INTRODUCTION

Gastro-esophageal reflux disease is the commonest upper digestive disorder with approximately 45% of the population having reflux symptom. It affects a large group of patients and has a negative impact on quality of life. In addition, this disorder is associated with considerable long-term morbidity and mortality.Symptoms of GERD include retrosternal burning and regurgitation, which are highly predictive of acid exposure to the esophageal mucosa **(*Shimi SM, 2002).***

The passage of food from the esophagus to the stomach is facilitated by a transient relaxation of the distal esophagus. It is initiated by swallowing-induced peristaltic waves. The resting tone of the distal esophagus is important in preventing the reflux of gastric contents into the thoracic portion of the eso-phagus. The anatomic area integral to the prevention of reflux is the abdominal esophagus, where the high-pressure zone (HPZ) is located. The HPZ is dependent on many factors, including an adequate length of intra-abdominal esophagus, intact phreno-esophageal ligaments, normal diaphragm, and sufficient gastric emptying. Symptoms of reflux tend to occur when the sphincter pressure is (0-5mmHg). About 81% of patients in whom the intra-abdominal esophagus is

1cm or shorter have reflux, whereas 38% of those with an intra-abdominal segment longer than 3cm have reflux ***(Winan and Harris, 2002).***

For diagnosis and quantitation of gastro-esophageal reflux disease, a number of different examinations are available. The simplest are the patient's history and complaints as well as the proton pump inhibitor test; both methods have a positive predictive value of 65% to 70%. Esophagogastro-duodenoscopy is the gold standard for differentiation between erosive and non-erosive reflux disease.Biopsy does not enhance the significance of endoscopy except for proof of Barrett's epithelium or malig-nant transformation. 24-hour PH monitoring has the highest sensitivity and specificity for the diagnosis of gastro-esophageal reflux disease ***(Holscher, et al., 2005).***

The principal aim of reflux disease treatment is to eliminate or alleviate the symptoms, to heal tissue damage and to reduce the frequency and duration of recurrences. Lifestyle and dietary modification are of only limited value in GERD treatment. Proton Pump Inhibitors (PPI) are the mainstay of GERD pharmacotherapy for both initial episode and long-term manage ment. Surgical treatment is indicated in : complicated GERD, in patients who need high effective dose of medication, young patients who need life long PPI . Laparoscopic Nissen fundo-plication

has become the operation of choice. Neverthless patients who have undergone fundoplication may experience adverse postoperative complication. The useful alternatives in the management of GERD may indeed eventually prove the new endoscopic methods of minimally invasive treatment which are currently under thorough evaluation.The most promising of are: radio-frequency ablation (the streett's procedure), endoscopic gastroplasty, endoscopic injection of lower esophageal sphincter ***(Grazyna and Baniukiewicz, 2004)***.

AIM OF THE WORK

The aim of this study is to review the literature and high-light update in diagnosis and treatment of gastro-esophageal reflux disease (GERD) regarding medical, surgical, endoscopic approaches.

ANATOMY OF THE ESOPHAGUS

The esophagus is a muscular tube about 25cm (10 in) long, connecting the pharynx to the stomach. It begins in the neck, level with the lower border of the cricoid cartilage and the sixth cervical vertebra; descending largely anterior to the vertebral olumn through the superior and posterior mediastina. It traverses the diaphragm, level with the tenth thoracic vertebra, and ends at the gastric cardiac orifice level with the eleventh thoracic vertebra. Generally vertical in its course, it has two shallow curves. At its beginning it is median but inclines to the left as far as the root of the neck, gradually returns to the median plane near the fifth thoracic vertebra, and at the seventh deviates left again, finally turning anterior to traverse the diaphragm at the tenth. The tube also bends in an antero-posterior plane to follow the cervical and thoracic curvatures of the vertebral column. It is the narrowest part of the alimentary tract, except for the vermiform appendix, and is constricted:

- At its commencement, 15cm (6in) from the incisor teeth.
- Where crossed by the aortic arch, 22.5cm (9in) from the incisor teeth.

- Where crossed by the left principal bronchus, 27.5cm (11in) from the incisors.
- As it traverses the diaphragm, 40cm (16in) from the incisors.

