Recent Trends in Management of Esophageal Trauma

Thesis

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Presented by

Mohamed Ahmed Makin

M.B., B. CH.

Under Supervision of

Prof.Dr.Mostafa Abd-Elhamid Soliman

Professor of General Surgery

Faculty of Medicine - Cairo University

Dr. Maged Kamal El-Deen Rehan

Lecturer of General Surgery

Faculty of Medicine - Cairo University

Faculty of Medicine

Cairo University

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بسم الله الرحمن الرحيم

﴿قَالُوا سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا

إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ ﴾

صدق الله العظيم

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Abstract

Classification of esophageal injury recognizes three major categories of causes: penetrating trauma, chemical trauma and foreign body ingestion injuries. **Penetrating trauma** includes gunshot wounds, stab wounds, and medical instrumentation injuries from endoscopic procedures. Blunt trauma occurs by dramatic pressure changes within the esophagus. **Chemical traumas** include those from ingestion of a caustic material that causes injury to the entire esophagus. **Foreign body ingestion** may cause a laceration or puncture to the esophageal wall.

Iatrogenic esophageal perforation is the most common cause of perforation. It may result from esophageal instrumentation such as endoscopy and dilatation of esophageal strictures or achalasia, or surgical dissection around the esophagus in the course of other operations as abdominal vagotomy, hiatal hernia repair or antireflux procedures.

Thoracic esophagus is more likely to be injured than cervical esophagus especially its lower third and becomes more susceptible to be injured by underlying disease, as it becomes more fragile. Abdominal esophagus is the least common part to be injured.

Key words:

Gastrointestinal - Self-expanding stents - Revised trauma score .

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List Of Abbreviations

EFBs	Esophageal foreign bodies.
GERD	Gastroesophageal reflux disease.
GI	Gastrointestinal.
HIV	Human Immunodeficiency Virus.
IRAAF	Intra-operative radiofrequency ablation of atrial fibrillation.
ISS	Injury severity score.
LES	Lower esophageal sphincter.
NPO	Nil per os.
RTS	Revised trauma score.
SEPS	Self-expanding stents.
UES	Upper esophageal sphincter.
VATS	Video-assisted thoracoscopic surgery.

Introduction

An esophageal injury is defined as a breach of esophageal wall, whether due to a mucosal tear, perforation or rupture, ***(Cheynel, et al., 2003).***

An esophageal injury occurs because the esophagus, unlike the rest of the alimentary tract, lacks a serosal layer, which usually contains collagen and elastic fibers. The esophageal wall is thus comparatively weaker and may rupture at a lower intraluminal pressure, ***(DeMeester, 1986).***

Among the causes of esophageal injury, the iatrogenic esophageal injury is the most common accounting for 61% of perforations, it includes intraluminal injuries (during therapeutic and diagnostic endoscopy or during intubation) and intraoperative injuries (as during surgeries for thyroid, cervical spine or anti-reflux surgeries). Spontaneous rupture (Boerhaave's syndrome) can be post-emetic (due to alcohol or pregnancy), barogenic (during parturition, defecation or weight lifting), neurological (as during seizures), and in presence of pre-existing disease (as malignancy, ulceration or TB). Another cause is traumatic injury to the esophagus, either due to blunt trauma (as in blast injury or motor vehicle accidents) or penetrating trauma (as in stabbing or gunshot wounds). Ingestion injuries can occur due to ingestion of foreign bodies or corrosive agents, ***(Vogel, et al., 2005).***

Esophageal perforation is still a high morbid condition with high mortality rates if not diagnosed early and treated promptly, ***(Shenfine and Griffin, 2007).***

Morbidity and Mortality are determined by:

1-Anatomical location: with thoracic esophageal perforations having the highest mortality rates (27%) and cervical perforations the lowest (6%).

