

A simultaneous endoscopic and laparoscopic approach for management of early iatrogenic bile duct obstruction

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Background: Bile duct occlusion secondary to inadvertent application of a surgical clip or suture usually is managed with endoscopic or surgical exploration.

Objective: To evaluate the safety and efficacy of a novel method of simultaneous endoscopic and laparoscopic approach in patients with acute iatrogenic bile duct obstruction.

Design: Single arm study and single center design.

Setting: University medical center.

Patients: Three consecutive patients diagnosed with complete or near-complete obstruction of a bile duct after cholecystectomy were identified for inclusion.

Interventions: Endoscopic retrograde cholangiopancreatography (ERCP) and laparoscopy was performed simultaneously. Surgeon removes the surgical clips or suture from the bile duct with concurrent ERCP by endoscopist to assess and treat bile duct injury following resolution of the block.

Main Outcome Measurements: Technical and clinical success rate and adverse events.

Results: All of the patients were seen between 5 and 7 days after cholecystectomy. The diagnosis of obstructed bile duct was established by ERCP. The guidewire failed to negotiate across the obstruction in one of these patients. In another patient, a guidewire could be passed, but a biliary stent could not be deployed across the high-grade stricture. In a third patient, only a single biliary stent (7F × 11 cm) could be placed across the obstruction, with significant difficulty. In all the patients, simultaneous ERCP and laparoscopy were performed immediately to remove the surgical clips and/or sutures from the bile duct, followed by placement of biliary stents.

Limitations: Small series.

Conclusion: The concurrent endoscopic and laparoscopic approach for the management of acute iatrogenic common bile duct obstruction is associated with rapid and complete recovery.

Bile duct injury (BDI) is a well-known adverse event of cholecystectomy.¹ Inadvertent application of a surgical clip or suture on a bile duct during cholecystectomy

Abbreviations: BDI, bile duct injury; CBD, common bile duct.

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can cause obstructive jaundice. Diagnosis usually is established during ERCP. At times, endoscopic therapy is attempted, with placement of a biliary stent across the

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obstruction.² Failure of initial endoscopic therapy warrants either percutaneous transhepatic cholangiography for adequate visualization of the entire biliary tract and biliary drainage³ and/or surgical exploration.

METHODS

In this case series, we describe a novel method of simultaneous endoscopic and laparoscopic approaches of management in patients who are seen with iatrogenic bile duct obstruction during the early postoperative period. Three patients with iatrogenic bile duct obstruction underwent a simultaneous endoscopic-laparoscopic method of treatment.

Case 1

A 46-year-old man was seen 6 days after laparoscopic cholecystectomy, with symptoms of upper abdominal pain and jaundice. Liver function test results included bilirubin (total) of 9.0 mg/dL (normal range, 0.2-1.2 mg/dL), alanine aminotransferase 289 IU/L (normal range, 4-42 IU/L), aspartate aminotransferase 150 IU/L (normal range, 10-39 IU/L), and alkaline phosphatase 492 IU/L (normal range, 40-125 IU/L). In view of a strong clinical suspicion of acute obstructive cholestasis, ERCP was performed to rule out a bile duct stone versus a clipped bile duct. ERCP revealed complete obstruction of the common hepatic duct by a surgical clip (Fig. 1A). Multiple attempts to advance the guidewire across the obstruction in the common hepatic duct were unsuccessful. Laparoscopy was performed to remove a surgical clip from the common bile duct (CBD) with concurrent ERCP to assess the biliary tree injury during and after the removal of surgical clips. Two surgical clips blocking the CBD were identified during laparoscopy and subsequently removed under continuous cholangiographic monitoring (Fig. 1B). Concurrent ERCP revealed complete filling of the biliary tree and a bile leak at the site of the surgical clip after its removal (Fig. 1C); therefore, a single biliary stent (10F × 12 cm) was placed. The stent was removed 4 weeks later, and a cholangiogram at that time did not reveal any stricture or leak (Fig. 1D). The patient remained asymptomatic in the 30-month follow-up period after the procedure, and liver function test results stayed normal.

Case 2

A 61-year-old man was seen with persistent upper abdominal pain and nausea for 5 days after his laparoscopic cholecystectomy. He was immediately referred to our institution for evaluation of a suspected biliary leak. His liver function test results did not reveal any abnormality. Because of a high clinical suspicion of bile leakage, ERCP was performed. Significant obstruction of the CBD was seen at the level of the cystic stump on ERCP. The guidewire could be passed, but a biliary stent could not be

Take-home Message

- Iatrogenic bile duct obstruction often is managed by endoscopic or open surgical exploration.
- A simultaneous laparoscopic-endoscopic approach in patients with acute iatrogenic bile duct obstruction without transection is associated with rapid and complete recovery.

deployed across the obstruction (Fig. 2A). Attempts to dilate the stricture were unsuccessful. Exploratory laparoscopy was performed, during which 3 Prolene sutures (Ethicon, Somerville, NJ) noted on the CBD were subsequently removed. Repeat ERCP performed concurrently during laparoscopy revealed significant bile duct leakage at the site of the sutures after their removal, but there was no residual stricture (Fig. 2B). A biliary stent (10F × 15) was placed in the CBD across the site of the bile leak. Six weeks later, ERCP findings were normal (Fig. 2C). The patient remained asymptomatic at 26-month follow-up, and his liver function test results stayed normal.

Case 3

A 27-year-old woman was referred for evaluation of jaundice 1 week after laparoscopic cholecystectomy. Her liver function tests revealed total bilirubin of 6.7 mg/dL, alkaline phosphatase of 162 IU/L, alanine aminotransferase of 342 IU/L, and aspartate aminotransferase of 101 IU/L. Because of a high probability of a retained bile duct stone, ERCP was performed, which revealed a high-grade stricture of the CBD caused by a surgical clip at the level of the cystic duct (Fig. 3A). A single stent (7F × 11 cm) was placed across the stricture, with significant difficulty. Because of the slight plausibility of bile duct fibrosis from a surgical clip recently placed during laparoscopic cholecystectomy, a decision to do a combined endoscopic-laparoscopic approach for management of bile duct obstruction was made. During laparoscopy, a clip was found obstructing the CBD and was subsequently removed. Concurrent ERCP revealed complete resolution of the CBD stricture; 2 biliary stents were subsequently placed in the CBD. ERCP after the removal of the biliary stents revealed a normal biliary tree (Fig. 3B). The patient was asymptomatic with normal liver function test results at a 20-month follow-up.

RESULTS

The combined endoscopic-laparoscopic method was attempted in a total of 3 cases over the last 2½ years. By using this novel endoscopic-laparoscopic method in patients seen with acute iatrogenic bile duct obstruction, we found that all patients had rapid and complete recovery. No adverse events were encountered in any patient treated with this technique.

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