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Anatomical Study of Vagal Trunks at Gastro Esophageal Junction

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Abstract: *- Vagus is the chief parasympathetic nerve to the most of the organs in the neck, thorax and abdomen. The number and position of anterior and posterior vagal trunks have variations at the gastro esophageal junction. This is a very important factor for surgeons who plan for vagotomy or vagal preservation surgeries in esophageal resection. The study was done in 45 autopsy specimens. Considerable variations were found in the number and position of anterior and posterior vagal trunks. Knowledge about these variations will be helpful for surgeons to avoid injury to the vagus nerve in hiatal hernia surgeries and in lower esophageal resection.*

Keywords: ***Vagal trunks, gastro esophageal junction, esophageal hiatus.***

Introduction

Vagus is the longest cranial nerve which gives parasympathetic innervation to most of the organs in the neck, thorax and abdomen. The left vagus becomes anterior vagal trunk and the right vagus becomes the posterior vagal trunk after passing through the esophageal hiatus of the diaphragm. The functions of the lower esophageal sphincter are controlled by the fibres arising from the anterior and posterior vagal trunks [1]. The number of vagal trunks varies considerably at the gastro esophageal junction below the diaphragm. Skandalakis had studied extensively about the vagus nerve and reported several variations in its course related to gastro intestinal tract [2]. The knowledge about these variations was helpful for the surgeons in the surgical treatment for peptic ulcer disease [3]. With the advent of advanced medical management for the peptic ulcer disease, the surgical management became a rarity. In carcinoma of lower end of esophagus and gastro esophageal junction, the lower part of the esophagus is removed which results in damage to the vagal trunks [4,5]. Surgeries for hiatus hernia also may damage the vagal trunks [6]. Vagus nerve preserving surgical management retains the functions and anatomical continuity of the upper gastro intestinal organs [4].

This study aims to focus on the number of vagal trunks at the lower end of the esophagus and their position in relation to the midpoint of the esophagus in Indian population and compare it with the previous studies.

Materials and Methods:

The study was carried out in 45 autopsy specimens collected from adult cadavers which comprised of posterior mediastinal structures, diaphragm and organs of supra colic compartment. The gastro esophageal junction was exposed and the vagus nerve was traced from the thoracic part of the esophagus. The anterior and posterior vagal trunks were identified and traced up to the gastro esophageal junction. Their number and position was recorded and analyzed.

Results:

The number of anterior vagal trunks varied from 1 to 3. In 35 specimens it was single. [Figure.1] Two trunks were observed in 7 specimens [Figure.2] and three trunks in 3 specimens.

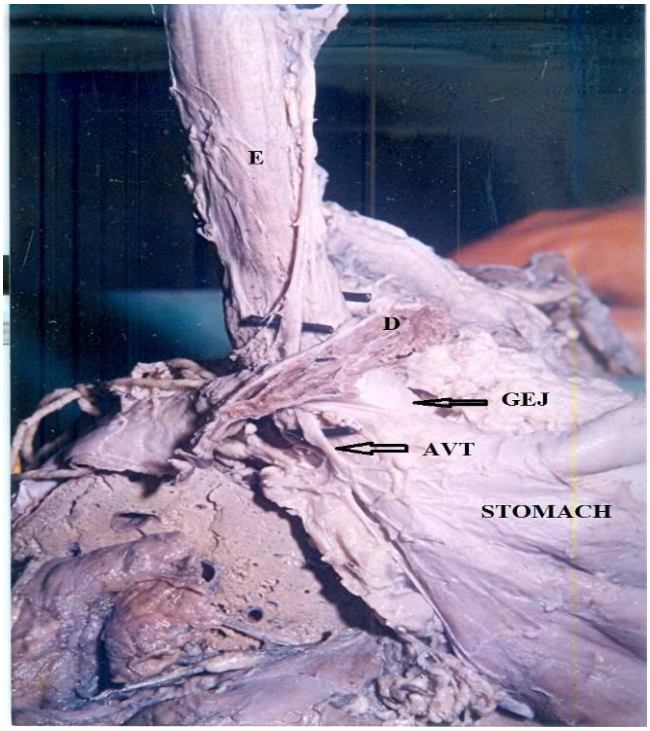

Figure 1: Single anterior vagal trunk at esophageal hiatus. E-Esophagus, D- Diaphragm, GEJ- Gastro esophageal junction, AVT-Anterior vagal trunk

