

A new application for therapeutic EUS: main pancreatic duct drainage with a “pancreatic rendezvous technique”

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Endoscopic treatment of chronic pancreatitis depends on deep cannulation of the main pancreatic duct (MPD) through the major or the minor papilla.¹⁻³ Although technical success rates of more than 95% are reported, the presence of an obstructing lesion (i.e., stricture, stone, anomalies, tortuous duct shape) may preclude access to the MPD.⁴ Several techniques have been described for overcoming such problems: extracorporeal shock wave lithotripsy of pancreatic calculi,^{5,6} precut sphincterotomy,⁷ secretin injection,⁸ percutaneous-guided ductography,⁹⁻¹¹ “pancreatic rendezvous” with passage of a guidewire between minor and major papillae,¹² and the “transduodenal rendezvous” with puncturing the MPD under fluoroscopic guidance.¹³ EUS is an established imaging method for evaluating pancreatic disorders.¹⁴⁻¹⁶ EUS-guided cholangiopancreatography has been considered an interim step toward EUS-guided therapy for pancreatic disorders.¹⁷⁻²⁰ This is a description of a new approach to transduodenal “rendezvous” with endosonographic guidance.

CASE REPORT

A 45-year-old man with symptoms from recurrent pancreatitis (first episode 8 years earlier) was hospitalized with recurrent abdominal pain. The patient denied use of alcohol and tobacco and was thought to have idiopathic or obstructive pancreatitis. Examination showed epigastric tender-

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ness, and serum pancreatic enzyme levels were 3 times normal values. Magnetic resonance cholangiopancreatography (MRCP) demonstrated dilation of the MPD (8 mm) proximal to a short suprapapillary stricture and a 12-mm diameter cystic lesion. Although there had been 3 unsuccessful attempts to cannulate the MPD through the major and minor papillae after biliary sphincterotomy before referral, further therapeutic endoscopy was considered preferable to surgery because of the extremely short stricture.

After obtaining written informed consent, ERCP was attempted with a standard therapeutic duodenoscope (TJF-160R, Olympus, Omnilabo, Aartselaar, Belgium) with the patient under general anesthesia. A normal-appearing major papilla was located on the left inner aspect of a duodenal diverticulum (the latter corresponded to the cystic lesion noted by MRCP). The previous biliary sphincterotomy rendered selective opacification of the pancreatic duct difficult and incomplete. A tight suprapapillary stricture (length 6 mm) was, however, demonstrated with upstream dilation of the MPD (10 mm). Despite multiple attempts, including a precut incision of the pancreatic duct orifice and opacification through the minor papilla, the MPD could not be selectively cannulated.

The MPD was then punctured through the duodenal wall under EUS guidance with a linear array echoendoscope with a 2.4-mm diameter accessory channel (FGUX36, Pentax Benelux, Breda, The Netherlands) and a 22-gauge Vilmann needle (GIP-Medizin Technik, Medi-Globe Corp., Achenmühle, Germany) (Fig. 1). The transduodenal approach was chosen to facilitate puncture of the pancreas and to avoid the intraperitoneal leakage of pancreatic fluid that would occur if the procedure was unsuccessful by a transgastric route. Contrast medium was injected under fluoroscopy to confirm that the needle tip was correctly positioned in the MPD (Fig. 2). A 0.018-inch diameter hydrophilic guidewire (Terumo Europe, Leuven, Belgium) was then inserted through the needle and passed downstream through the stricture and major papilla into the duodenal lumen (Fig. 3).

The echoendoscope was removed over the guidewire, and a duodenoscope was passed along the guidewire to the papilla.

Endoscopically, the puncture site with the guidewire was clearly visible about 2 cm proximal to the papilla. The distal end of the guidewire exiting through the papilla was

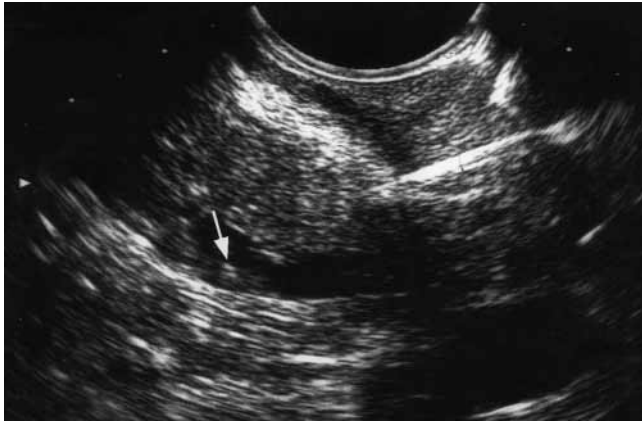


Figure 1. EUS image showing transduodenal endosonographically-guided puncture of main pancreatic duct. The needle is shown entering the pancreatic parenchyma and pancreatic duct. Hyperechoic air bubbles (*arrow*) in duct mask tip of needle.



