A comparison of highly selective vagotomy with truncal vagotomy and pyloroplasty

ESSAY

Submitted in partial fulfilment for the
Master Degree in General Surgery

By

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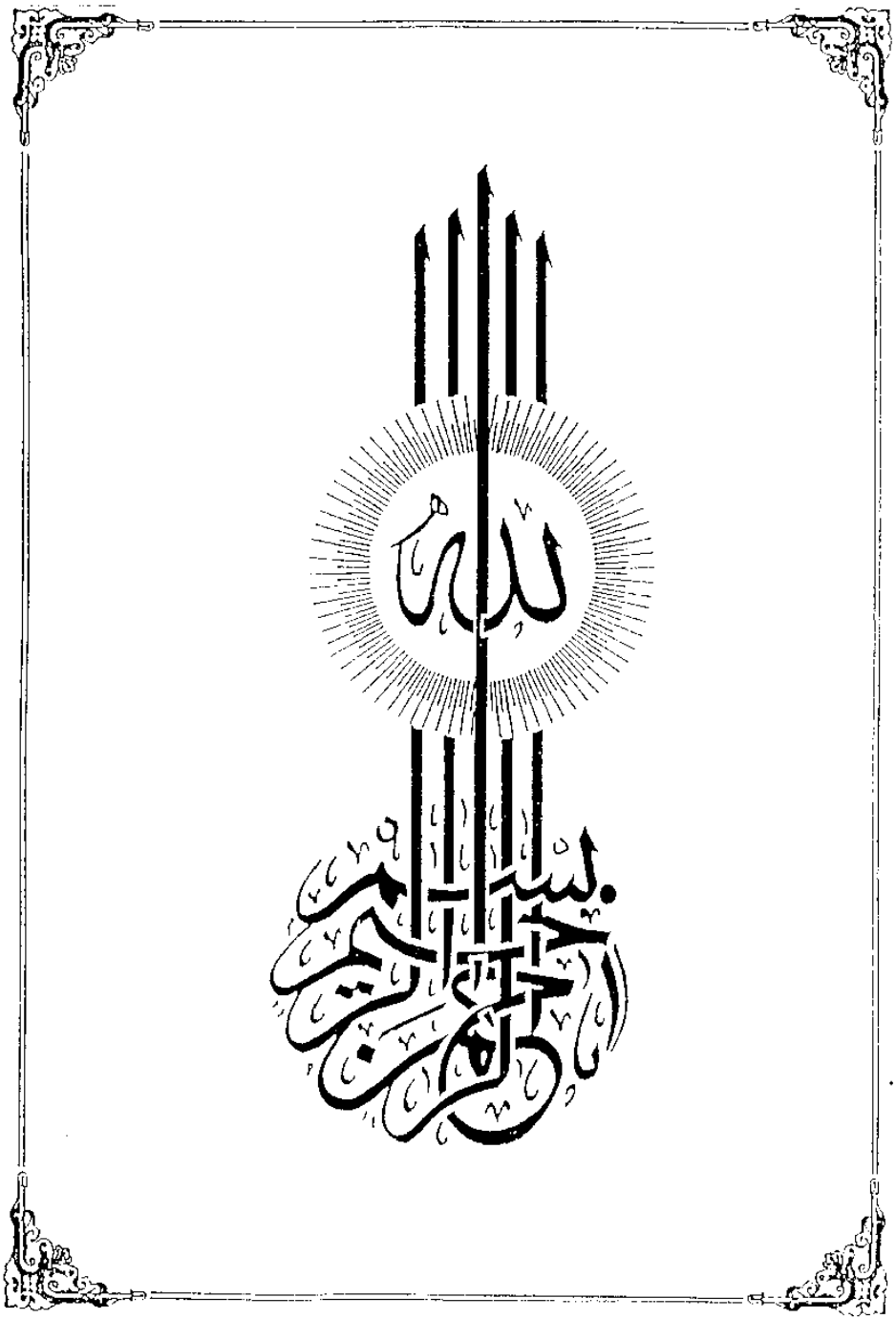

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INTRODUCTION

Peptic ulcer is a world wide diseas, the actual cause of which remains to be defined, its treatment is still controversial. Medical treatment does not always succeed of curing the patient of this hazardous condition. Surgical treatment is a problem which has not yet been solved.

