JNM
J Neurogastroenterol Motil, Vol. 17 No. 2 April, 2011
DOI: 10.5056/jnm.2011.17.2.197
Journal of Neurogastroenterology and Motility

Weak Peristalsis in Esophageal Pressure Topography: Classification and Association With Dysphagia

(Am J Gastroenterol 2011;106:349-356)

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Summary

For weak peristalsis, no validated metrics currently exist in high resolution esophageal pressure topography (EPT). This study aimed to define normal values of control subjects, to test for abnormalities of these metrics in a cohort of patients with unexplained nonobstructive dysphagia.

High resolution impedance manometry studies were carried out in 16 control subjects to verify EPT features associated with incomplete bolut transit (IBT). The normal range for EPT features associated with IBT was established by scoring each of another 75 control subject's EPT study for the occurrence of features identified from the high resolution impedance manometry findings and EPT simulation. The EPT integrity was compared between control subjects and 113 patients with non-obstructive dysphagia identified from a large clinical series.

Large breaks (> 5 cm) in the 20 mmHg isobaric contour were uniformly associated with IBT, and small breaks (2-5 cm) variably associated with IBT. The normal range for isobaric contour breaks was 0%-20% for large (> 5 cm) and 0%-30% for small (2-5 cm) breaks, with both occurring significantly more frequently in dysphagic patients. Failed peristalsis occurred no more frequently in dysphagic patients than in normal subjects.

According to the occurrence frequency of breaks in the 20 mmHg isobaric contour, a classification of weak peristalsis adapted to EPT is proposed. Weak peristalsis with large breaks is defined by those occurring with > 20% of swallows and weak peristalsis with small breaks defined by those occurring with > 30% of swallows.

Comment

High-resolution manometry (HRM) is a modified technique of conventional manometry, and provides detailed information regarding esophageal body peristalsis by utilizing 32 or 36 sensors spaced closely together. Topographic plots are used to handle vastly increased data and to display a seamless dynamic representation of pressure at every axial position in the esophagus. The advantages of HRM are as follows: (1) a simplified procedure with improved sphincter localization, (2) simplified data interpretation and (3) ability to perform more sophisticated analysis of

Received: November 30, 2010 Revised: December 3, 2010 Accepted: December 6, 2010

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Financial support: None.
Conflicts of interest: None.

esophageal function.[1]

Mutichannel intraluminal impedance (MII) provides a qualitative data on bolus transit. Imam et al[2] demonstrated that barium videoesophagogram and impedance had agreement in over 97% of swallows. Studies using impedance combined with conventional manometry have found that dysphagia occurred most often in patients with incomplete bolus transit on MII and MII clarified symptoms and function heterogeneity in patients with manometrically defined distal esophageal spasm.[3,4]

In the last decade, investigations evaluating HRM have been actively carried out to assess sensitivity in the diagnosis of esophageal motility disorder. A clinical study compared conventional manometry with HRM in 212 patients using similar diagnostic criteria and showed that HRM had a higher sensitivity in diagnosis of achalasia and incomplete lower esophageal sphincter relaxation.[5] HRM is also definitely better for the localization of lower esophageal sphincter, and reliable even in cases of a hiatal hernia.[5] A study evaluating oropharyngeal function by using HRM and video fluoroscopy demonstrated that HRM accurately depicts the pharyngo-esophageal segment space-time-pressure structure and specific physiological events related to upper esophageal sphincter opening and transsphincteric flow during normal swallowing.[6]

Studies aiming to set up normal values, and to reestablish classification system of peristalsis patterns have been performed. The Chicago group developed a classifying criteria based on new pressure topography parameters by analyzing 400 esophageal motility disorder patients and 75 controls; integrated relaxation resistance, distal contractile integral and pressurization from velocity.[7] This study focused on defining the stereotyped EPT pattern in patients with nonobstructive dysphagia.[8] As the authors disclosed in the article, previous studies also found that failed peristalsis and breaks in the 20 mmHg isobaric contour correlated with IBT.[9-11] What is new here is that the authors of this study determined cutoff length of break in the 20 mmHg isobaric contour which is significantly correlated with IBT by analyzing EPTs in a larger number of patients and normal subjects.

Although HRM provides detailed informations on esophageal peristalsis and a higher sensitivity in the diagnosis of esophageal motility disorder, it still fails to clarify the cause of non-obstructive dysphagia in a subset of patients. In this study, only one-third of non-obstructive dysphagia patients exhibited frequent large and small breaks in the 20 mmHg isobaric countour; ie, two-thirds of them did not show EPT patterns discriminating from normal subjects, based on the current algorithm. Investigators are making efforts to develop EPT parameters clinically relevant to dysphagia. A recent study conducted concurrent EPT and fluoroscopy in 18 subjects.[12] The user defined decelerating point accurately demarcated initial fast phase (fast contractile front velocity [CFV*fast*]) in which CFV reflects peristaltic velocity, and subsequent slow phase (CFV*slow*) where it reflects the progression of ampullary emptying. It is suggested that these distinctions improve understanding of impaired bolus transit across the esophageal junction.

HRM and impedance improved understanding of esophageal body peristalsis and bolus transit. Studies evaluating HRM have shown that it provides higher accuracy in the diagnosis of esophageal motility disorder, and detailed information regarding peristalsis, and its additional value is still under investigation.

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