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ALIMENTARY TRACT

Long-term Outcomes of Patients With Normal or Minor Motor Function Abnormalities Detected by High-resolution Esophageal Manometry

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BACKGROUND & AIMS: **High-resolution manometry (HRM) expands recognition of minor esophageal motor abnormalities, but the clinical significance of these is unclear. We aimed to determine the outcomes of minor esophageal motor abnormalities.**

METHODS: **We reviewed HRM tracings from patients who underwent esophageal manometry at Northwestern Memorial Hospital from July 2004 through October 2005 by using the Chicago classification (version 2.0). We identified 301 patients with normal findings or minor manometric abnormalities (weak peristalsis, hypertensive peristalsis, frequent failed peristalsis, or rapid contractions with normal latency). Ninety-eight patients participated in a phone survey in which they were asked questions from the impact dysphagia questionnaire (mean follow-up period, 6 years 5 months).**

RESULTS: **Of 301 patients assessed, 166 had normal findings from HRM, 82 had weak peristalsis, 34 had hypertensive peristalsis, 17 had frequent failed peristalsis, and 2 had rapid contractions with normal latency. The primary indications for HRM of dysphagia (44%) and gastroesophageal reflux disease (63%) were unrelated to manometric findings. There were no endoscopic or videofluoroscopic differences between patients with minor manometric abnormalities. Of 98 patients with follow-up, findings from HRM were normal in 63, weak peristalsis was observed in 23, hypertensive peristalsis was observed in 10, and frequent failed peristalsis was observed in 2. No patients underwent surgical myotomy, pneumatic dilation, or botulinum toxin injection. Use of proton pump inhibitors and rates of fundoplication were similar, regardless of manometric findings. Sixteen patients (16%) had significant dysphagia at follow-up; hypertensive peristalsis was the most likely to be symptomatic.**

CONCLUSIONS: **Patients with normal and minor esophageal motor abnormalities report minimal symptoms and have few medical interventions related to esophageal dysfunction during long-term follow-up. Therefore, identification of normal and minor motor function is likely a good prognostic indicator.**

Keywords: Chicago Classification; Weak Peristalsis; Nutcracker Esophagus; Minor Manometric Abnormalities.

See editorial on page 1424.

In contrast to conventional manometry, high-resolution manometry (HRM) uses an increased number of esophageal pressure sensors positioned closely to allow intraluminal pressure to be monitored as a continuum. This in turn allows manometric data to be displayed as pressure topographic plots and facilitates the simultaneous analysis of different contractile segments of the esophagus and in essence a more precise definition of contractile characteristics of the esophagus. However, the increased information amassed by HRM falls beyond the limits of conventional manometric classification systems, presenting a diagnostic challenge. The Chicago classification attempts to address this need by providing a new system in which to group esophageal motor disorders identified with HRM.[1]

Abbreviations used in this paper: **EGD, esophagogastroduodenoscopy; GERD, gastroesophageal reflux disease; HRM, high-resolution esophageal manometry; IDQ, impact dysphagia questionnaire; PPI, proton pump inhibitor.**

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However, although major motor abnormalities such as achalasia and aperistalsis carry indisputable clinical significance, they are less common than normal studies or minor motor abnormalities such as weak or hypertensive peristalsis, for which the clinical significance is less clear. In fact, these findings are commonly observed in healthy volunteers and often correlate with normal bolus transit.[2,3]

To date there are limited data on the natural history and long-term outcomes for patients evaluated initially with conventional manometry and HRM. Previous studies are small and did not use the Chicago classification.[4,5] However, despite this, some have suggested an association between weak esophageal peristalsis and gastroesophageal reflux disease (GERD).[6–8] Other studies have also suggested that minor motor abnormalities may be precursors to major motor abnormalities such as achalasia.[9] We sought to define the natural history of patients with normal findings and minor manometric abnormalities found initially on high-resolution esophageal manometry.

