

# ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

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## Approaches to ERCP in Patients With Roux-en-Y Gastric Bypass Anatomy



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**G&H** Why are alternative approaches to endoscopic retrograde cholangiopancreatography needed for patients with Roux-en-Y gastric bypass anatomy?

**TB** Patients who have undergone Roux-en-Y gastric bypass have an altered anatomy, and traditional endoscopic retrograde cholangiopancreatography (ERCP) endoscopes are not long enough to reach the papilla in these patients. Therefore, alternative approaches to conventional ERCP are needed.

**G&H** How is laparoscopic-assisted ERCP performed?

**TB** Laparoscopic-assisted ERCP is considered the standard technique in most institutions and is performed in an operating room. A surgeon accesses the excluded stomach laparoscopically to bring it up to the abdominal wall. A large-diameter trocar is placed from the skin to the excluded stomach, allowing an endoscopist to then pass an endoscope through the trocar to the papilla. When the procedure is finished, the surgeon removes the trocar and closes the opening made in the stomach.

**G&H** What advantages and disadvantages are associated with this technique?

**TB** The primary advantage of laparoscopic-assisted ERCP is the path created by the surgeon through the

excluded stomach that allows an endoscopist to use a traditional ERCP endoscope to access the papilla. However, the endoscope generally has to be sterilized for the procedure, a process that takes a minimum of 24 hours at most institutions. Thus, if an issue arose that was unanticipated, there would be at least a 1-day delay. Likewise, the endoscopist and team have to use sterile techniques, which endoscopy personnel may be unfamiliar with in an operating room setup. The layout of the operating room may also be a disadvantage for endoscopists, as well as having surgical personnel in the room waiting for them to complete the ERCP portion of the procedure before the case can be finished. Additionally, aligning the schedules of the endoscopist and surgeon can be challenging.

**G&H** How do device-assisted techniques compare?

**TB** Device-assisted techniques use a long-length endoscope, typically a single- or double-balloon enteroscope depending on the institution, to travel down the Roux-en-Y limb and pass back up to access the papilla. Colonoscopes were used previously but generally failed to reach the papilla. Some institutions will have a radiologist perform a percutaneous puncture and place a guidewire down into the small bowel to assist in reaching the papilla prior to the use of a single-balloon enteroscope, but that is not common practice, carries another set of risks, and employs an additional nonendoscopic procedure.

The main limitation with the balloon enteroscope method is that the endoscope is forward-viewing, and cannulation of the papilla is optimal when a side-viewing endoscope is used. Thus, once the device reaches the papilla, cannulation becomes technically difficult because the working channel is positioned 90 degrees from where it needs to be. Further, because most balloon enteroscopes are a much longer length and have smaller working channels compared to traditional therapeutic ERCP endoscopes, the accessories are either not long enough or the diameter or channel of the endoscope is not large enough, and special accessories may need to be ordered. Balloon-assisted ERCP can take 2 hours or more to perform, which is also a downside.

### G&H What endoscopic ultrasound–guided approaches are available?

**TB** Endoscopic ultrasound–directed transgastric ERCP (EDGE) is a procedure in which an endoscopist connects the gastric pouch to the excluded stomach and places a lumen-apposing metal stent between them. After removing the endoscope, a traditional ERCP can be performed by placing an ERCP endoscope through the stent and down into the duodenum. The ERCP can be performed either immediately or after a delay following endoscopic ultrasound. A delay may be necessary to avoid the risk of dislodging the stent and creating a perforation between the 2 stomachs that were just created. For a patient who requires an urgent or emergent ERCP, the stent is balloon-dilated to allow the ERCP endoscope to pass through. However, a risk of stent dislodgement remains, and some clinicians advocate anchoring the stent in place with other endoscopic techniques.

Another approach is to puncture from the gastric pouch directly into the left hepatic duct and perform endoscopic ultrasound–guided hepaticogastrostomy. This technique provides drainage into the stomach through the left hepatic duct but requires managing biliary stones from an antegrade approach. In these cases, the stones are pushed through the papilla, which has to be dilated downstream. One of the limitations with this approach is that if the intrahepatic ducts are not sufficiently dilated, it can be difficult, if not impossible, to access the left hepatic duct.