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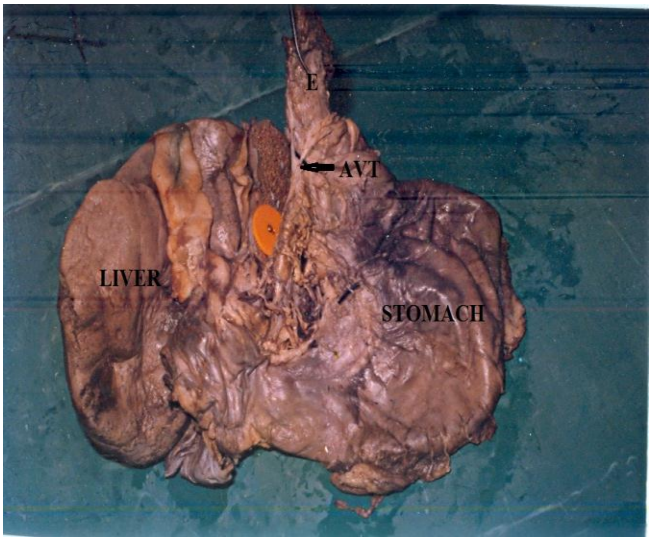

Figure 2: Double anterior vagal trunks at esophageal hiatus. E-Esophagus, AVT-Anterior vagal trunk

The position of the vagal trunks also was variable. Out of 35 single trunks, 33 were in midpoint and 2 were seen to the right of the midpoint. Out of the 7 specimens where two anterior vagal trunks were observed, 5 had both trunks in the mid point. 2 specimens had one in the midpoint and the other one to the right of the midline. In the specimens with 3 vagal trunks, the position of the trunks was not uniform. One specimen had one trunk in the midline and the other two trunks towards the right and left of the midline respectively. One specimen had two trunks towards the right of the midline and one trunk in the midline. One specimen had one trunk to the right of the midline and two trunks towards the left.

The number of posterior vagal trunks varied from one to two. Out of 45 autopsy specimens, 39 specimens had single posterior vagal trunk [Figure.3] and 6 specimens had 2 trunks [Figure.4].

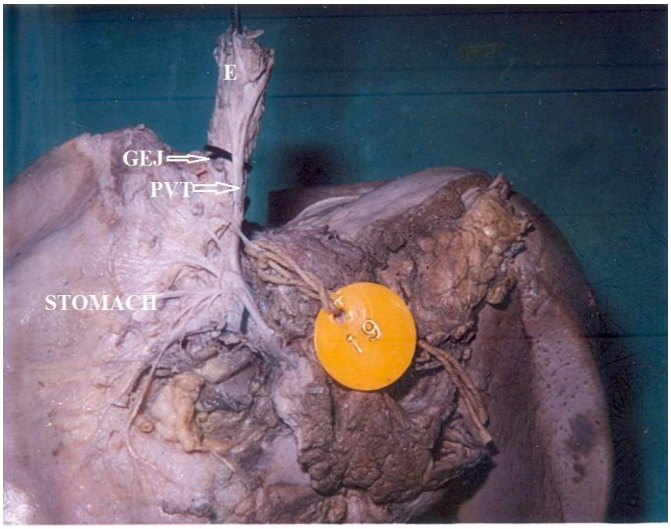

Figure 3: Single posterior vagal trunk at esophageal hiatus. E-Esophagus, GEJ- Gastro esophageal junction, PVT-Posterior vagal trunk

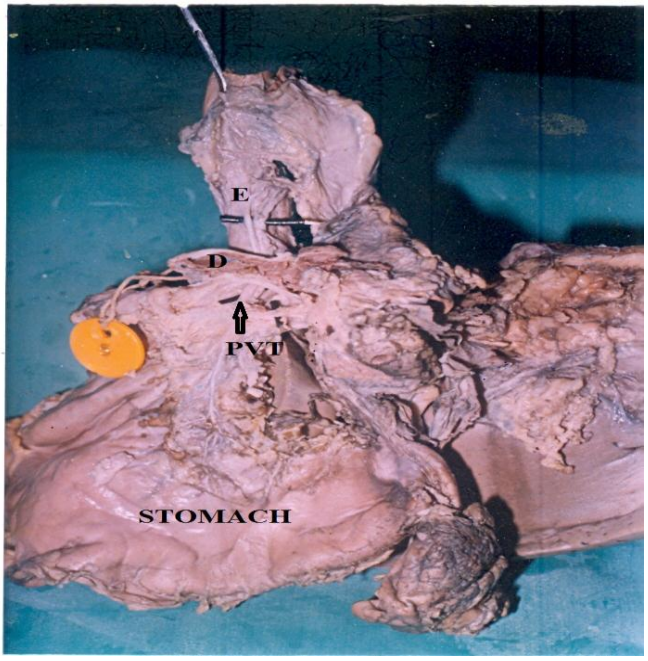

Figure 4: Double posterior vagal trunks at esophageal hiatus. E-Esophagus, D- Diaphragm, PVT-Posterior vagal trunk

In the single posterior vagal trunks, 36 were found to lie to the right and 3 in the midpoint. In the specimens with 2 posterior vagal trunks, 3 specimens had both trunks towards the right and 2 specimens had one trunk in the right and the other one in the midpoint. One specimen had both trunks towards the left of the midpoint.