2-Delay in diagnosis: as mortality rises significantly with delays in definitive diagnosis and treatment. If properly diagnosed and treated within 24 hours the mortality is less than 14%, rates rise to 31% if delay is more than 24 hours. Mortality rates also are higher in spontaneous perforations (up to 71%) and underlying esophageal disease, ***(Shenfine and Griffin, 2007).***

A high index of suspicion coupled with accurate, on time, and high-resolution imaging are necessary because injury to the esophagus commonly presents with nonspecific signs and symptoms or can be totally asymptomatic, ***(Smakman, et al., 2004).***

Signs and symptoms that are associated with esophageal injury can include pain, fever, dysphagia, odynophagia, hematemesis, hoarse voice, subcutaneous emphysema/crepitus, mediastinal crunch (Hamman sign), oropharyngeal blood, hemoptysis, and dyspnea, ***(Euathrongchit, et al., 2006).***

The critical determinants of therapy for esophageal perforation are the cause, the location, and the severity of the perforation, as well as the interval between perforation and treatment, (***Brinster, et al., 2004).***

Treatment goals in the management of esophageal perforation are prevention of further contamination by elimination of source of soiling & provision of adequate drainage, elimination of infection, restoration of gastrointestinal integrity, and provision of nutritional support, ***(Hinojar,et al., 2002).***

There are many options for operative management of esophageal rupture including primary repair, primary repair with reinforcement (with pleural flaps, diaphragmatic pedicle flaps, omental patches, rhomboid and latissimus dorsi flaps and strap muscle flaps), esophageal resection, drainage either alone or T-tube drainage, exclusion and diversion, ***(Shenfine and Griffin, 2007).***

Aim of the Work

The aim of the present study is to illustrate the advances in the management of esophageal trauma.

Aiming to highlight the patterns of esophageal trauma, how to identify and the recent modalities of treatment with comparison between conservative and surgical treatment.

Surgical Anatomy of the Esophagus

The esophagus is a flattened muscular tube of 18 to 26 cm length from the upper sphincter to the lower sphincter. Between swallows the esophagus is collapsed but the lumen can distend to approximately 2 cm in the antro-posterior dimension and up to 3 cm laterally to accommodate a swallowed bolus, ***(Long and Orlando, 2002).***

The esophagus commences at the lower edge of the cricoid cartilage (at the level of sixth cervical vertebra) and ends at the esophago-gastric junction (at the level of eleventh thoracic vertebra) which is situated posterior to the 7^{th} left costal cartilage about 2.5 cm from the midline, ***(Pelligrini, et al., 1991).***

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,(Fig.1), ***(Bannister, 2003).***

Topographically, there are three distinct regions: cervical, thoracic, and abdominal esophagus.

The cervical esophagus extends from the pharyngoesophageal junction to the suprasternal notch and is about 4 to 5 cm long. At this level, the esophagus is bordered anteriorly by the trachea, posteriorly by the vertebral column, and laterally by the carotid sheaths and the thyroid gland.

The thoracic esophagus is approximately 20 cm long and extends from the suprasternal notch to the diaphragmatic hiatus, passing posterior to the trachea, the tracheal bifurcation, and the left main stem bronchus. The esophagus lies posterior and to the right of the aortic arch at the T4 vertebral level. From the level of T8 until the diaphragmatic hiatus the esophagus lies anteriorly to the aorta, ***(Shield, 2003).***

The abdominal esophagus extends from the diaphragmatic hiatus to the orifice of the cardia of the stomach. Forming a truncated cone, about 1 cm long, the base of the esophagus transitions smoothly into the cardiac orifice of the stomach. The abdominal esophagus lies in the esophageal groove on the posterior surface of the left lobe of the liver, ***(Bannister, 2003).***

