ADVANCES IN GERD

Current Developments in the Management of Acid-Related GI Disorders

Section Editor: Prateek Sharma, MD

Advances in Diagnostic Accuracy and Treatment of Achalasia

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G&H How is achalasia currently defined, and how common is this disorder?

PK Achalasia is usually described as a swallowing disorder. However, this term is a misnomer because swallowing is not disordered; what the esophagus does after the action of swallowing is disordered. The esophagus is supposed to effortlessly move food into the stomach. In achalasia, the lower esophageal sphincter (LES), which is supposed to relax and allow the passage of food, does not perform properly; thus, esophageal contractility is disordered.

Older textbooks put the incidence of achalasia at 1 case per 100,000 people per year, which suggests that achalasia is rare; however, that is clearly understated. Achalasia goes undiagnosed in many patients throughout life. This situation has improved with high-resolution manometry (HRM) and increased recognition of the disorder.

Although clinicians typically think of achalasia as a rare presentation at a gastroenterology practice, multiple cases are seen every day at the Northwestern Medicine Digestive Health Center because it is a referral center, and its clinicians manage more and more cases every year.

The introduction of HRM led the gastroenterology team at Northwestern University to realize that very many cases of achalasia were not being detected. The team conducted a study that examined local incidence. Over a 10-year period, an incidence of approximately 2.5 per 100,000 people per year was found. This is 2.5 times higher than the traditionally quoted statistic. The true incidence of achalasia is probably even higher, considering that the Northwestern University study made a set of assumptions that downplayed the incidence. For example, the study assumed that Northwestern was the only health care provider in the area that was seeing new cases of achalasia, which is clearly not the case. Besides other types of facilities, there are 3 other academic medical centers in the area.

As for prevalence, meaning how many cases exist in contrast to how many new cases occur in a certain location within a certain time span (ie, incidence), what was seen over the 10-year study period was that the prevalence kept increasing until it was more than 30 cases per 100,000 people. This phenomenon demonstrated that the prevalence value will not stabilize for many years. The average case detected is a patient in his or her early fifth decade of life. Because achalasia is a nonfatal disease, the prevalence value will likely continue to increase for 30 years.

G&H How can HRM enhance efficiency in the diagnosis of achalasia?

PK The gold standard for diagnosis of achalasia is currently HRM. It is a test whereby a sensing device is placed within the esophagus that detects pressure changes. A sequenced contraction going from top to bottom is observed followed by relaxation of the LES. The visualized image is presented on a screen that is reminiscent of a weather map in which isobaric pressure contours are seen.

HRM is diagnostic for achalasia, although there are other ways to detect and define the disorder. When the disease is very advanced, its diagnosis is clear regardless

of what diagnostic instrument is used—whether it is a barium swallow, endoscopy, or HRM. In earlier stages of the disease process, HRM provides a better detection rate than other modalities.

G&H How are the subtypes of achalasia defined, and why is differentiating them important?

PK Prior to HRM, conventional manometry was an option that could be used to detect achalasia. Many cases were probably missed because they did not have a classic presentation, which is type 1 achalasia. Classic presentation is characterized by impaired relaxation of the LES. No peristalsis is observed in the esophagus between the top and the bottom or only a little is present at the very top.

What became apparent with the use of HRM in the diagnosis of achalasia is that type 1 is less common than type 2. The more common form of achalasia—type 2—is a presentation in which the LES does not relax, but pressurization is seen within the entire esophagus from top to bottom. This is known as panesophageal pressurization. This may or may not have been detected on conventional manometry and was probably more often missed than identified, in part because it was being defined as nonspecific esophageal motility disorder rather than achalasia. This subtype is probably an earlier manifestation of what will eventually progress to type 1 achalasia, but this concept needs to be further explored.

Type 3 achalasia is the most difficult to define. In this subtype, the LES is not relaxing properly, but there is a spastic contraction between the top and bottom of the esophagus. The timing of this contraction is out of sync, and it seems to be occurring simultaneously at the top and bottom of the esophagus. This type of achalasia was likely referred to as distal esophageal spasm in the past. On radiography, this often takes the appearance of a corkscrew esophagus, which is a textbook definition of distal esophageal spasm, and so a misdiagnosis was easily made.

It is important to define the subtype because treatment needs to be tailored to the subtype. Also, treatment outcomes differ depending on the subtype. Type 2 is the easiest to treat and is associated with the best treatment outcomes.

When achalasia progresses, dilatation and retention develop within the body of the esophagus. The esophagus enlarges, retains food, and becomes deformed, ultimately becoming like a sink trap where food goes in and cannot get out. Chronic aspiration and regurgitation result, leading to significant lung morbidity. Treatment becomes less effective with disease progression, eventually more because of the deformed esophageal anatomy than the disordered contractility. In the extreme, if disease progresses to fulminant megaesophagus, no available treatments work very well, and an esophagectomy will need to be performed.

G&H What are the most common treatments for achalasia?