These data are important clinically with regard to the passage of instruments along the esophagus ***(Gray, 2000)*.**

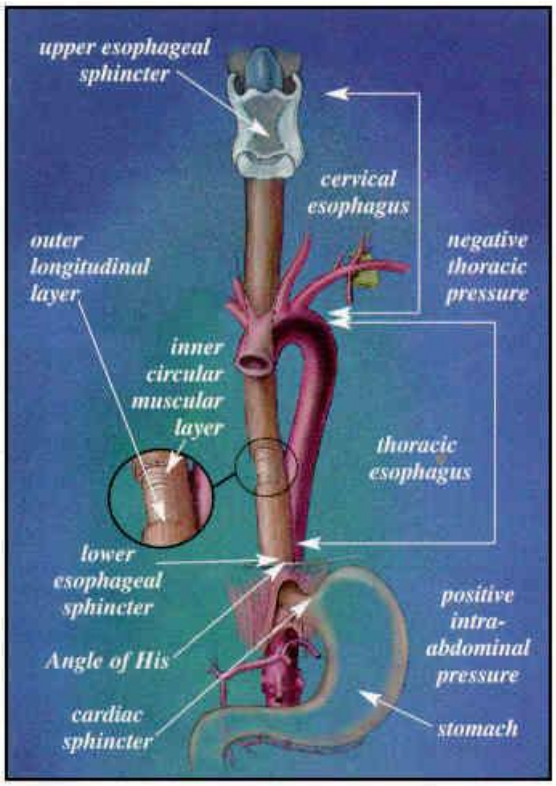

Fig. (1): Constrictions of the esophagus ***(Zuidema GD, 1996)***

The Relations of the esophagus:

I) The cervical part of the esophagus has the following relations:

Anteriorly lies the trachea, to the posterior membranous wall of which it is attached by loose connective tissue. The recurrent laryngeal nerve ascends one on each side, in or slightly in front of the groove between the trachea and esophagus. **Posteriorly** it adjoins the vertebral column, the longus colli and the prevertebral layer of the deep cervical fascia. **Laterally** on each side, lie the corresponding common carotid artery and the posterior-part of the lobe of the thyroid gland; in the lower part of the neck, where the esophagus projects to the left side, it has a closer relation to the carotid sheath and the thyroid gland than that right side . The thoracic duct ascends for a short distance along the left side of the esophagus **(*Peter et al, 1995).***

