found that the mean distance between the pylorus and the main nerve of Latarjet is 6.1 cm, between the pylorus and the most proximal gastrin producing cells is 6.9 cm, and between the pylorus and the most distal parietal cells is 6.4 cm[8]. That is, the antrum-corpus boundary is 6 to 7 cm from the pylorus, on average; and the nerve of Latarjet crosses onto the stomach 6 cm from the pylorus. Thus, is most patients, preservation of the main terminations of the nerve of Latarjet is compatible with complete vagal denervation of the distal

parietal cell mass (PCM). Nevertheless, in some patiants-particulary those who have little gastritis, small gastric antra, large PCMs and high acid outputs-the antrum-corpus boundary may lie only 4 to 5 cm from the pylorus, slightly distal to the point of entry of the nerves of Latarjet[7]. In these patients, complete vagal denervation of the distal PCM could be accomplished only by cutting the nerves of Latarjet, which should obviously not be done, because to do so would produce gastric stasis, excessive release of gastrin and increased incidence of recurrent ulceration. So distal dissection should be carried right up to the terminations of the nerves of Latarjet, but no farther. When this is done, 20 to 25% of patients with duodenal ulcer will have a slightly incomplete denervation of the distal PCM as has been proved by histologic studies and sham feeding experiments[9]. The anterior nerve of Latarjet can be traced distally to about the level of the incisura in most subjects, but in many it reaches the pylorus and in a few it is visible as far as the first part of the duodenum[5] (Fig. 5). It has been shown that vagal branches which are subserosal at the surface may penetrate the muscularis and continue downwards to the antrum by the submucuosal (Meissner's) plexus[10]. The anterior vagal trunk in the thorax tends to lie on the left side anterior to the esophagus. Then it changes its position gradually until it comes to lie to the right as it passes through the hiatus[5]. Therefore, at the level of the hiatus it varies in position between the left of the midline of the esophagus and the right side of the esophagus. The anterior trunk

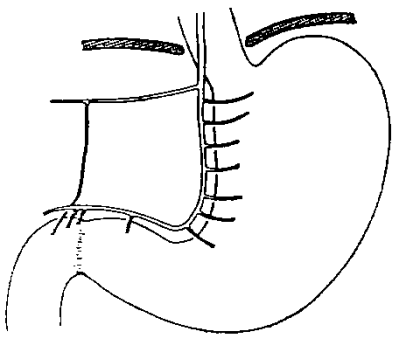

Fig.(5): Typical pattern of distribution of the anterior gastric and hepatic division of the anterior vagal trunk.

lies very close to the esophagus and when the peritoneum over the esophagus is incised, during operation, and the esophagus is put under tension the trunk tends to lie deep in the esophageal muscle[1]. It can be felt as a taut bowstring in this region. Occasionally the anterior nerve of Latarjet is absent with all anterior branches coming from the anterior vagal trunk or the hepatic division[1]. Under these circumstances, the pyloric branch assumes some importance as all anterior branches are at risk of being divided during proximal gastric vagotomy (Fig. 6). Even where a definite nerve of Latarjet is

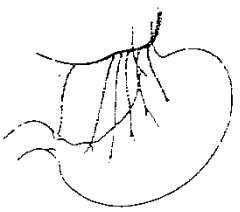

Fig.(6): Absence of the anterior nerve of Latarjet with the gastric branches coming directly from the anterior vagal trunk.