EUS and ERCP: brothers in arms

With the advent of minimally invasive endoscopic procedures during the 1970s, ERCP has become the primary method of diagnosing and treating many patients with pancreatobiliary disease (PBD). However, this role was later challenged by the introduction of less-invasive procedures such as high-end US, helical CT scanning, EUS, and finally magnetic resonance imaging (MRI) in clinical gastroenterology during the past 2 decades. These techniques have added a new dimension in the diagnosis of pancreatic and biliary diseases, leaving the more invasive ERCP procedures as primary ''therapeutic'' instruments for the treatment of biliary and pancreatic obstruction. This development was rather logical and expected because purely diagnostic ERCP still carries a significant risk of acute pancreatitis in up to 1.5% to 5.0% of cases and a small, albeit distinct, potential for procedure-related death.[1-3]

Fortunately, the contemporary clinical gastroenterologist is ''armed'' with several complementary imaging and endoscopic techniques to detect PBD with high resolution. Hence, the primary diagnosis of PBD is much easier to establish today than it was 30 years ago, particularly in patients with small stones in the common bile duct (EUS or MRCP) and those with advanced pancreatic/biliary cancer (US, CT, MRI) that unfortunately comprise up to 40% to 50% of cases seen in a GI department. These patients will only benefit from ERCP interventions when the goal of this procedure has been previously clearly defined before introduction of contrast and catheters. However, the optimal sequence of how to best use available imaging techniques in individual patient cases remains to be a puzzling decision in some cases because the specificity of most indirect procedures can still be unsatisfactory. This is the case, for instance, with patients with small pancreatic lesions and those with chronic pancreatitis in whom the development of cancer must be ruled out. Today there is a great need for minimally invasive procedures that permit rapid tissue-based diagnosis in all patients with unclear PBD, particularly those with suspected precancerous or clearly malignant lesions. No systemic chemotherapy or radiotherapy should be performed without cytohistologic evidence of cancer and its subtype. However, brush cytology specimens obtained during ERCP have a notoriously low sensitivity (approximately 30%), whereas biliary forceps biopsy specimens are usually only available after endoscopic sphincterotomy with a diagnostic yield of 40% to 50% and they put the patient at some additional risk of bleeding. Currently, EUS with simultaneous US-guided FNA biopsy appears to be the best-suited method for this task.[4-6] Since its introduction in the early 1980s, EUS has progressed from a relatively crude and merely diagnostic modality to a ''multitasking'' instrument that can provide diagnosis and local staging of PBD. Since then, EUS has emerged as a clinically useful tool with a major impact on patient management in many instances, particularly in patients with obscure common bile duct stones, submucosal GI tumors, biliary pancreatitis, chronic pancreatitis, pancreatic and biliary malignancies, including cystic lesions of the pancreas oradrenals, other retroperitoneal tumors, and a multitude of mediastinal diseases.[7-12] The risk of serious side effects has been consistently shown throughout the studies to be rather low, between 1% to 2%, even with interventional FNA procedures.[13] This explains why a rising number GI centers set out to take advantage of EUS-FNA and obtain a cytohistologic diagnosis before further endoscopic interventions.

Today there is a great need for minimally invasive procedures that permit the rapid tissue-based diagnosis in all patients with unclear pancreatobiliary disease, particularly those with suspected precancerous or clearly malignant lesions.

The retrospective study by Ross et al[14] suggests a relatively novel diagnostic ''tandem'' approach. This technique involves performing EUS with FNA first for the tissue-based cytohistologic diagnosis, followed by therapeutic ERCP for local treatment in patients with suspected malignant obstruction at the level of the distal bile ducts and pancreatic head at the same setting. This approach offers several hypothetic and some evidence-based advantages. First, EUS imaging is carried out under ''untouched'' or naive conditions, which minimizes any artifacts that could be potentially induced by EUS, ERCP-induced pancreatic necrosis, ERCP brushing, or

