Endoscopic ultrasound, the one-stop shop for abdominal pain?

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Abstract

The Endosonography for Right Sided and Acute Upper Intestinal Misery (EFRAIM) study indicates that the yield of endoscopic ultrasound (EUS) is equivalent if not superior to upper endoscopy combined with transabdominal ultrasound in patients presenting with acute discomfort. Furthermore, this strategy may be more cost effective as EUS simultaneously enables assessment of intraluminal disease as well as extra intestinal pathology. These results are in sync with prior studies demonstrating the hegemony of EUS in the assessment of pancreaticobiliary disease and its role in the assessment of enigmatic chronic abdominal pain. Nevertheless, EUS does not permit assessment for appendicitis or genitourinary catastrophe. Thus a careful history and physical examination to localize pain to the right upper quadrant and epigastrium is essential.

Keywords

Endoscopic ultrasonography, abdominal pain, cholecystitis, pancreatitis, acute, gallstones

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In this issue of *United European Gastroenterology Journal*, the results of the Endosonography for Right Sided and Acute Upper Intestinal Misery (EFRAIM) study are presented. Transabdominal ultrasound (TUS) was performed in 240 patients, followed by randomization to oesophagogastroduodenoscopy (EGD) followed by endoscopic ultrasound (EUS) or vice versa. Different radiologists and endoscopists performed each procedure and were blinded to prior results, enabling comparison of the modalities. It was found that in patients with acute abdominal pain and normal laboratories the diagnostic yield of EUS is equivalent, if not superior, to the combination of EGD and TUS.

EUS enables simultaneous assessment of extraluminal anomalies such as cholecystitis and pancreatitis as well as mucosal abnormalities of the oesophagus, stomach and duodenum. This approach is convenient as it obviates redundant diagnostic tests and is potentially cost effective. The authors report that EUS is 20% less expensive than the combination of EGD and TUS in Germany. In the United States, there is likely to be a similar trend as fees for EUS are comparable to EGD and the latter is already included as part of EUS billing codes. In a pilot analysis of EUS as the initial

test for dyspepsia, Sahai et al. projected that an evaluation strategy saved US\$36–122 per patient compared to competing approaches, which utilized EGD as well as TUS and abdominal computed tomography (CT) and magnetic resonance imaging.¹

This work adds another dimension to prior studies of EUS in the evaluation of undiagnosed abdominal pain. In a prior prospective, multicentre trial, Chang et al. demonstrated that the diagnostic yield of EUS was comparable to the combination of EUS and EGD.² All patients in this trial had been symptomatic for more than 4 weeks, whereas the current study included only patients whose symptoms developed in the prior 48 hours EFRAIM.² Interestingly, the yield of EUS in the current study was higher, 62.3% than the multicentre study by Chang et al., 24%, likely due to

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the greater prevalence of functional disease in those with chronic abdominal pain.

Nevertheless, there are several considerations regarding the use of EUS in the initial evaluation of acute abdominal pain. In the United States, malpractice litigation has in part driven the widespread use of more expensive and comprehensive imaging, particularly CT scans, in the initial evaluation of acute abdominal pain.^{3,4} Unlike EUS, CT enables evaluation for appendicitis and genitourinary catastrophes at the same time as assessment for upper gastrointestinal problems.⁴ In the current series, three patients were readmitted with acute appendicitis following the initial evaluation and another for acute complications of adhesions.

Additionally, in two patients the stiff echoendoscope tip likely resulted in the failure to detect gastric ulcers. In developing regions and centres who primarily manage immigrant populations, gastric ulcers are worrisome for malignancy and necessitate endoscopic follow-up to ensure no neoplastic development.⁵ Another limitation is that EUS is primarily available at large academic and private referral centres, where endosonographers often have to manage large pancreaticobiliary practices making prompt EUS performance in the Emergency Department impractical.

Nonetheless, the study demonstrates that EUS is an outstanding modality in the evaluation of acute pancreaticobiliary processes akin to its role in chronic diseases. In the current trial, pancreatitis was discovered by EUS in nine patients, choledocholithiasis in six patients and pathological gallbladder wall thickening in nine patients in whom TUS was not diagnostic. Prior studies of EUS in the assessment of abdominal pain indicate that EUS enables assessment of the entire pancreas and bile duct in 98–100% of cases.^{2,6} When compared with EUS, TUS provides complete evaluation of the distal bile duct in only 75% of patients and the pancreas in 50–75% due to intervening bowel gas and adiposity.^{2,6}

In the assessment, 200 patients with chronic non-reflux-related abdominal pain by EUS and TUS, Lee et al. demonstrated that EUS detected 23 additional extraluminal lesions. Nearly all of these findings were pancreaticobiliary abnormalities including ductal stones, cholecystitis and pancreatitis. In the current study, patients found to have gallbladder thickening by EUS were treated with antibiotics and improved clinically. The role of EUS in acute gallbladder disease, underscored by EFRAIM, deserves further prospective work. Additionally, given the demonstrated hegemony of EUS in the evaluation of malignant pancreaticobiliary disease, a negative EUS is also particularly reassuring to patients. In their study of EUS in upper abdominal pain,^{2,7} Chang et al. report that only 10% of patients required further testing following EUS

combined with EGD.² Thus, if a careful history and physical exam indicate that the pain is from the epigastrium and right upper quadrant, EUS is the optimal first diagnostic test.

Additionally, improvement of EUS technology has resulted in less trauma at time of intubation and future developments including forward viewing echoendoscopes will likely enhance assessment of mucosal lesions.^{8,9} In the current trial, mucosal biopsy using the echoendoscope was facilitated using paediatric biopsy forceps. Additionally, EUS training is increasingly available and services are expanding at smaller centres akin to the propagation of endoscopic retrograde cholangiopancreatography (ERCP).¹ It is plausible that EUS may become as widely available as ERCP in the near future.¹

In addition to improved technology and training, careful studies to identify the best role for EUS in acute settings are needed. While EUS is not the 'one stop shop' for all patients presenting with abdominal pain, it has a promising role as the favoured diagnostic modality for those with suspected acute pancreaticobiliary disease. Using a large cohort of patients who underwent EGD and logistic regression analysis, Lieberman et al. identified key symptoms that predicated significant findings.¹⁰ Risk factors including age, weight loss and emesis were correlated with serious pathology in those with dyspepsia. A similar approach is needed to identify symptoms predictive of significant pancreaticobiliary pathology. It is plausible that an evidence-based, cost-effective algorithm might be developed, in which patients with abdominal pain might be directed toward EUS versus CT imaging versus careful observation based on key symptoms.

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Conflict of interest

The authors declare that there is no conflict of interest.

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