# New Updates in Management of Oesophageal Motility Disorders

An **Essay**

Submitted for partial fulfillment of master degree in general surgery


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| | | |
|---|---|---|
| **μm** | : | Micro meter |
| **3D** | : | Three-dimensional |
| **AGA** | : | American gastro-intestinal association |
| **ATP** | : | Adenosine triphosphate |
| **cGMP** | : | cyclic guanosine monophosphate |
| **Cm** | : | Centemeter |
| **CP** | : | Cricopharyngeus |
| **DES** | : | Diffuse oesophageal spasm |
| **DMN** | : | Dorsal motor nucleus |
| **FDA** | : | Food and Drug Administration |
| **FLASH** | : | Fast low-angle shot |
| **fMRI** | : | functional magnetic resonance imaging |
| **GEJ** | : | Gastro-oesophageal junction |
| **GERD** | : | Gastro-oesophageal reflux disease |
| **GI** | : | Gastro intestinal |
| **$H_2$RAs** | : | $H_2$-receptor antagonist |
| **HFIUS** | : | High-Frequency Intraluminal Ultrasonographic |
| **HRM** | : | High-resolution manometry |
| **ICC-IM** | : | Intramuscular interstitial cells of Cajal |
| **IOM** | : | Ineffective oesophageal motility |
| **LES** | : | Lower oesophageal sphincter |
| **Mg/dL** | : | Milligrams per Deciliter |
| **MHz** | : | Mega Hertz |
| **MMC** | : | Migrating myoelectrical complex |
| **NAME** | : | L-N-nitro-L-arginine methyl ester |
| **NANC** | : | Non-Adrenergic Non-Cholinergic |
| **NMDA** | : | N-methyl D-aspartate |
| **NMMA** | : | L-NG-monomethyl-L-arginine |
| **nNOS** | : | Neuronal Nitric oxide Synthetase |

| | | |
|---|---|---|
| **NOS** | : | Nitric oxide synthetase |
| **PPI** | : | Proton pump inhibitor |
| **PSI** | : | Pounds Per Square Inch |
| **RCTs** | : | Randomized controlled trials |
| **SE** | : | Standard error |
| **SOC** | : | Sustained oesophageal contraction |
| **SPG** | : | Swallowing program generator |
| **TLESR** | : | Transient Lower Oesophageal Sphincter Relaxation. |
| **UES** | : | Upper oesophageal sphincter |
| **US** | : | United states |
| **Vs.** | : | Versus |

# Contents

# Introduction

The oesophagus is a small hose-like tube which connects the mouth to the stomach. As it leaves the mouth, it follows a straight path through the neck and chest, passing near the heart, through the diaphragm muscle and finally entering the stomach. The oesophagus consists of two anatomically and physiologically distinct regions; namely a proximal striated muscle portion (cervical oesophagus) and a distal smooth muscle portion (thoracic and abdominal oesophagus). Diseases that affect these two regions are quite different. Motility disorders may be classified based on major symptom, clinical syndrome, oesophageal motility findings, oesophageal bolus transport, pathophysiology or the anatomic site of major involvement. From an anatomic perspective, motor disorders of the oesophageal smooth muscle may be classified as those involving the oesophageal body or the lower oesophageal sphincter (LES) and those involving the longitudinal muscle. Based on the type of innervation affected, they can be broadly classified into disorders of inhibitory (nitrergic) or excitatory (cholinergic and non cholinergic) innervation **(Paterson et al.,2006)**.

Oesophageal motility disorders are suspected in patients who have dysphagia that is not explained by stenosis or inflammation of the oesophagus and for patients who

have chest pain that is not explained by a heart disease or other thoracic disorders **(Spechler and Castell 2001)**.

The evaluation of oesophageal motility disorders often begins with endoscopy. In many cases, diagnosis can be made with endoscopy alone, although some require manometry or barium x-ray study for confirmation **(McCormick and Kozarek 2006)**.

The problem with oesophageal motility disorders is that the symptoms often seem disproportionately severe in comparison to the abnormality that can be demonstrated by objective investigations and the response to treatment may be so poor that the clinician is driven to questioning the very existence of motility disorders. The greatest difficulty arises when pain is the only symptom. Since surgery is advocated as a treatment for some motility disorders, it's essential that the surgeon understands the nature of the condition, as much harm may be done by inappropriate enthusiastic surgery for ill difined conditions **(Bancewicz 2006**).

## Aim of the work

The aim of this essay is to review the recent advances in the management of oesophageal motility disorders. In addition, to shed some light on gastro-oesophageal reflux disease as a common entity frequently confused with these disorders.

# Oesophageal Anatomy

## Embryology

The oesophagus develops from the distal part of the primitive foregut at the second week of gestation. Mesoderm forms and separates ectoderm from endoderm so it provides material necessary for connective tissue, muscular coats and serous coverings. This is also the site of development of larynx and trachea first as a groove then convert to a tube **(Long and Orlando 2002).**

The close relationship between the origin of the oesophagus and trachea accounts for the common malformation in which the upper part of the oesophagus ends blindly while the lower part opens into the lower trachea at the level of T4 (oesophageal atresia with tracheo-oesophageal fistula). Less commonly, the upper part of the oesophagus opens into the trachea, or oesophageal atresia occurs without concomitant fistula into the trachea. Rarely, there is a tracheo-oesophageal fistula without atresia **(Larsen 2001).**

# Adult Oesophageal Anatomy

## Gross Anatomy :

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

The oesophagus connects the pharynx to the stomach. Beginning in the neck, at the pharyngo-oesophageal junction (C5-6 vertebral interspace at the inferior border of the cricoid cartilage), the oesophagus descends anteriorly to the vertebral column through the superior and posterior mediastinum. After traversing the diaphragm at the diaphragmatic hiatus (T10 vertebral level), the oesophagus extends through the gastro-oesophageal junction to end at the orifice of the cardia of the stomach (T11 vertebral level) ***(Kuo and Urma 2006)***.

Topographically, there are three distinct regions; cervical, thoracic and abdominal. The cervical oesophagus extends from the pharyngo-oesophageal junction to the suprasternal notch and is about 4 to 5 cm long. At this level, the oesophagus is bordered anteriorly by the trachea, posteriorly by the vertebral column and laterally by the carotid sheath and the thyroid gland ***(Skandalakis and Ellis 2000)***.

The thoracic oesophagus extends from the suprasternal notch to the diaphragmatic hiatus, passing posterior to the trachea (the tracheal bifurcation) and the left main stem bronchus. The oesophagus 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 oesophagus lies anterior to the aorta ***(Kuo and Urma 2006)***.

The abdominal oesophagus extends from the diaphragmatic hiatus to the orifice of the cardia of the stomach, forming a truncated cone about 1cm long. The base of the oesophagus transitions smoothly into the cardiac orifice of the stomach. The abdominal oesophagus lies in the oesophageal groove on the posterior surface of the left lobe of the liver. Two high-pressure zones prevent the backflow of food; the upper and lower oesophageal sphincters. These functional zones are located at the upper and lower ends of the oesophagus but there is not a clear anatomic demarcation of the limits of the sphincters ***(Aziz 1994)***.