Oesophageal motility disorders: New manometric classification and modern treatment

Abstract:

Esophageal symptoms (dysphagia, chest pain, heartburn, regurgitation) are common referral reasons to gastroenterologists and gastro-intestinal surgeons. After having ruled out structural lesions by endoscopy and/or upper GI series patients presenting with dysphagia are investigated for esophageal function abnormalities using esophageal manometry. Esophageal manometry is the gold standard in diagnosing achalasia and can identify additional abnormal motility patterns, which may explain the presenting symptoms.

Recent technologic developments allow a more detailed pressure profile of the esophagus and its sphincters and a more intuitive representation of the pressure topography during swallowing. In recent years, high-resolution manometry (HRM) has become the state-of-the-art modality to investigate esophageal motility. The advantage of HRM is that it requires minimal repositioning of the catheter, concomitant evaluation of pressure changes of upper esophageal sphincter (UES), esophageal body, lower esophageal sphincter (LES) and proximal stomach during swallowing. In addition, introducing HRM into clinical practice brought up a new manometric classification system promoted by the clinicians and investigators at the North Western University in Chicago USA, hence the “Chicago classification”.

Conventional esophageal manometry used the seminal paper of Spechler and Castell to classify esophageal motility abnormalities. The conventional classification system includes achalasia (aperistalsis of the esophagus with or without elevated LES residual and resting pressure), esophageal spasms (more than 20% simultaneous contractions), ineffective esophageal motility (more than 30% manometric ineffective contractions), nutcracker esophagus (normal peristalsis with average distal contraction amplitude >180mMg), hypertensive LES (mid respiratory LES resting pressure above 45mmHg), poorly relaxing LES (LES residual pressure exceeding 8mmHg) and hypotensive LES (mid respiratory LES resting pressure below 10mmHg). Normal esophageal manometry is defined as less than 20% simultaneous and less than 30% ineffective contractions, average distal esophageal amplitude less than 180 mmHg, LES resting pressure between 10 and 45mmHg and average LES residual pressure less than 8mmHg.

The new HRM classification system approaches esophageal motility abnormalities from the lower esophageal sphincter. An integrated residual LES pressure over 4 seconds (IRP4s) of 15mmHg is used to separate normal from abnormal LES relaxation. Patients with IRP4s exceeding 15mmHg and esophageal aperistalsis are diagnosed with achalasia. Patients with achalasia can be further subdivided into 3 types based on the presence or absence of intra-esophageal pressurization (type I classic, type II with pressurization) and presence of simultaneous high-amplitude contractions (type III). Patients with elevated IRP4s and normal peristalsis are diagnosed as having esophageal-gastric junction (EGJ) out-flow obstruction.

Patients with normal IRP4s (i.e. less than 15mmHg) are further subclassified as having motility disorders (i.e. patterns not seen in normal individuals) or peristaltic abnormalities (i.e. patterns exceeding statistical limits of normal). Esophageal motility disorders include esophageal spasms (i.e. >20% premature contractions), hypercontractile esophagus (at least one contraction with distal contractile amplitude DCA >8’000 mmHg*sec*cm) and absent peristalsis. Peristaltic abnormalities include weak peristaltic abnormalities with large or small peristaltic defects, frequent failed peristalsis, hypertensive peristalsis and rapid contractions with normal latency. Normal esophageal (HR) manometry is a “diagnosis of exclusion” for patients not achieving the above diagnostic criteria.

With regards to therapy, the best results are achieved in patients with primary esophageal motor disorders, i.e. achalasia. Although none of the current therapies is restoring the underlying neural degeneration in achalasia, sustained symptomatic improvement can be achieved by reducing the LES pressure. Pharmacologic agents (i.e. calcium channel blocker, nitrates, phosphodiesterase 5 inhibitors) have limited efficacy. Injecting botulinum toxin (BoTox) into the lower esophageal sphincter provies transient improvement, 50% of patients relapsing after a median period of 6 months. Pneumatic dilatation or laparoscopic myotomy of LES achieve symptomatic improvement in approx. 90% of patients with newly diagnosed achalasia, to date both therapies should be considered equally effective in the first 2 years. Recently described per oral endoscopic myotomy (POEM) is an interesting feasible procedure for achalasia, further studies will reveal it’s position in the therapeutic armamentarium for achalasia.
Therapeutic approaches to esophageal motility abnormalities are based on the premises that: (1) the abnormal pattern is responsible for the patients’ symptoms and (2) restoring normal contractions patterns improves patients’ symptoms. Thus, patients with high amplitude contractions (hypercontractile esophagus, hypertensive peristalsis, nutcracker esophagus) are treated with smooth muscle relaxants (i.e. Ca2+ channel blockers, PO-5 inhibitors), BoTox injections of the distal esophagus or, in extreme cases by long esophageal myotomy. Patients with spastic esophageal disorders (i.e. esophageal spasms, rapid esophageal contractions) are initially treated with NO donors (i.e. long-acting nitrates, nitroglycerine) with the aim or restoring esophageal peristalsis. Similar to patients with hypercontractile esophageal abnormalities, BoTox and/or myotomies have been used in these patients. Patients with esophageal hypomotility (i.e. ineffective esophageal motility, hypotensive LES) are investigated for underlying / associated gastroesophageal reflux disease (GERD) and, if present treated with proton pump inhibitors. Studies have reported the use of bethanechol, pyridostigmine and buspirone to augment esophageal contraction amplitude and/or lower esophageal sphincter pressure. Symptomatic improvement in these patients lags behind the improved contraction amplitude and bolus clearance.

In summary, high resolution esophageal manometry (HRM) provides a more comprehensive evaluation of pressure changes in the esophagus during swallowing, it proposes a new set of metrics and classification of esophageal motility abnormalities. Therapeutic approaches for patients with motility abnormalities aim at restoring the normal contraction pattern with variable success in terms of symptomatic improvement. Further studies are warranted to understand the contribution of esophageal motility abnormalities in the pathogenesis of esophageal symptoms and help direct management of these patients.

References:

Disclosure of conflicting interests:
Consultant: Movetis, Addex, Nestle, MMS, Sandhill Scientific
Speakers bureau: MMS, Sandhill Scientific