Endoscopic Approach to the Bile Duct in the Patient with Surgically Altered Anatomy

Alexander Lee, MD[a], Janak N. Shah, MD[b,*]

KEYWORDS

- Endoscopic retrograde cholangiopancreatography • Billroth II
- Roux-en-Y anastomosis • Gastric bypass • Double-balloon enteroscopy
- Push and pull enteroscopy

KEY POINTS

- Endoscopic retrograde cholangiopancreatography (ERCP) in patients with surgically altered anatomy can be technically challenging because of the difficulty in traversing altered anatomy, cannulation from an altered position, and the lack of standard ERCP accessories for use with longer-length endoscopes.
- For ERCP in most patients with Billroth II anatomy, standard duodenoscopes or gastroscopes (with or without caps) can be used with high success rates.
- For ERCP in patients post Roux-en-Y, longer-length endoscopes or deep enteroscopy techniques are usually necessary. After the biliary orifice is reached, success rates for ERCP are reasonably high. Percutaneous or laparoscopic-assisted access for ERCP may be preferred in patients with long-limb Roux-en-Y gastric bypass.
- An endoscopist's thorough understanding of the postsurgical anatomy, along with careful preparation and availability of all potentially needed accessories, maximizes the chances of successful ERCP in the patient with surgically altered anatomy.

INTRODUCTION

Endoscopic retrograde cholangiopancreatography (ERCP) in surgically altered anatomy can be technically challenging, because of three main problems that must be overcome: (1) endoscopically traversing the altered luminal anatomy, (2) cannulating the biliary orifice from an altered position, and (3) performing biliary interventions with available ERCP instruments. This article addresses the most common and

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[a] Division of Gastroenterology, University of California, San Francisco, 513 Parnassus Avenue, Room S-357, San Francisco, CA 94143, USA; [b] Paul May and Frank Stein Interventional Endoscopy Center, California Pacific Medical Center, University of California, San Francisco, 2351 Clay Street, 6th Floor, IES Lab, San Francisco, CA 94109, USA
* Corresponding author.
E-mail address: shahj@sutterhealth.org

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most challenging variations in anatomy encountered by a gastroenterologist performing ERCP. It also highlights the innovations and progress that have been made in coping with these anatomic variations, with special attention paid to altered anatomy from bariatric surgery.

POSTSURGICAL ANATOMY WITH CONVENTIONALLY ACCESSIBLE BILIARY SYSTEM

Certain types of postsurgical anatomy feature a conventionally accessible biliary system, so ERCP can be performed with a standard duodenoscope and from the usual ERCP position. This offers two important advantages: endoscopist familiarity with standard ERCP techniques, and complete compatibility with standard ERCP tools.

There are several common operations that do not affect access to the patient's biliary systems: (1) sleeve gastrectomy, in which the greater curvature of the stomach is resected, and the remnant stomach is kept in continuity with the small bowel; (2) laparoscopic adjustable gastric band, in which a band-like device is placed around the stomach immediately beneath the gastroesophageal junction, with the inner portion of the band consisting of a saline-filled silicon balloon that can be inflated or deflated by a subcutaneous access port; and (3) Billroth I distal gastrectomy, in which antrectomy is performed and an end-to-end anastomosis is created between the remnant stomach and the duodenum.[1]

Advancement of the duodenoscope is usually relatively straightforward in these cases. The anatomic variations may be apparent as the stomach is traversed, and there may be variations in endoscope looping and position. However, with the duodenum remaining in continuity, establishing a good position for cannulation of the major papilla is generally not difficult, and the usual ERCP accessories are used for cannulation and therapy.

POSTSURGICAL ANATOMY WITH DIFFICULT-TO-ACCESS BILIARY SYSTEM

Many surgical procedures create variations in gastrointestinal anatomy, making ERCP challenging or even impossible. The difficulty arises because the gastric outlet is no longer contiguous with the duodenum. Altered anatomy leads to a longer gastrointestinal tract length to traverse to reach the biliary tree and to an unusual cannulation approach from a caudal angle. Duodenoscopes may be of insufficient length to reach the papilla, and ERCP in altered anatomy often requires the use of longer endoscopes, deep enteroscopy techniques, surgically assisted approaches, or additional supporting instruments. Common operations that result in difficult-to-access biliary systems are described next.

Gastrojejunostomy (Including Billroth II)

An anastomosis is created between the stomach and a loop of the jejunum. Typical procedures that use this type of anastomosis include gastrojejunostomy after partial gastrectomy or gastrojejunostomy without gastric resection for treatment of gastric outlet obstruction. The Billroth II distal gastrectomy uses a gastrojejunostomy (**Fig. 1**). Although this type of operation is performed infrequently in the current era of proton pump inhibitors, it is still encountered by biliary endoscopists, because it was popular in the past for complicated peptic ulcer disease.[2] During the procedure, the distal stomach is resected and an end-to-side gastrojejunostomy is created. From the anastomosis, an afferent limb leads to the more proximal small bowel and duodenum, and an efferent limb leads to the distal small bowel. Approach to the