### G&H What factors should be considered when choosing the best approach?

**TB** The approach is sometimes chosen based on the specialist that the patient is initially referred to. In my institution, endoscopists will generally perform the EDGE procedure if the patient is sent directly to us. However, if the

patient is sent first to a laparoscopic surgeon, it is reasonable to assume that a laparoscopic approach will be used and an endoscopist will assist. The decision also depends on the center and whether the expertise is available in each of the disciplines. If a center has unlimited expertise, I believe that the EDGE procedure is ideal because it is technically the easiest. Endoscopic ultrasound–guided gastrogastrostomy is straightforward and can be completed with low risk, and endoscopists have largely overcome the learning curve. Whether the ERCP is immediate or delayed is endoscopist- and patient-dependent. In nonemergent situations, ERCP can be delayed 10 to 12 days without the risk of stent dislodgement. Risks vary depending on the approach but tend to be relatively similar in terms of the types of complications, if not necessarily the frequency or the management. As with any endoscopic procedure, perforation and bleeding are the major complications, and management depends on when the complication is recognized.

Another important consideration before proceeding to an endoscopic approach over a laparoscopic-assisted one is whether the patient has an intact gallbladder, as most patients who have bile duct stones also have gallstones and will need cholecystectomy. In these cases, an argument can be made that interoperative ERCP is the optimal approach because the patient will already be in the operating room for a laparoscopic cholecystectomy. On the other hand, if a patient has very complicated bile duct stones that require a more intense endoscopic approach, it may still be better to perform a purely endoscopic approach before cholecystectomy. This decision is best made in a multidisciplinary manner.

Cost is also a factor. My colleagues and I published a cost-analysis modeling study that compared laparoscopic-assisted, enteroscopy-assisted, and EDGE-assisted ERCP approaches. In all the various modeling that we did, the EDGE approach was most cost-effective because of the avoidance of operating room costs.

### G&H What training is needed to perform these procedures?

**TB** The laparoscopic-assisted approach has a learning curve related to positioning the endoscope in the duodenum, as the endoscopist has to maneuver the device through the trocar and excluded stomach rather than through the esophagus and native stomach. It can take time to be familiar with the orientation and trajectory of the endoscope and its position to the papilla in a patient with Roux-en-Y gastric bypass anatomy. Of course, training in ERCP is also necessary. For the endoscopic ultrasound–guided approaches, there is a reasonable learning curve to performing advanced therapeutic

endoscopic procedures. Endoscopists who are performing endoscopic ultrasound–guided gastrogastrostomy are typically in academic centers as opposed to community settings. Likewise, the balloon enteroscopy–assisted approach is mostly performed by endoscopists in tertiary care centers.

### G&H How do these approaches compare in terms of clinical and technical success rates?

**TB** The success rate for laparoscopic-assisted ERCP is dependent on 2 operators. A laparoscopic surgeon may not be able to access the excluded stomach laparoscopically due to anatomy, or an endoscopist may experience trouble with cannulation and not be able to get into the bile duct. These situations are uncommon but can occur. As a result, the combined technical success rate may not be 100%, but could be 90% to 99% for either procedure.

The majority of published success rates for balloon-assisted ERCP are relatively high; however, the results come from select centers that provide advanced endoscopy. This approach is technically difficult, and we found that the published rates of technical success range from 60% to 100% with an average of 70%.

The success rates of the endoscopic ultrasound–guided approaches, and for EDGE in particular, are close to 100%. However, similar to balloon-assisted ERCP, these rates come from centers that have expertise in therapeutic ultrasound, so they may not be generalizable to community practices.

### G&H What are the priorities of research in this field?

**TB** Roux-en-Y gastric bypass surgery for obesity is a commonly performed procedure, and the number of patients

in the United States who have undergone it has risen. There is a lifetime potential for ERCP in this patient population. Thus, prospective, multicenter, randomized trials comparing the various alternative approaches to ERCP would be beneficial. These trials are challenging because a 3-arm study (to compare laparoscopic-assisted vs balloon-assisted vs endoscopic ultrasound–assisted ERCP) would require a large number of patients at centers that have equal expertise in all 3 approaches. In the meantime, centers should continue to publish their outcomes of retrospective, multicenter studies.

*Dr Baron serves as a speaker and consultant for Cook Endoscopy, Boston Scientific, Medtronic, Olympus, and W. L. Gore.*

### Suggested Reading

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