Figure 2. Radiographic image of endosonographically guided pancreatography showing dilated main pancreatic duct proximal to duodenal diverticulum. Contrast media has been injected through the 22-gauge needle under EUS and fluoroscopic guidance. Mixing of contrast media and air obscures endosonographic guidance at this point.

grasped with a snare and was withdrawn through the accessory channel of the duodenoscope (Fig. 4). The extreme tightness of the stricture did not allow cannulation with a standard 5F ball tip catheter (Reynders Medical Supplies, Lennik, Belgium) and necessitated forceful passage of a 3-5-7F Soehendra dilator (Cook Belgium, Strombeek-Bever, Belgium) over the guidewire into the MPD. The hydrophilic guidewire was replaced with a standard 0.035-inch Teflon-coated guidewire (Cook Belgium, Strombeek-Bever, Belgium), and an “over the guidewire” pancreatic sphincterotomy was performed. Then, a 7F Flexima stent (Boston Scientific Benelux, Maastricht, The Netherlands) was inserted. The patient did not have postprocedure pain, and there were no complications.

Three months later the 7F stent was replaced with a 10F Amsterdam stent after dilatation of the remaining stricture with an 8 mm, 2 cm-long balloon (Maxforce, Boston Scientific Benelux, Maastricht, The Netherlands). Cytologic specimens obtained from the stricture were neg-



Figure 3. Radiograph showing insertion of 0.018-inch guidewire through needle into main pancreatic duct. The tip of the needle has been withdrawn slightly into the pancreatic parenchyma to allow movement of the guidewire and to avoid cutting the guidewire with the needle tip.



Figure 4. Radiograph showing duodenoscope with guidewire withdrawn through accessory channel with snare. The end of the guidewire that exits through the puncture is held firmly by an assistant to facilitate cannulation.

ative for malignancy; testing for the *Ki-ras* mutation was also negative. The patient remained asymptomatic during follow-up of 1 year at which time MRCP showed a nondilated MPD without any evidence of chronic pancreatitis. The stent was then removed.

DISCUSSION

The new EUS-ERCP “rendezvous” technique reported here is a variant of the previously described transduodenal “rendezvous” method in which fluoroscopy alone is used to guide puncture of the MPD.¹³ With the latter method, the puncture is performed through the duodenal wall by using the imprint made with the needle knife catheter on the previously opacified MPD to select the site. The necessity of initial opacification of the MPD restricts the use of this approach to patients in whom a pancreatogram can be obtained.

Linear array echoendoscopes provide good images of the pancreatic parenchyma and main pancreatic duct and allow diagnostic and therapeutic applications. The former now include fine-needle aspiration of various pancreatic lesions^{21,22} and EUS-guided cholangiopancreatography.¹⁷⁻²⁰ Therapeutic applications with regard to the pancreas include EUS-guided pseudocyst drainage,^{23,24} injection of pancreatic tumors with therapeutic agents,²⁵ and radiofrequency ablation.²⁶ Newer linear array echoendoscopes have larger-diameter accessory channels as well as an elevator and thus open possibilities for a wider range of interventional techniques with a single endoscope. These may include pancreatic duct puncture, passage of guidewires, dilatation, and insertion of stents. Existing dilation of the MPD caused by obstruction, chronic pancreatitis, or both facilitates access under EUS guidance. By comparison to patients with this finding, it is likely that pancreatic duct puncture will be more difficult and success rates lower in patients with a nondilated MPD.

Hemorrhage, pancreatitis, local or systemic infection, and perforation are potential complications of the transduodenal "rendezvous technique."²⁷⁻²⁹ A case of pneumoperitoneum-complicating ERCP performed immediately after EUS-guided fine needle aspiration has been described in which the pneumoperitoneum resolved spontaneously.³⁰ The risk of hemorrhage from puncture of an interposing vessel should be decreased by the use of Doppler imaging.³¹ The presence of underlying chronic pancreatitis may enhance the safety of passage of a needle through the pancreatic parenchyma. By comparison, use of EUS-guided puncture of the MPD in patients without chronic pancreatitis may be associated with a greater risk of complications.

This report describes a new procedure for pancreatic duct drainage that combines EUS and ERCP. When ERCP, in experienced hands, fails to provide access to an obstructed MPD, this technique may be useful. Interventional EUS is undergoing rapid technical development because of improvements in echoendoscopes and EUS accessories.³² Further improvements in both are mandatory, however, if therapy with a single echoendoscope is to be an obtainable goal. Moreover, these developing techniques are extremely demanding in terms of time and resources. They should be attempted only by endoscopists with high levels of skill and experience in both therapeutic EUS and therapeutic ERCP.

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