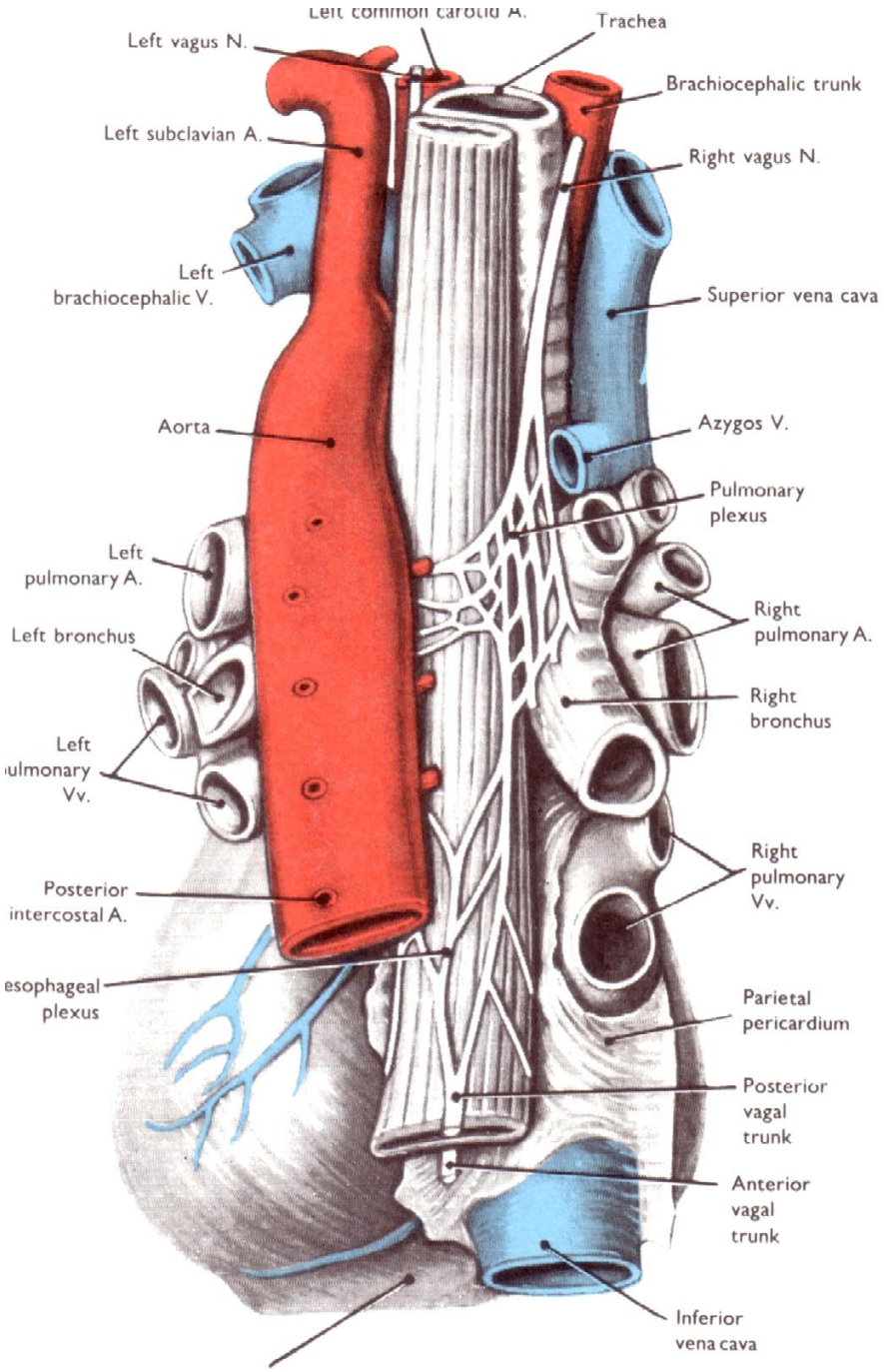

Fig. (2): Relations of the esophagus in the superior and upper part of posterior mediastinum as seen from posterior aspect ***(Zuidema, 1996)***

II) The thoracic part of the esophagus:

Is at first situated in the superior mediastinum between trachea and the vertebral column , a little to the left of the median plane it passes behind and to the right of the aortic arch and descends in the posterior mediastinum along the right side of the descending thoracic aorta. Below, as it inclines to the left, it crosses in front of the aorta, and enters the abdomen through the diaphragm at the level of tenth thoracic vertebra. It is in relation: **Anteriorly** (from above downwards), with the trachea, the right pulmonary artery, the left principal bronchus, the pericardium (separating it from the left atrium), and the diaphragm. **Posteriorly** are the vertebral column, the longus colli muscles, the right posterior (aortic) intercostals arteries, the thoracic duct, the azygos vein and the terminal parts of the hcmiazygos and accessory hcmiazygos veins, and inferiorly, near the diaphragm, the front of the aorta. In the posterior mediastinum, an elongated recess of the right pleural sac intervenes between the esophagus and the vena azygos and vertebral column ***(Peter et al, 1995).***

On its left side in the superior mediastinum the terminal part of the aortic arch, the left subclavian artery, the thoracic duct, and left pleura are immediate relations , while the left recurrent laryngeal nerve runs upwards

in , or just in front of the groove between it and the trachea , in the posterior mediastinum it is in relation with the descending thoracic aorta and the left pleura. **On its right side** it is related to the right pleura, the azygos vein intervening as it arches towards above the right principal bronchus to join the superior vena cava, below the roots of the vagus nerves descend in close contact with it , the right nerve chiefly behind, and the left chiefly in front of it ; the two nerves unite to form a plexus around the tube. In the lower part of the posterior mediastinum the thoracic duct lies behind and to the right of the esophagus higher up it is placed behind it, and crossing to the left about the level of the fifth thoracic vertebra to continue upwards on its left side. On the right side of the esophagus, just above the diaphragm, a small serous sac (the infracardiac bursa) is sometimes found; it represents the upper detached part of the right pneumato-centeric recess **(*Peter et al., 1995).***

