ADVANCES IN UPPER GI DISORDERS

Current Developments in the Management of Upper GI Disorders

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Is Functional Lumen Imaging Probe Technology Ready for Prime Time?

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G&H What is the primary role of the functional lumen imaging probe for evaluation of esophageal motility disorders?

DC To start with the title question, the functional lumen imaging probe (FLIP; Endoflip, Medtronic) is definitely ready for prime time. Arguably, it has been ready for several years. There are multiple roles for the FLIP as an assessment tool in esophageal disease. One key role is that the FLIP test is recommended for use in the diagnosis of motility disorders when there is a baseline inconclusive or equivocal motility finding. This often occurs with nonspecific or inconclusive esophageal high-resolution manometry (HRM) findings, such as a classification of esophagogastric junction outflow obstruction. In these situations, FLIP findings can be very useful to help clarify the clinical picture and help reach a definitive diagnosis.

Another clinical scenario where FLIP technology is increasingly being used is at the time of the initial or index endoscopy (ie, before HRM). It is worth noting that endoscopy is often the initial diagnostic test performed in patients who are being evaluated for esophageal dysphagia or other symptoms suggestive of esophageal motility disorders. Use of the FLIP test in that scenario can be especially helpful to triage which patients may need HRM. In some instances, HRM may not be needed, such as when a definitive esophageal motility diagnosis is reached with endoscopy and FLIP findings together or when FLIP findings are normal. A normal FLIP result has a very high negative predictive value for relevant esophageal motility disorders. However, when FLIP findings are abnormal but do not indicate a definitive diagnosis, then they help direct which patients are at increased need for HRM.

G&H In what other clinical scenarios is FLIP technology currently being utilized?

DC There are several other clinical scenarios where FLIP technology has been helpful. One in particular has been in eosinophilic esophagitis, where the FLIP test can measure both the dimensions and distensibility of the esophagus (ie, in assessing strictures while also characterizing the motility function that in some patients with eosinophilic esophagitis can be abnormal as well). The FLIP test may be useful after a therapeutic intervention to evaluate treatment response in patients with achalasia or symptoms in patients after surgeries such as fundoplication. FLIP findings can also be used during surgical procedures, such as lower esophageal sphincter myotomy and fundoplication, as a guide for making intraoperative adjustments.

> A key advantage of the FLIP test over manometric testing is that it is performed during a sedated endoscopy.

G&H How effective is the FLIP test in the diagnosis and monitoring of esophageal disease?

DC The FLIP test is quite effective among the diagnostic tools currently available. FLIP findings frequently parallel the same findings obtained from HRM and can be effective in diagnosing normal motility (ie, for ruling out major esophageal motility disorders). Furthermore, the FLIP test can effectively diagnose achalasia, which is the most important esophageal motility disorder. One of the challenges for assessing effectiveness of a tool for diagnosing motility disorders is that there is not a true gold standard, as HRM, esophagram, and the FLIP test all have some imperfections. When there are inconclusive results from one motility test, having results from multiple tests may be necessary. The findings from HRM and the FLIP test can complement each other and provide a better view of what is happening clinically with patients. The takeaway is that the FLIP test is not a complete replacement for HRM; however, in some scenarios, it reduces the need for HRM.

G&H What does the FLIP test add over manometric testing?

DC A key advantage of the FLIP test over manometric testing is that it is performed during a sedated endoscopy. Because of this, the FLIP test is very well tolerated; patients have essentially no discomfort. There is minimal to no added risk other than extending the endoscopy time by a few minutes. In comparison, HRM, which requires transnasal catheter insertion, can involve a fair amount of discomfort, and some patients are unable to tolerate the test.

Another advantage of an endoscopy with FLIP is that it allows the user the ability to immediately react to FLIP findings (eg, allowing the gastroenterologist to take a second or clarifying look with endoscopy). In some scenarios, an immediate, point-of-care diagnosis can be made because of the endoscopy findings plus FLIP findings, and it may be appropriate to perform treatment, such as an esophageal dilation. Thus, an endoscopy with FLIP can provide a quicker, more-efficient diagnosis and in some cases same-day treatment, whereas with HRM because it is performed as a separate procedure, the patient must schedule another appointment, take another day off of work, and come back to the clinical facility for the test.

G&H How simple is the FLIP test to perform and interpret?

DC The FLIP test is easy to perform and interpret. The test takes about 4 to 5 minutes, and interpretation of the results can be performed in real time based on a few key measurements. Our group at Northwestern has been part of a FLIP working group of key opinion leaders from North America that has developed a standardized, relatively simple protocol for interpretation of the measurements obtained during the FLIP test. This group recently devised consensus statements on how to use the FLIP test and interpret its findings for motility disorders, and the results of this work have been accepted for publication in an upcoming issue of *Gastroenterology*.

> The FLIP study protocol for interpretation is easy and simple enough to apply in any endoscopy center.

The FLIP working group also previously completed a study that showed high levels of interrater agreement and accuracy in the interpretation of the results from both the FLIP test and HRM. At our center, new users are taught how to perform the FLIP test through a simple training process that usually entails a brief discussion with a few example cases and has a very easy learning curve. Students are generally able to pick up and start using the technology pretty quickly. Our center is currently conducting an ongoing study to test this training strategy in new learners.

G&H Is the FLIP test suitable for routine practice or is it a referral center test?

DC The FLIP test is suitable for both care settings. The FLIP study protocol for interpretation is easy and simple enough to apply in any endoscopy center. I think anybody who can perform an endoscopy can perform an endoscopy with FLIP, if they are interested. Certainly, the FLIP test has a role in referral centers as it can be an essential component to use in a comprehensive assessment of patients with complex motility scenarios. In routine clinical practice, using the FLIP test, especially with an initial or index endoscopy, can help triage patients who may need to be referred to a dedicated motility center.

G&H What has been the response from patients?

DC Patients have been generally happy with having the FLIP test as part of their endoscopy that is performed

while they are under sedation. Patients are really happy if they do not have to undergo HRM. However, I am cautious to not promise that a patient will never need HRM because, as mentioned, there are times when both tests are needed, and the findings can complement each other.

G&H What resources are required to install and adopt FLIP technology in practice?

DC There is a dedicated FLIP system that needs to be purchased, which is an up-front cost, and a unit cost, as each FLIP procedure is performed with a disposable catheter. An associated Current Procedural Terminology code for the FLIP procedure is available for potential reimbursement. Beyond that, the application of FLIP technology takes some basic training and understanding of when and how to use it. As I mentioned, the FLIP protocol and interpretation is usually fairly easy to learn and teach. There are some educational resources, including videos, which our group at Northwestern created in partnership with Medtronic (the distributor of the FLIP system), that have been used to help train new users. A variety of FLIP courses are offered through the different gastrointestinal societies either online or at conference sessions, where gastroenterologists can learn the ins and outs of using the technology.

G&H What other role might FLIP technology have in the near future?

DC Outside the esophagus, another proposed application for which there has been increasing use and research of FLIP technology is gastroparesis. For instance, the FLIP test may be used to assess the pylorus for the presence of a functional abnormality with gastric outflow, and the findings could perhaps help tailor treatment of patients with gastroparesis.

Disclosures

Dr Carlson serves as a consultant and speaker for Medtronic. He also has a shared licensing agreement for an artificial intelligence classification model that is not currently being used in clinical practice. Additionally, Northwestern University holds shared intellectual property rights and ownership surrounding FLIP panometry systems, methods, and apparatus with Medtronic.

Suggested Reading

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