ELSEVIER

Techniques in
Gastrointestinal
Endoscopy

ERCP with the Double Balloon Enteroscope in Patients with Roux-en-Y Anastomosis

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Endoscopic retrograde cholangiopancreatography (ERCP) is technically more challenging in patients with postsurgical anatomy, such as Roux-en-Y anastomosis, frequently mandating an operative intervention. Although limited, there is growing evidence that ERCP can be performed using the double balloon enteroscope (DBE) in patients with complex postoperative anatomy. We present the technical aspects of performing ERCP with the DBE in patients presenting with complex postsurgical anatomy having biliary problems. ERCP using the DBE is feasible in patients with complex postsurgical anatomy, permitting diagnostic and therapeutic interventions in 80% of patients.
Tech Gastrointest Endosc 10:128-135

KEYWORDS double balloon enteroscopy, double balloon enteroscope, cholangiography, Roux-en-Y anastomosis, hepaticojejunostomy

Not infrequently, patients with previous complex upper GI surgery, such as Whipple's operation or Roux-en-Y anastomoses, present with pancreatobiliary problems.[1,2] Endoscopic interventions in these situations are technically more challenging, and diagnostic or therapeutic interventions can be very difficult or impossible, frequently mandating an operative intervention. In this chapter, we describe the technical aspects of performing endoscopic retrograde cholangiopancreatography (ERCP) with the double balloon enteroscope (DBE) in patients with complex postsurgical anatomy presenting with biliary problems.

Technical Aspects

Instruments and Materials

Currently there are two types of DBEs available which can be used for DB-ERCP. The diameter of the working channel of the therapeutic DBE is 2.8 mm, whereas the diagnostic one is 2.2 mm wide. Both channels allow for the passage of the standard biopsy forceps, snare, injection needle standard biliary catheter, and the thin argon plasma catheter (APC catheter 20132-212, Erbe Tübingen, Germany). But other therapeutic ERCP utensils, such as stone retrieval basket, dilation balloon, and 7-Fr stent, can only be advanced through the channel of the therapeutic DBE. Please refer to the chapter by Schäfer and coworkers, which includes a list of devices and materials currently available for use during DBE-assisted ERCP. Complications as a consequence of DBE-assisted ERCP are defined according to standard criteria and experience of large centers performing DBE.[3-5]

Procedure Description

Technique of Advancing the DBE into the Excluded Roux-en-Y Limb

Before attempting an endoscopy in patients with surgically altered GI anatomy, the surgical record should be thoroughly reviewed. The endoscopist should gain access to all available surgical information, make the necessary consultations, and thoroughly discuss the individual case. Review or order of all possible non-invasive imaging studies will allow for a better understanding of the altered anatomy (e.g., high quality abdominal ultrasound, CT scans, magnetic resonance, cholangiopancreatography, upper GI contrast series). Always assume no two cases will be the same! Good knowledge of the different surgical procedures that alter the upper GI tract is mandatory (Table 1).

The method to advance the DBE is the same as when performing a standard DBE.[6-9] Adhesions may limit the mobility of the intestine and make insertion of the DBE more cumbersome. The most important aspect to remember is to be patient and not to advance the scope forcefully. In addition, careful attention should be paid to avoid air insufflation

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 1096-2883/08/$-see front matter
doi:10.1016/j.tgie.2007.12.008

Table 1 Operative Procedures that Alter Endoscopic Access to the Upper Gastrointestinal and Biliopancreatic Tracts

1. Procedures involving gastric resection:
   a. Preserving natural access to the duodenum:
      i. Billroth I resection (end to end gastroduodenostomy)
   b. Affecting gastric outlet *and* the natural access to the duodenum:
      i. Billroth II (any reconstruction, including Roux-en-Y anastomosis)
      ii. Bypass for morbid obesity with variable lengths of the alimentary and/or biliopancreatic limb
   c. Affecting the gastric outlet *and* biliopancreatic tracts:
      i. Whipple's procedure, any reconstruction (e.g. pylorus preserving procedure)
2. Procedures *not* involving gastric resection:
   a. Preserving natural access to the duodenum:
      i. Choledocho-duodenostomy (side to side or end to side)
   b. Affecting gastric outlet *and* the natural access to the Duodenum:
      i. Derivative side to side gastro-enterostomy (usually palliative)
   c. Preserving the gastric outlet, but altering access to the biliopancreatic tract:
      i. Hepatico-jejunostomy (usually Roux-en-Y anastomosis)
      ii. Pancreatic drainage procedures (DuVal, Puestow)
3. Gastric bypass procedures:
   Procedures for morbid obesity: gastric bypass and bilio-pancreatic diversion will have variable limb lengths:
   a. Both procedures will have a small gastric pouch draining to a Roux-en-Y limb (called alimentary limb)
   b. Re-entry of the bilio-pancreatic limb into this alimentary limb will be at variable distances, depending on the planned desired malabsorption, as in the bilio-pancreatic diversion procedure

Note that the bilio-pancreatic diversion creates a limb too long to gain access to the duodenum and ampulla of Vater.