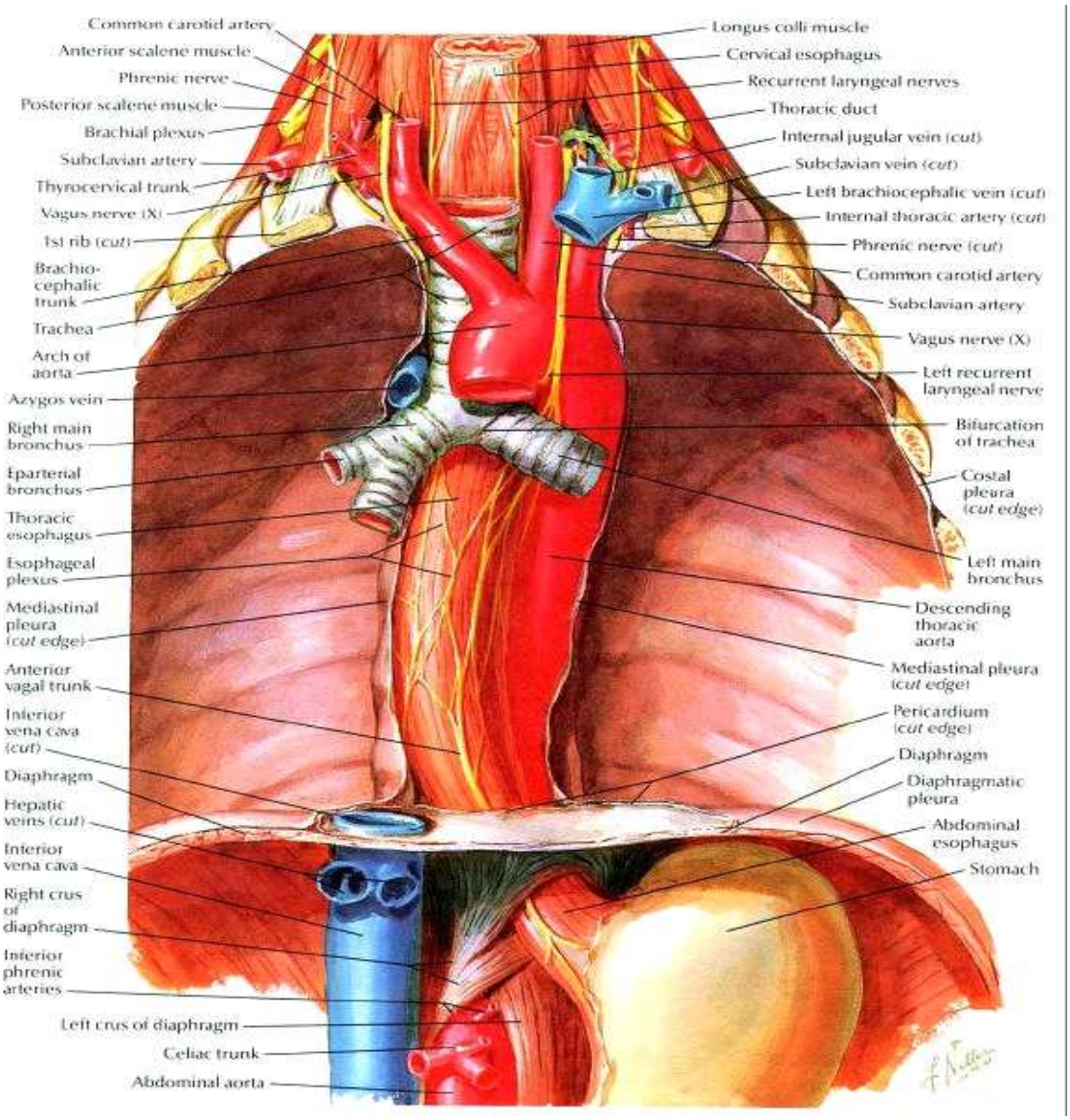

Fig.1 Relations of the esophagus, ***(Braden and Daniela, 2006).***

Constrictions of the esophagus:

There are major constrictions and minor constrictions: (Fig.2).

A) Major constrictions:

1. The cricopharyngeal or pharyngo-esophageal constriction is produced by the cricoid cartilage and the cricopharyngeal muscle 6 inches (15 cm) from the incisors.

2. The broncho-aortic constriction is produced by the arch of aorta and the left primary bronchus 9 inches (22.5 cm) from the incisors.