Abstract

Altered digestive anatomy creates unique challenges in endoscopic retrograde cholangiopancreatography (ERCP). The type of previous surgery acts as a guide for endoscope selection and technical approach. Endoscopic therapy is preferred to percutaneous radiologic technique as it is minimally invasive and less morbid. In this article, the authors present a series of selected cases demonstrating the different therapeutic aspects of ERCP in altered anatomy. This article is part of an expert video encyclopedia.

Keywords

Bile duct; Billroth II gastrectomy; Endoscopic retrograde cholangiopancreatography; Enterscopy; Roux-en-Y reconstruction; Video.

Video Related to this Article

Video available to view or download at doi:10.1016/S2212-0971(13)70206-1

Materials

- 0.035 in. JAG wire™ straight-tip high-performance guidewire (Boston Scientific, Natick, MA, USA).
- CleverCut 3V single-use 3-lumen sphincterotome (Olympus Corporation, Tokyo, Japan).
- Needle cut 3V 3-lumen needle knife (Olympus Corporation, Tokyo, Japan).
- Multi 3V single-use 3-lumen extraction balloon (Olympus Corporation, Tokyo, Japan).
- Quantum TTC® biliary balloon dilator (Cook Medical, Winston-Salem, NC, USA).
- Cotton-Leung® biliary stent (Cook Medical, Limerick, Ireland).
- Zimmon® pancreatic stent (Cook Medical, Limerick, Ireland).
- Omnipaque™ dye (Isohexol 37.5 mg 50 mL⁻¹) (GE Healthcare Australia Pty Ltd., Rydalmere, Sydney, NSW, Australia).
- Acusnare polypectomy snare (Cook Medical, Winston-Salem, NC, USA).
- Erbe VIO 300 microprocessor-controlled electrosurgical generator (Tübingen, Germany).

Background and Endoscopic Procedure

Four different examples of performing Endoscopic Retrograde Cholangiopancreatography with postsurgical altered gastrointestinal and biliary anatomy are presented.

Video Journal and Encyclopedia of GI Endoscopy http://dx.doi.org/10.1016/S2212-0971(13)70206-1

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Cholangiogram demonstrates a 15 mm common bile duct with a single 12 mm stone, and a peri-ampullary diverticulum.

A 15 mm balloon sphincteroplasty is performed. Balloon sphincteroplasty is generally safer than needle knife extension when biliary anatomy is altered and the direction of bile duct may be difficult to ascertain.

The biliary stone is then extracted on balloon trawl, lodging in the peri-ampullary diverticulum.

A 60 mm fully covered metal stent is inserted to mitigate against the risk of perforation with a large sphincteroplasty, and will be removed in 6 weeks. The patient went home without complication.

This 59-year-old patient has a Roux en Y hepatico-jejunostomy following a repair of a laparoscopic cholecystectomy related bile duct injury 10 years prior. The patient presented with typical symptoms of an anastomotic stricture characterized by intermittent choluria, fever and low-grade biliary pain.

In this case a pediatric colonoscope is used to advance to the side-to-side entero-enteral anastomosis in the proximal jejunum. To access the hepatico-jejunostomy one must then cross lumens by crossing the side-to-side anastomosis into the limb descending from the liver.

In this case the efferent limb is located above, and the afferent or Roux limb, is located below. The colonoscope is then passed through the Roux limb to the hepatico-jejunostomy.

Whilst maintaining the anastomosis in the 6 o’clock position, the right intra-hepatic duct is cannulated with a wire and a 6 mm dilating balloon. The dilating balloon has a long catheter, suitable for use with the colonoscope.

Cholangiogram showed strictures just proximal to the anastomosis in the left and right intrahepatic ducts, and balloon dilation of the right-sided stricture is demonstrated here.

On intubation you see the jejunal folds rolling up the screen, analogous to sitting backwards on a train and watching fence posts passing by.

The ampulla appears abnormal with small fleshy nodule.

Initial wire tip biliary cannulation aiming for the 5 o’clock position cannulates the pancreatic duct and a stent is inserted.

A controlled needle knife sphincterotomy is performed, using single taps of the electrosurgical unit in a smooth upward motion toward the anticipated position of the biliary orifice.

A thin wire snare removes the nodule to improve access for further sphincterotomy. Histology shows normal ampullary mucosa.

Assessment is performed after each cut to reduce the risk of deep injury, and may also expose the biliary orifice for cannulation.

On fluoroscopy, the duodenoscope assumes a ‘hockey stick’ configuration in patients with a Billroth II gastrectomy.

Cholangiogram shows a dilated duct with at least one filling defect. Biliary stenting then extension sphincterotomy is performed. A balloon sphincteroplasty and duct clearance could be performed today, however a two-stage approach is chosen, and repeat ERCP will be performed in 4 weeks.

This is a 79-year-old patient with a Billroth II gastrectomy. The patient had an ERCP with needle knife sphincterotomy and stent insertion 1 week ago for jaundice secondary to choledocholithiasis and ampullary adenoma.

The most challenging point of advancing the duodenoscope in Billroth II gastrectomies, is usually negotiating the duodeno-jejunal flexure. Orientating the scope to ‘reverse’ around the flexure is often useful.

Following biliary stent removal, the ampulla is carefully assessed. Endoscopic resection is possible, with good mobility and no intraductal extension. However, the patient has significant comorbidities and would poorly tolerate any complications, therefore a conservative approach is taken.

The common bile duct is cannulated via the needle knife sphincterotomy, and balloon trawl confirms a clear biliary system.

A straight biliary stent is inserted to maintain biliary drainage then the native biliary orifice is cannulated with a balloon and wire.

Regular stent exchanges at four monthly intervals are planned, with endoscopic monitoring of the ampullary adenoma.