PK A major advance in the treatment of achalasia has been peroral endoscopic myotomy (POEM). With POEM, the endoscopist enters the wall of the esophagus as high up as needed. A tunnel is made within the wall of the esophagus, which gives access to the outer musculature, and the myotomy is done from within that tunnel and tailored to an individual patient's need. POEM allows for versatility. The endoscopist can perform a short myotomy or one that extends all the way up the spastic segment of the esophagus, which ultimately results in better treatment outcomes, particularly in patients with type 3 achalasia.

G&H How can the functional luminal imaging probe be used in the management of achalasia?

PK The functional luminal imaging probe (FLIP) is a technology pioneered at Northwestern University. The first iterations were called EndoFLIP because the device fit through the channel of an endoscope. That was abandoned because it was not practical. The new technique is to remove the endoscope and, while the patient is still sedated, position the FLIP sensor within the esophagus and perform the FLIP study.

FLIP is a 16 cm–long bag that contains fluid. It is positioned to straddle the LES as well as the last section of the esophagus. Saline is pumped into the bag (which also contains a pressure sensor) to make it expand. As the bag fills with saline, the pressure within it is recorded, as is cross-sectional area at every centimeter within the bag. These measures provide a profile of the distention of the esophagus along with the corresponding pressure. The measures are depicted on a screen as a cylinder that is interpolated between the adjacent sensors.

In achalasia, the cylinder takes on an hourglass shape. The LES area is the neck of the hourglass, and minimal contractility is evident above and below it. Whereas manometry measures the squeeze of the sphincter, FLIP measures its distensibility as volume in the bag increases. The measurements of interest are the distensibility index (DI), which is a cross-sectional area per unit pressure, and the maximal sphincter diameter achieved. Low values indicate a very nondistensible sphincter. This is what untreated achalasia looks like. Higher DI and maximal diameter values are seen as achalasia responds to treatment.

FLIP provides additional information about the contractility of the esophagus proximal to the sphincter

related to secondary peristalsis. This technology is referred to as FLIP Panometry. The team at Northwestern has pioneered the development of FLIP Panometry because it has the potential to replace HRM, which is very uncomfortable and elicits a lot of resistance among patients, especially among those who have already experienced the procedure. Unlike manometry, Panometry is performed under sedation.

The sensitivity of FLIP Panometry in achalasia detection is as good as or better than that of HRM, allowing for the detection of cases that appear marginal or are completely missed by HRM. When used in treatment, FLIP is combined with either a laparoscopic Heller myotomy or POEM. When used during POEM, FLIP measures and records the DI at different stages of the myotomy to better ensure the desired result.

G&H What long-term outcomes can be expected when treatments such as POEM are appropriately applied?

PK Discussion about outcomes is challenging because very few centers have a high-enough volume of cases to report relevant outcome figures. A few large randomized controlled trials have been performed—one comparing pneumatic dilation with laparoscopic Heller myotomy and another laparoscopic Heller myotomy with POEM. Meta-analyses of cohort studies and case reports also have been published.

The message, however, is that treatment efficacy is related to the type of achalasia being treated and the treatment method. For type 1 achalasia, outcomes using pneumatic dilation—an older endoscopic technique—are not as good as those using myotomy. For type 2 achalasia, pneumatic dilation, laparoscopic Heller myotomy, or POEM can be used, with randomized controlled trials showing good outcomes for all 3 treatments extending up to the 2-year posttreatment endpoints of the trial. However, the therapeutic effect of pneumatic dilation is not permanent, and patients will often require subsequent dilations. Myotomy, on the other hand, is permanent, but varying degrees of reflux can develop, especially if the patient had a hiatal hernia before treatment.

As for type 3 achalasia, a hierarchy of treatment effects exists. The best outcomes are seen with POEM, the worst with pneumatic dilation, and between these are outcomes seen with laparoscopic Heller myotomy.

G&H What treatment innovations are currently emerging or in late-stage research?

PK This is a rapidly evolving area. Everything previously discussed has occurred over the past 10 to 15 years, which is a very short time. As the technology matures, the algorithms for defining patient-specific pathology will improve. A good example of this evolution concerns esophagogastric junction outflow obstruction (EGJOO). In EGJOO, the LES does not relax—as is the case in achalasia—but there is sufficient esophageal peristalsis such that it cannot be called achalasia. When observed, EGJOO can be an artifact or it can signal a small hiatal hernia, mild esophageal stricturing, or an evolving case of achalasia.

Over the past few years, EGJOOs were mostly being treated as variants or evolving cases of achalasia. Some of them were, and some were not, and, thus, some cases of EGJOO were being overtreated in ways that are not reversible (ie, via myotomy). The Chicago Classification Version 4.0, which is the most current interpretation scheme for HRM, presents a much more restrictive definition of EGJOO to discourage its overtreatment. It calls for secondary diagnostic testing using FLIP or timed barium esophagram and mandating a certain symptom profile before a definitive treatment for EGJOO can be performed.

Disclosures

Dr Kahrilas is a co–patent holder of FLIP.

Suggested Reading

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