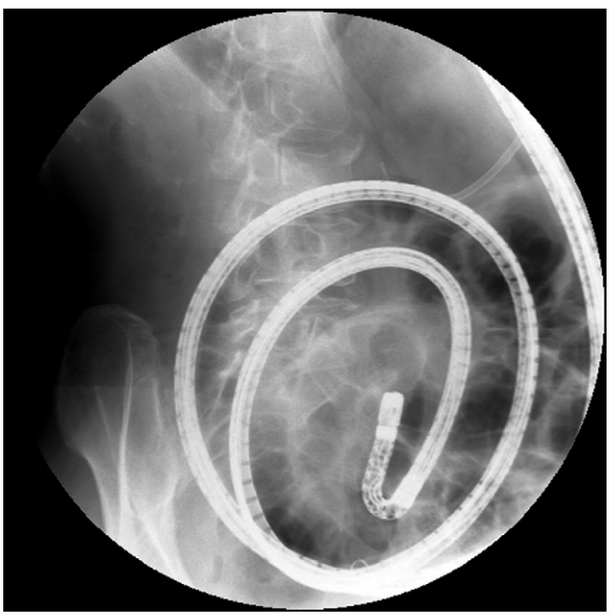

Figure 1 Intubation of the efferent limb can be confirmed fluoroscopically. Note that the scope is in the pelvis.

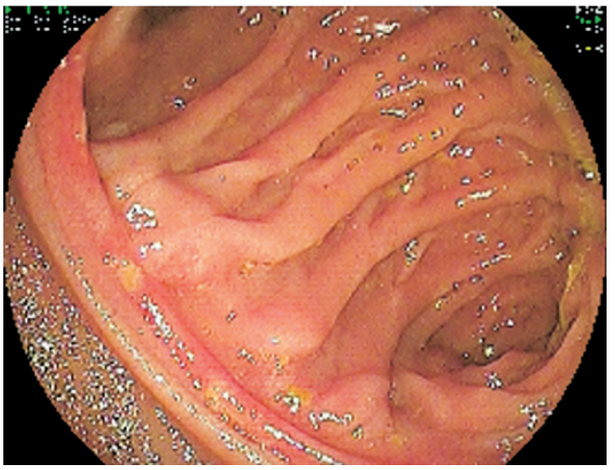

Figure 2 The afferent limb is usually located to the left side. The entrance is very angulated, and on advancing the endoscope, it can be missed and thus it is not found until retrieval of the endoscope. (Color version of figure is available at www.techgiendoscopy.com.)

while advancing the endoscope as the bowel gets distended and further advancement is thus hampered. Changing the patient's position or applying external abdominal pressure may help. Fluoroscopy can be very helpful in situations when advancement is limited, as it permits to estimate the degree of looping present as well as to visualize the direction that the scope is taking.

During DBE ERCP, we measure the depth of insertion using the method of May and coworkers,[10] but modify it according to the anatomy found. Due to the postsurgical anatomy of the bowel and adhesions, this method of depth measurement may not be as exact as when investigating the intact small bowel, but it provides a useful approximation. We modify the calculation of advanced depth according to the limitations encountered during advancement. For example, frequently an endoscopic push of 40 cm results in only a luminal advancement of 10 cm, and this is carefully noted in our procedure log. We also like to perform a "final" measure-

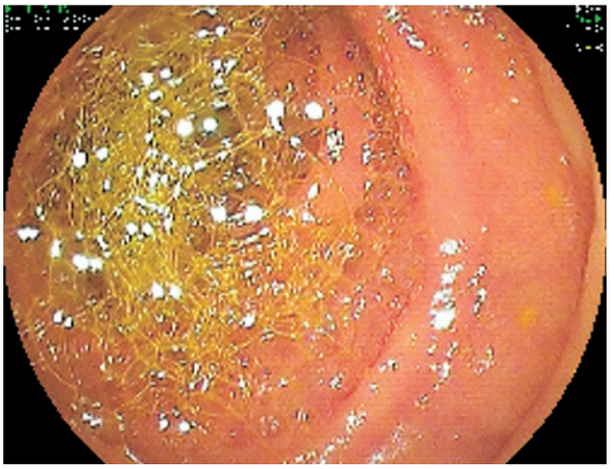

Figure 3 The afferent limb is usually recognized by the presence of bile or many yellow-colored air "bubbles." These bubbles are the result of bile saponification. (Color version of figure is available at www.techgiendoscopy.com.)