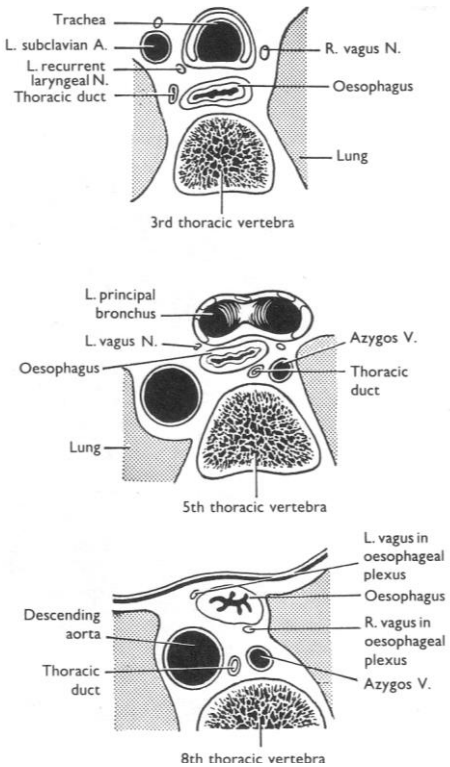

Fig. (3): Relations of thoracic esophagus at different levels of thoracic vertebrae (axial cuts) ***(Zuidema, 1996)***

III) The Abdominal Part:

This emerges from the right diaphragmatic crus, slightly left of the midline and level with the tenth thoracic vertebra, grooving the posterior surface of the left lobe of the liver. It forms a truncated cone, about 1cm long, curving sharply left, its base continuous with the cardiac orifice of the stomach; its right side continues smoothly into the lesser curvature , while the left is separated from the gastric fundus by the cardiac notch. Covered by peritoneum on its front and left side, it is contained in the

upper left part of the lesser omentum ; the peritoneum reflected from its posterior surface to the diaphragm is part of the gastro-phrenic ligament, through which esophageal branches of the gastric vessels reach it. Posterior are the left crus and left inferior phrenic artery. The relations of the vagus nerves vary as the esophagus traverses the diaphragm. Usually the left vagus is composed of two or three trunks firmly applied to the anterior aspect of the esophagus; the right vagus is usually single, a thick cord some distance from the posterior aspect of the esophagus **(*Gray, 2000).***

The lower esophagus has specialized anatomy as it consists of: the supra-diaphragmatic portion, the inferior eso-phageal constriction, the vestibule and the cardia. The supra-diaphragmatic portion consists of an ampulla and the "empty" segment just distal to it. The ampulla is not an anatomical dilatation, but it is caused by a primary peristaltic wave acting in conjunction with the negative intrathoracic pressure which momentarily expands this segment just before the lower eso-phageal sphincter (LOS) ***(Cuschiere; 1995).***

The inferior esophageal constriction consists of a concentric narrowing of the esophageal lumen present at the level of the diaphragmatic hiatus , it is situated 2cm from the cardio-esophageal junction, it is not synonymous

with the LOS although this extends to include this region, the longitudinal esophageal mucosal folds are very prominent inside this part, but disappears readily when the esophagus is dilated during endoscopy ***(Cuschieri, 1995).***

The intra-abdominal segment of the esophagus is known as the vestibule, it is an inverted cone which inclines to the left before joining the stomach at an acute angle (angle of His) ***(Cuschieri, 1995).***

The cardia denotes the junction between the esophagus and the stomach. The only reliable and constant anatomical landmark, it is made by a sling of oblique fibers of the stomach, it contains the squamo- columnar junction which forms a serrated line (Z-line) ***(Cuschieri, 1995).***

The Z-line is situated within 1-4cm of the anatomical gastro-esophageal junction; a zone of junctional epithelium is inter-posed between the gastric and the esophageal mucosa. This junctional epithelium extends up wards in patients with long-standing reflux esophagitis ***(Cuschieri, 1995).***

The obliquity of the gastro -esophageal junction, the effect of spiral and longitudinal muscles, and various mucosal folds, have all been considered to exert a valvular effect. It is hence noticeable that a number of

structures may possess either alone, or collectively, the potentiality of physiological sphincter control at this site of controversy. However, the actual mechanism is still uncertain **(*Peter et al, 1995).***