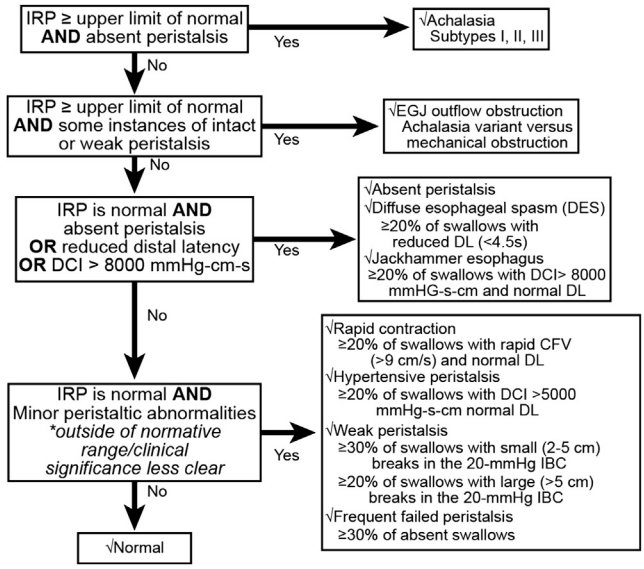

Figure 1. Algorithmic approach to the Chicago classification. CFV, contractile front velocity; DCI, distal contractile integral; DL, distal latency; EGJ, esophagogastric junction; IBC, isobaric contour; IRP, integrated relaxation pressure.

Methods

The study was approved by the Northwestern Memorial Hospital institutional review board. This was a retrospective cohort study. Patients between the ages of 18 and 90 years who were referred to Northwestern Memorial Hospital for a clinically indicated high-resolution esophageal manometry study between July 2004 and October 2005 were identified. Esophageal manometry had been performed per a standard protocol. A solid-state esophageal manometry catheter with 36 circumferential sensors spaced 1 cm apart was placed transnasally. Studies were done in both an upright seated and supine positions, with 10 liquid swallows in each position. Study interpretation was based on swallows while in the supine position. Those younger than the age of 18 years, a history of previous upper gastrointestinal surgery, prior esophageal endoscopic dilation or surgical lower esophageal sphincter myotomy, esophageal stricture, or a technically inadequate manometry study were excluded. All studies were reviewed by a single investigator (K.R.) and classified per the Chicago classification criteria (version 2.0).[1] Those with major manometric abnormalities, defined by the Chicago classification scheme as achalasia, gastroesophageal junction outflow obstruction, absent peristalsis, distal esophageal spasm, and hypercontractile (jackhammer) esophagus were excluded (Figure 1).

Clinical notes were reviewed to assess clinical characteristics, endoscopic findings, and radiographic features. Identified study subjects were contacted for a phone survey by using the impact dysphagia questionnaire (IDQ)[3]. The IDQ is a tool consisting of 10 questions to assess dysphagia, with a total score range of 0–50. The IDQ has previously been used in studies to assess dysphagia.[3] Recently the IDQ has been validated by our group in more than 1000 patients, with a score of greater than or equal to 7 serving as a cutoff for abnormal motor function. Descriptive statistics were used to characterize the overall patient cohort. Comparison between patient groups was made by using the Student t test and χ^2 test.

Results

Index Manometric and Clinical Findings

A total of 507 patients who underwent high-resolution esophageal manometry at Northwestern Memorial Hospital between July 2004 and October 2005 were identified. After excluding those not meeting inclusion criteria, a total of 301 eligible patients were found (Figure 2). The most common manometric finding was normal, which was seen in 166 patients. Of the 135 patients with minor manometric abnormalities, 55 had weak peristalsis with small peristaltic defects, 27 had weak peristalsis with large peristaltic defects, 34 had hypertensive peristalsis (nutcracker esophagus), 17 had frequent failed peristalsis, and 2 had rapid contractions with normal latency (Table 1).

Clinical data for the cohort are summarized in Tables 1 and 2. Patients with minor manometric abnormalities were older than those with normal esophageal manometry, which was consistent among all subtypes except frequent failed peristalsis. However, symptoms at presentation, as defined by indication for the study, were similar among groups. Gastroesophageal reflux was the most common indication reported in 63% of patients,