Discussion:

The secretomotor innervation to the stomach is given by the anterior and posterior vagal trunks [1]. The observations made in the present study confirm the presence of the anterior and posterior vagal trunks at the gastro esophageal junction.

The number of anterior vagal trunks was found to be variable. The other studies also reported that the number of trunks can be one to four. [Table.1]. Single trunk was the commonest one in all the studies [7, 8, 2].

Table 1: Comparison of number of anterior vagal trunks in different studies

Number of anterior vagal trunks	1	2	3	4
G A G Mitchell (15 specimens)	66%	44%	0	0
Henry Doubilet (32 specimens)	63%	31%	6%	0
Skandalakis JE (100 specimens)	88%	7%	2%	3%
Present study (45 Specimens)	78%	15%	7%	0

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The variations in the position of the anterior vagal trunks also were reported by Jackson R.G and Skandalakis JE [2, 9]. It was found to be variable in our study too which is important for surgeons. During surgical resections, the surgeons have to search for the additional vagal trunks in other parts of the gastro esophageal junction.

The number of posterior vagal trunks was also reported as variable [Table.2].

Table 2: Comparison of number of posterior vagal trunks in different studies

Number of posterior vagal trunks	1	2	3
G A G Mitchell (15 specimens)	53%	40%	7%
Henry Doubilet (32 specimens)	63%	34%	3%
Skandalakis JE(100 specimens)	85%	10%	5%
Present study (45 Specimens)	84%	16%	0

Though single posterior vagal trunk is the commonest one, occurrence of double trunks is also found to be common. Three posterior vagal trunks are rare but present. [7, 8, 2].

As per the present findings and previous studies, the position of posterior vagal trunks need not be in the midpoint of the esophageal hiatus. They can be present on either side of the midpoint [2, 9]. If a surgeon plans to preserve or cut the posterior vagal trunk, the presence of additional trunks has to be ruled out.

Conclusion:

The number and position of anterior and posterior vagal trunks have lot of clinical significance. With the prevalence of laparoscopic surgery for vagotomy, the additional vagal trunks need to be searched for and cut to prevent recurrence of peptic ulcer disease [10]. And in vagal preserving esophagectomy and hiatal hernia repair, this knowledge regarding their variations will help the surgeons to prevent damage to the vagal trunks during the surgical procedure [4,5,6].

References:

[1] Susan Standring, "Gray's Anatomy: The Anatomical basis of clinical practice". 41st edition. Elsevier.UK.2016
[2] Skandalakis JE, Rowe JS Jr, Gray SW, et al., "Identification of vagal trunks at the esophageal hiatus". Surgery, 1974: 75: 233-237.
[3] Dragstedt LR, Harper PV, JR, Tovee EB and Woodward ER, "Section of the vagus nerves to the stomach in the treatment of peptic ulcer: complications and end results after four years". Annals of Surgery, 1947:126:687
[4] Christian A, Gutschow and Wolfgang Schroder, "Vagus preserving Merendino procedure for early carcinoma of the gastro esophageal junction". The Chinese-German journal of clinical oncology. 2004; 3:4:226-228.
[5] Steven R, DeMeester MD, "Endoscopic mucosal esection and vagal - sparing esophagectomy for high grade dysplasia and adenocarcinoma of the esophagus". Thoracic and cardio vascular surgery, 2005; 1043-0679/05.
[6] Selwyn van Rijn, Yvonne G.M. Roebroek , Jose M. Conchillo et.al., "Effect of Vagus Nerve Injury on the Outcome of Antireflux Surgery". An Extensive Literature Review. Dig Surg 2016;33:230–239
[7] Mitchell GAG, "The nerve supply of gastro esophageal junction". Brit.J.Surg., 1938:26:333-345.
[8] Doubilet H, Shafiroff BGP and Mulholland JH., "The anatomy of the perioesophageal vagi". Ann.Surg., 1948; 127: 128-135.
[9] Jackson RG, "Anatomy of vagus nerves in the region of the lower esophagus and the stomach.". Anat.Rec., 1949, 103:1-18.
[10] Mouiel J, Katkhouda N, "Laporoscopic vagotomy for chronic duodenal ulcer disease". World J surgery, 1993;17:34-39

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