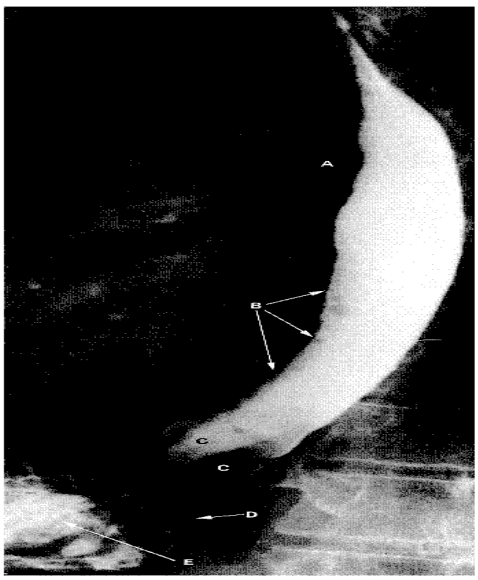

Fig. (4): An oblique radiograph of the thorax during the esophageal transit of part of a'meal' of barium sulphate paste. At [**A**] the translucency of the air-containing right principal bronchus is visible. The concave ventral aspect of the esophagus [**B**] is topographically related to the pericardium covering the left atrium of the heart.Longitudinal mucosal folds are visible [**C**] immediately proximal to the soft tissue shadow of the diaphragm [**D**] Some barium sulphate is already admixed with the gastric contents [**E**] The esophagus in the lower thorax curves ventrally away from the vertebral column to reach the esophageal orifice in the diaphragm **(Gray, 2000).**

Blood Supply Of The esophagus:

Arterial supply:

The arteries supplying the esophagus are derived from the inferior thyroid branch of the thyrocervical trunk,

from descending thoracic aorta, from the bronchial arteries, from the left gastric branch of the celiac artery, and from the left inferior phrenic branch of the abdominal aorta. They have for the most part a longitudinal direction **(*Peter et al., 1995).***

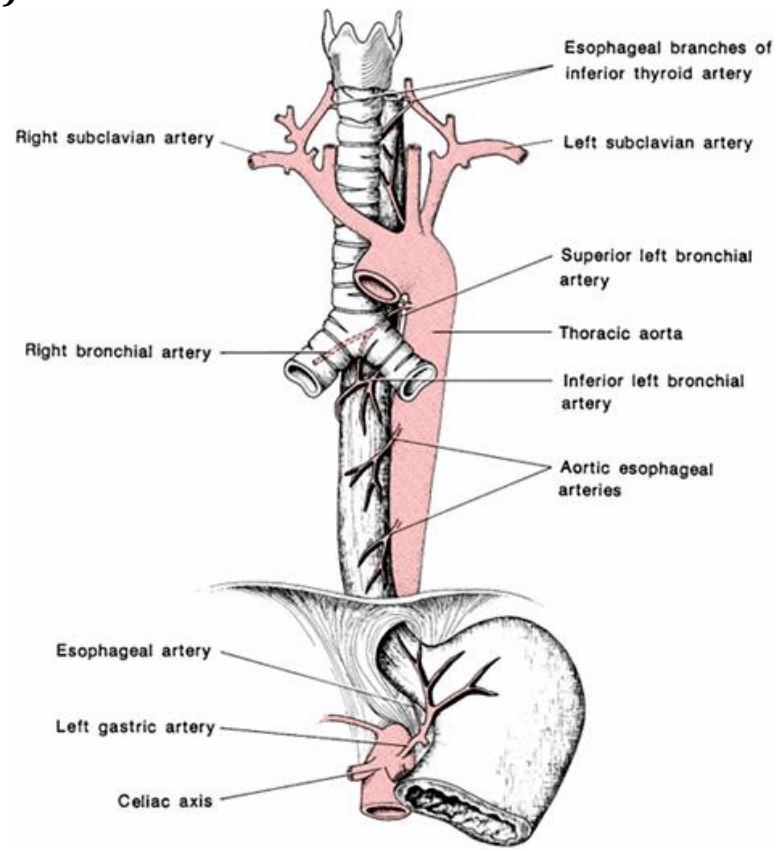

Fig. (5): Arterial blood supply of the esophagus ***(Zuidema, 1996)***.

Venous drainage:

The veins from the cervical part of the esophagus drain into the inferior thyroid veins and those from the thoracic part into the azygos, hemiazygos and accessory hemiazygos veins. The abdominal part drains partly into