Since the brilliant work of Lester Dragatedt in 1943, vagotomy has played a major role in the surgical treatment of duodenal ulcer and it is probably at present the most commonly used procedure throughout the world.

In this essay, a comparative evaluation is made between two main types of vagotomy, one which is in common use, trunkal vagotomy and pyloroplasty, and the other which is relatively recent but worthy challenging, high selective vagotomy.

HISTORICAL EVOLUTION OF VAGOTOMY :

Operations on the stomach were first developed for gastric cancer during the later part of 19th. century.

Gastro-jujenostomy, one of the earliest elective operations on the abdominal viscera, was performed by Wolfer in Vienna 1881, to short-circuit an obstructing carcinoma of the pyloric antrum. The applicability of this operation to the treatment of duodenal ulcer was then recognised. The rationale for its use being that it rested a duodenal ulcer by short-circuiting, and also that it neutralised gastric acidity by allowing the regurgitation of alkaline juices through the stomach. Its simplicity, at a time when the mortality and morbidity of intra-abdominal operations was high, was also in its favour, it was performed with great acceptance by surgeons throughout the world and there were very few who questioned its benefit, from 1930, onwards gastrojujenostomy fell into disfavour because of the risk of stomach ulceration which complicated about 30 % of gastrojujenostomies. As early as 1910, Austrian and German surgeons recognised this and adopted partial gastrectomy for duodenal ulcer, its rationale was reduction of gastric acidity by removal of the greater part of the parietal cell mass.

During the late 1930s and 1940s and early 1950s the trend moved towards more radical operation. However, it became evident that although gastrectomy effectively cured duodenal ulcer, its sequelae were too frequent and too serious to be discontinued. This

promoted a search for operations equally effective and less costly in mortality and morbidity.

In 1943, the rediscovery of the prinicple of vagus nerve section by Lester Dragstedt and his colleagues at the University of Chicago introduced a new era in the surgical treatment of duodenal ulceration, by 1947 he reported on 96 patients treated by vagotomy alone but only 6 of them developed gastric retention, then he added gastrojujenostomy to facilitate gastric emptying and soon considered that it should routinely accompany vagotomy. This adjunctive procedure rapidly became known as "drainge procedure". Other procedures were then advocated to drain the stomach. Tanner in London and Weinberg in California tried pyloroplasty, Smithwick and Edwards in United States and Johnson in Britain employed antrectomy of the Polya type. Subsequently vagotomy coupled with drainge procedure became solidly established, but the occurrance of nutritional disturbance and in particular episodic diarrhea after vagotomy has led to a search for a more satisfactory form of gastric denervation.

Selective vagotomy was introduced to achieve gastric vagotomy with preservation of the hepatic and coeliac vagal branches. There was no decrease in the incidence or severity of the side effects, though diarrhea became less frequent. It has been largely abandoned.

In a continued attempt to avoid the complications of

vagotomy a further refinement of vagal section, high selective vagotomy, has been introduced in man by Amdrup and Johnston in 1969, it was first used in dogs by Griffith and Harkins in 1957, it aims at vagal denervation of just the parietal cell mass of the stomach preserving the antral innervation so, drainge procedure is unnecessary since gastric stasis is unlikely.

Recently, attempts have been made to interrupt the gastric vagal fibres, not outside the stomach as in H.S.V., but actually as they enter the muscular coat of the stomach by the operation of seromyotomy, or at the submucosal level by chemoneurolysis with alcohol.

SURGICAL ANATOMY OF VAGUS

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Central connection :

The vagus nerve arises from the vagal nucleus in the medulla oblengata in the vagal trigon in the floor of the 4th. ventricle caudal to IX nucleus.

