Role of Endoscopy in GERD

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KEYWORDS

• Endoscopy • GERD • Barrett • Diagnosis • Therapy • Esophagitis

KEY POINTS

- Endoscopy is the mainstay diagnostic and therapeutic tool in the management of GERD.
- Endoscopy is recommended for the evaluation of medically refractory or atypical GERD, patients with alarm symptoms of dysphagia, anemia or weight loss, for diagnosis and surveillance of Barrett esophagus in patients with chronic GERD, and for application of such therapies as esophageal dilation or ablation.
- Newer imaging techniques in development will further improve the accuracy and use of endoscopy in management of GERD.

INTRODUCTION

Gastroesophageal reflux disease (GERD) is one of the most common conditions encountered in primary care and gastroenterology practices. Almost 40% of the US population suffers from occasional heartburn and up to 20% of patients report bothersome symptoms on at least a weekly basis. Heartburn or indigestion is the commonest symptom of GERD and accounts for nearly 2 million outpatient clinic visits, with dysphagia accounting for additional 1 million visits. GERD is the leading diagnosis for gastrointestinal disorders in outpatient clinic visits in the United States accounting for almost 9 million visits in the year 2009, with Barrett esophagus accounting for an additional 500,000 visits. Endoscopy is commonly performed for the diagnosis and management of GERD, with reflux symptoms (24%) and dysphagia (20%) being the commonest indications.[1]

The prevalence of GERD and use of endoscopy for management of GERD are rising. In a systemic analysis, El-Serag[2] reported an increasing prevalence of GERD over the last two decades. Analysis of CORI and CMMS databases shows an increased use of endoscopy partially accounted for by rising prevalence of GERD.[3]

This article discusses the appropriate indications for endoscopy in patients with GERD and highlights newer imaging technologies that may improve utility and outcomes of endoscopy in management of GERD.

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ESOPHAGOGASTRODUODENOSCOPY OR UPPER ENDOSCOPY

High-definition, high-resolution flexible video endoscopy has become the standard of endoscopic care in the United States. Esophagogastroduodenoscopy allows for excellent view of the mucosal details and allows for obtaining photographs, video recordings, and tissue sampling using biopsy and brush cytology. Endoscopy also allows for application of therapies, such as esophageal dilation, Barrett ablation, and endoscopic resection of preneoplastic and early neoplastic lesions. Most esophagogastroduodenoscopy procedures in the United States are performed using conscious sedation or procedural sedations. However, data suggest that unsedated, thin-scope esophagogastroduodenoscopy can be safely and successfully performed in carefully selected patients.[4]

Advances in imaging technology are expanding the accuracy of traditional white light endoscopy. High-definition (>850,000 pixel density), high-magnification (>115×) endoscopes using 1080p technology allow one to see mucosal details with greater resolution improving its diagnostic accuracy. Electronic or virtual chromoendoscopy is replacing traditional chromoendoscopy using dye, which was cumbersome and messy.

Standard white light endoscopy uses blue, green, and red light waves, whereas the NBI technology (Olympus, Center Valley, PA), using electronic light filters, only uses blue (440–460 nm) and green (540–560 nm) wave light, eliminating the use of the red light. The narrower wavelengths highlight the superficial mucosa and blood vessels accentuating the mucosal architecture and microvasculature. The FICE system (Fuji, Wayne, NJ) and I-Scan (Pentax, Montvale, NJ) use postprocessing techniques, such as spectral analysis, or postprocessing enhancements to achieve electronic chromoendoscopy.

Full-spectrum endoscopy (FUSE; EndoChoice, Atlanta, GA) allows for a 245-degree field of view compared with the 160-degree field of view of traditional upper endoscopy and may improve the diagnostic yield of upper endoscopy.

CONFOCAL LASER ENDOMICROSCOPY AND OPTICAL COHERENCE TOMOGRAPHY

Confocal laser endomicroscopy and optical coherence tomography (OCT) use lasers to penetrate to a certain depth below the surface and magnify the images obtained to evaluate deeper structures. Two catheter-based technologies for confocal laser endomicroscopy (Cellvizio; Mauna Kea Technologies, Paris, France) and OCT (NvisionVLE; Ninepoint Medical, Cambridge, MA) have been approved by the Food and Drug Administration for use in the United States.

The Cellvizio probe-based confocal laser endomicroscopy system uses a 7F catheter confocal miniprobe, which is passed down the working channel of the upper endoscope and a low-power blue laser light (wave length 488 nm) passed through a fiberoptic bundle for tissue illumination after application of fluorescence agents (topical Acriflavine hydrochloride and Cresyl Violet, and systemic fluorescein) to obtain confocal images (~1000 × magnification) of the mucosa fixed image plane depth of 55 to 65 μm that are streamed at a frame rate of 12 frames per second.

OCT uses a technique called interferometry that measures the path length of reflected light and processes the information for image generation, a technique similar to an ultrasound that uses sound waves. The NvisionVLE OCT or volumetric laser endomicroscopy uses a balloon catheter that passes through a 2.8-mm or larger scope channel and performs volumetric laser interferometry based on frequency domain OCT to faster, real-time, high-resolution imaging. It provides resolution to 10 mm and imaging depth down to 3 mm, real-time resolution of 7 μm, scanning