

Balloon enteroscopy–assisted ERCP in patients with Roux-en-Y gastrectomy and intact papillae (with videos)

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Background and Aims: Balloon enteroscopy–assisted ERCP has provided a marked improvement in the success rate of reaching the papilla and consecutive ERCP procedures in patients with surgically altered anatomy in the Roux-en-Y reconstruction setting. However, limited data are available on the outcome of balloon enteroscopy–assisted ERCP in patients with Roux-en-Y anatomy who have naïve papillae. We retrospectively evaluated the feasibility of balloon enteroscopy–assisted ERCP in Roux-en-Y reconstruction after total or subtotal gastrectomy (RYG) with native papillae.

Methods: We performed 123 ERCP procedures in 109 patients with RYG. Among these patients, 90 consecutive ERCPs in 90 patients with native papillae were included. When selective biliary cannulation failed, the double-guidewire technique, the precut technique, or the rendezvous technique were performed as advanced cannulation methods.

Results: The overall success rate of reaching the papilla was 93.5% (115/123). The total procedure success rate was 88.1% (96/109). The adverse event rate was 7.3% (8/109). The success rate of the standard cannulation of the intact papilla was 67.8% (61/90). The final cannulation success rate was 95.6% (86/90) by using advanced cannulation methods.

Conclusions: Standard cannulation of the intact papilla in RYG cases remains challenging and uncertain. The use of various advanced cannulation methods improves the deep cannulation rate. Once selective cannulation succeeds, the treatment success rate is very high. (*Gastrointest Endosc* 2016;83:377-86.)

ERCP in patients with surgically altered anatomy in the setting of Roux-en-Y reconstruction is challenging. Balloon enteroscopy allows access to the papilla and biliopancreatoenteric anastomoses.¹⁻⁶ Even after the papilla or anastomotic site is reached, selective cannulation through the naïve papilla or anastomotic site may be unsuccessful. The cannulation of a native papilla is particularly difficult because of the oblique and inverted endoscopic view of

the papilla, limited availability of accessories, and lack of an elevator. Limited data are available on the outcome of balloon enteroscopy–assisted ERCP in patients with naïve papillae and Roux-en-Y reconstruction including gastric bypass and after gastrectomy. In the present study, we evaluated the effectiveness of balloon enteroscopy–assisted ERCP in patients with native papillae and Roux-en-Y gastrectomy (RYG).

Abbreviations: DBE, double-balloon enteroscopy; DGT, double-guidewire technique; EPLBD, endoscopic papillary large-balloon dilation; FVE, forward-viewing endoscope; OVE, oblique-viewing endoscope; PTC, percutaneous transhepatic cholangiography; RYG, Roux-en-Y gastrectomy; SBE, single-balloon enteroscopy.

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PATIENTS AND METHODS

Patients

This study was a single-center retrospective study. Consecutive ERCs by using balloon enteroscopy were recorded; 123 procedures were performed in 109 patients (87 men and 22 women; mean age 72 years, range 49–95 years) with Roux-en-Y reconstruction after total or subtotal gastrectomy between January 2007 and October 2014 at Tokyo Medical University Hospital. For cases in which endoscope intubation to the papilla appeared obviously difficult owing to tumor invasion based on several imaging findings (2 patients) or critical illness of patients (3 patients), we performed percutaneous transhepatic cholangiodrainage from the start. Among these patients, we analyzed 90 consecutive ERCs in 90 patients (73 men and 17 women; mean age 72 years, range 49–95 years) with native papillae and RYG. All patients had an intact papilla without prior sphincterotomy, endoscopic papillary balloon dilation, or stent placement. Demographic characteristics are shown in Table 1.

Procedures

All procedures were performed with patients under moderate sedation by using intravenous flunitrazepam, pentazocine, and CO₂ insufflation. The procedures were performed by 3 experienced endoscopists (T.I., F.I., K.I.) who have performed more than 800 ERCs and 600 colonoscopies. Informed consent was obtained from each patient before each procedure.

A single-balloon enteroscope (SBE) (SIF-Q260, prototype SIF-Y0004-V01; Olympus, Tokyo, Japan) or a double-balloon enteroscope (DBE) (EN-450T5, EC-450BI5, EI-530B; Fujifilm, Tokyo, Japan) was used for all cases. When a long-type balloon enteroscope with an effective length of 200 cm was used, long-wire accessories and special prototype long-length devices were used. When the procedure could not be completed because of device limitations, the enteroscope was withdrawn while the overtube remained in position. A hole was created in the overtube to allow a standard forward-viewing endoscope (FVE) (GIF-XQ240/260; Olympus) to be inserted instead to complete the procedure, as previously described.^{1,7} In some cases, the balloon enteroscope was replaced by an oblique-viewing endoscope (OVE) (GIF-XK240; Olympus) or an ultrathin endoscope (GIF-N260, GIF-XP260; Olympus/EG-470N5; Fujifilm) when cannulation was difficult (Video 1, available online at www.giejournal.org).⁸

Cannulation

When a long-type balloon enteroscope was used, a prototype catheter (PRY0002; Olympus), a standard long catheter (ERCP catheter; MTW Co, Ltd, Düsseldorf, Germany), or a nasobiliary drainage tube (Cathex Co, Tokyo, Japan) was used for cannulation. When a short-type balloon en-

TABLE 1. Patient characteristics and disease

	EJ/GJ with R-Y*
Patient (procedure), no.	109 (123)
Age (range), y	72.0 (49–95)
Sex, male/female	87/22
Indication	
Cholelithiasis	89
Cholestasis	
Bile duct cancer	2
Pancreatic cancer	2
Gallbladder cancer	1
Metastatic lymphadenopathy†	3
Local recurrence‡	5
Hemobilia‡	1
Pancreatic duct stricture	
Chronic pancreatitis	1
Cholecystitis	1
Benign biliary stricture (unknown)	1
Infectious pancreatic cyst	1
Ampullary tumor	1
Primary sclerosis cholangitis	1

EJ, Esophagojejunostomy; GJ, gastrojejunostomy; R-Y, Roux-en-Y reconstruction.

*Total gastrectomy or subtotal gastrectomy.

†Due to gastric cancer.

‡Due to hepatocellular carcinoma.

teroscope (EC-450BI5, EI-530B; Fujifilm/prototype SIF-Y0004-V01; Olympus) or a standard FVE or OVE was used, conventional ERCP instruments were used; these included a standard tapered catheter (PR-110Q; Olympus) or bendable catheters (KD-V411M or PR-233Q; Olympus or Autotome RX or TRUEtome; Boston Scientific, Natick, Mass). When the balloon enteroscope was replaced by an ultrathin endoscope, a tapered catheter was used. When selective biliary cannulation failed, the pancreatic duct was cannulated, and the double-guidewire technique (DGT) was performed by using a 0.018 to 0.025-inch guidewire and a tapered catheter (Supplemental Fig. 1, Video 2, available online at www.giejournal.org). Otherwise, the precut technique was performed by using a needle-knife (KD-441Q or KD-10Q-1 or a prototype long-length needle-knife; KD-Y0002, Olympus) (Fig. 1). When deep cannulation could not be achieved despite the use of various techniques for approximately 60 minutes, the procedure was terminated. We then performed the percutaneous transhepatic cholangiography (PTC)-guided or EUS-guided rendezvous technique, followed by the transpapillary approach (Supplemental Figs. 2 and 3, available online at www.giejournal.org).^{1,9–11} When the rendezvous technique was used, we placed a 5F or 6F nasobiliary tube into the bile duct for 24 hours to prevent bile-induced peritonitis after the procedure.

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