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previous duct stenting. Second, conscious sedation has to be used only once for the same patient to undergo both interventions simultaneously. Third, the clinician performing both interventions gets an impression beyond the bowel wall about what anatomic and pathophysiologic changes she or he has to be aware of before the introduction of the ERCP catheters. Although not specifically investigated, the latter approach may—at least theoretically—be very useful in endoscopic practice to guide the therapeutic endoscopist, particularly in situations when a difficult access to the ducts is to be expected and decisions, such as the timing and size of precut sphincterotomy, must be considered. Finally, performing EUS-FNA and ERCP in tandem is presumably cost-effective and may reduce procedure time and the time until the final tissue-based diagnosis is available. In this study, the diagnostic yield of EUS-FNA in this highly selected study population was rather high (overall accuracy 88%) and the rate of endoscopic sphincterotomy or stenting was high (51 and 96 of 114 patients). The safety profile looks acceptable with side effects about 10.5% (mostly pancreatitis) and was in the range of the reported complications after biliary EUS and stent insertion in other studies that focused on therapeutic ERCP. The mean procedure time for both (74 minutes) looks somewhat long at first sight; however, at second look it becomes clear that the range was substantial because it was probably difficult to access the tumor or papilla in this group of rather ill patients with advanced disease. Compared with a 2-step, 2-procedure approach, the data are clearly in favor of the 1-step approach.

The results of Ross et al[14] are well in keeping with those that have just recently been published by an Italian group,[15] who reported that simultaneous (or sequential) EUS-FNA followed by ERCP and stenting was safe in 25 of 72 patients in whom both procedures were performed to establish the diagnosis of biliary obstruction and to relieve patients from jaundice and potential cholangitis. Only one patient had transient fever after both procedures, which was easily treated by administration of intravenous antibiotics. No serious side effects were reported. In contrast, other researchers reported 2 cases that underwent same-day therapeutic ERCP after transduodenal EUS-FNA for pancreatic tumors.[16] Endoscopic biliary manipulation during ERCP aggravated an inadvertent and subclinical needle puncture injury to the bile duct sustained during the preceding EUS-FNA. This resulted in leakage of bile into the retroperitoneal space, and both patients required laparotomy and surgical drainage. These authors suggested that additional clinical evidence was needed to clarify these issues and to determine whether it would be smart to perform therapeutic ERCP before diagnostic transduodenal EUS-FNA when these 2 procedures are planned as sequential or same-day procedures. Evidently, there is room for further refinement of this diagnostic ''tandem'' approach in the near future.

Therapeutic EUS-FNA as an alternative to ERCP or percutaneous transhepatic chlonagiography with drainage in selected patient cases in whom no acess is possible by conventional methods is another option that arises steadily in the literature.[17] In experienced hands, EUS-guided interventions may be capable of alleviating obstruction from the left hepatic biliary ducts or the pancreatic duct system, including rendezvous techniques with ERCP. Such techniques are presently very helpful only in a minority of patients but may lead to broader developments to access remote ducts and physiologic structures (such as the gallbladder) by using minimally invasive EUS-guided drainage techniques, presumably in different types of obstructions, fluid collections, and abscesses.

In conclusion, EUS-based methods in combination with modern imaging tools (US, CT, MRI) have replaced diagnostic ERCP for PBD when carried out in experienced GI centers. In contrast, therapeutic ERCP has a vital role for the treatment of PBD. When the forces of the 2 ''brothers in arms'' (EUS-FNA and ERCP) are combined, the interventional endoscopist has an even greater armamentarium at hand to face PBD and its complications, particularly the burden of malignant lesions. However, interventional EUS is still in its infancy and its true potential remains open ended. In the near future, further technologic advances (such as minimized digital US transducers that can be used simultaneously with ERCP) to facilitate better access and safer biliary and pancreatic interventions may be hoped for. Alternatively, true side-viewing EUS scopes with a large working channel that combine minimized linear and radial features would also be greatly appreciated and quickly implemented. Such developments may finally lead to the development of more advanced therapeutic echoendoscopes that allow real-time biliary imaging and EUS-guided interventions without changing instruments, a vision that needs to be supported by innovative and courageous endoscopic engineers.

DISCLOSURE

The author reports that there are no disclosures relevant to this publication.

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Abbreviations: MRI, magnetic resonance imaging; PBD, pancreaticobiliary disease.

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