The vagal fibres go from or to 3 nuclei, two motor and one sensory :

1. DORSAL MOTOR NUCLEUS : Responsible for viscero-motor innervation of the viscera.
2. NUCLEUS AMBIGUUS : Responsible for the voluntary motor innervation of the pharynx, larynx and soft palate.
3. SOLITARY NUCLEUS : Receive sensory impulses from the viscera as well as from the pharynx, larynx and soft palate.

The motor fibres of the abdominal vagi arising from the dorsal motor nucleus as preganglionic fibres relay only in the wall of the viscus they supply via Auerbach's plexus and Meissner's plexus from which short postganglionic fibres arise to supply neighbouring muscles. This particular arrangement offers accurately localizing effect.

The abdominal vagi :

At an early developmental stage, the alimentary tract is a median tube with right and left sides supplied by right and

left vagi respectively. With the outgrowth of the liver, the stomach rotates so that its left side becomes uppermost carrying its nerve supply with it, thus the left vagus becomes anterior and the right vagus becomes posterior.

In the thorax, the left and right vagi descend parallel to the oesophagus and form oesophageal plexus between the level of tracheal bifurcation and the level of the diaphragm. From the lower end of this plexus 2 vagal trunks, anterior and posterior, form and pass through the oesophageal hiatus in relation to the abdominal oesophagus. The anterior trunk gives rise to hepatic and anterior gastric divisions while the posterior trunk gives the coeliac and posterior gastric divisions.

Vagal pattern at the oesophageal hiatus :

Usually 2 vagal structures, anterior and posterior, are found. The anterior lies infront of the abdominal oesophagus being covered by its serous coat, while the posterior lies in the connective tissues between the abdominal oesophagus and the Aorta being closer to the later.

Sometimes, more than 2 vagal structure (up to 6) may be found at the hiatus in which case division has occured above the diaphragm.

Distribution of anterior vagus in the abdomen :

Anterior gastric division :

The separation of the anterior gastric and hepatic divisions occasionally occur above the diaphragm, but usually they lie on the abdominal oesophagus or the cardia of the stomach. A major branch of the anterior gastric division form the principle anterior nerve of the lesser curvature and lies 0.5 - 2 cm. from it between the 2 layers of lesser omentum and is called "anterior nerve of Laterjet". This nerve can be traced distally to about the incisura but in many it reaches the pylorus and in a few it is visible as far as the 1st part of the duodenum. From 2 - 12 branches pass from the principle nerve of Latarjet to the anterior gastric wall supplying separate strands of gastric musculature.

Hepatic division :

Usually arises from the anterior vagal trunk at the level of abdominal oesophagus and passes to the right towards the liver between the leaflets of the avascular portion of the hepato-gastric ligament. It is frequently found as multiple and closely parallel branches dividing before it enters the liver. One branch turns downwords to reach the pylorus and sometimes the 1st part of the duodenum and called the "pyloric nerve".

Distribution of the posterior vagus in the abdomen :

Posterior gastric division :

In most subjects, the posterior gastric division form the principle posterior nerve of the lesser curve (posterior nerve of Laterjet). Actually it is the mirror image of the anterior gastric nerve but as a rule the posterior nerve appears to terminate slightly higher on the lesser curve and possesses fewer gastric branches than does the anterior nerve.

Sometimes the gastric branches of the posterior nerve of Laterjet fall into 2 groups of branches, a superior and inferior groups. The superior group arises from the posterior vagal trunk just below or even above the diaphragm. The inferior group arises from the posterior nerve of Laterjet to supply only the lower body and antrum of the stomach. Between these 2 groups of branches the lesser curve has no grossly visible nerve supply. In many the most superior gastric branch arises at or above the origin of the coeliac division and is called "the criminal nerve of Grassi" as it can easily be overlooked and thus escape section in H.S.V. and becomes instrumental in subsequent recurrent ulceration.

Coeliac division :

It is the largest of the 4 vagal divisions and descends in the gastro-pancreatic peritoneal fold. It may follow the left gastric artery to the coeliac plexus or the right crus of the