Is There a Role for Endoscopic Therapy as a Definitive Treatment for Post-Laparoscopic Bile Duct Injuries?

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BACKGROUND: Excellent results of surgical reconstruction of major bile duct injuries (BDIs) have been well-documented. Reports of successful definitive management of central bile duct leakage and stenoses have been reported infrequently. The aim of this study was to assess treatment and outcomes for operative and endoscopic treatment of BDI after laparoscopic cholecystectomy (LC) and define the role of endoscopy in management.

STUDY DESIGN: All patients undergoing treatment for post-laparoscopic BDI from 1998 to 2007 at Mayo Clinic, Rochester, Minnesota were reviewed. Outcomes of surgical and endoscopic intervention were analyzed.

RESULTS: BDI was identified in 159 patients (mean age 51 years). Injury was recognized intraoperatively in 39 (25%) patients. Primary intervention was surgical in 59 (37%) and endoscopic in 100 (63%) patients. Class A BDIs (n = 77) were successfully treated endoscopically in 76 (99%) patients. Seven had class D BDIs; 4 were managed surgically, and 3 endoscopically. Of 66 patients with E1 to E4 BDI, 44 (67%) were initially managed surgically and 22 (33%) endoscopically. Thirteen of the latter 22 underwent sustained endoscopic therapy (median stent time 7 months), which was successful in 10 (77%). Four patients with E5 were managed surgically. Median follow-up was 45 months. Sixty-three patients underwent Roux-en-Y hepaticojejunostomy reconstruction at Mayo; 3 (5%) failed and required stenting. None required operative revision.

CONCLUSIONS: Endoscopic management of class A BDI has excellent outcomes. Although surgical management remains the preferred therapy, short-term endoscopic treatment for class E1 to E4 can optimize the patient and operative field for reconstruction. Prolonged stenting in select patients with E1 to E4 characterized by stenosis is successful in the majority. (J Am Coll Surg 2010;211: 495–502. © 2010 by the American College of Surgeons)

Laparoscopic cholecystectomy (LC) has been the preferred surgical approach for calculus gallbladder disease for nearly 2 decades.[1] Early in the procedure's adoption into routine surgical practice, it was assumed that bile duct injuries (BDIs) would diminish after the learning curve.[2,3] However, the incidence persists at 0.5%, and as a tertiary referral center for hepatobiliary disease, we continue to manage such patients regularly. We, and others, have reported both excellent clinical outcomes and quality of life for patients undergoing surgical reconstruction of major BDIs.[4,5] Clearly, not every patient sustaining a biliary injury after LC requires surgical intervention. In addition, several centers have reported favorable outcomes with definitive management of BDIs by endoscopic techniques in select patients.[6-8] Mindful of advances in endoscopic techniques and the inherent advantages of minimally invasive approaches to surgical disease, until now managed by open surgical techniques, we believed that the respective roles of surgical and endoscopic therapy warranted review.

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Abbreviations and Acronyms

BDI = bile duct injury
LC = laparoscopic cholecystectomy
PTC = percutaneous transhepatic cholangiography
RYHJ = Roux-en-Y hepaticojejunostomy

Our approach to the evaluation and management of post-LC BDIs is both multidisciplinary and collaborative, with input from interventional radiologists, interventional endoscopists, and hepatobiliary surgeons. Unlike our earlier reports that focused only on surgical management, here we sought to analyze all patients referred with biliary complications after LC. Our aims were to assess the rationale for selection of endoscopic or surgical therapy by class of BDI, to assess and compare long-term outcomes between the 2 approaches, and to identify factors associated with failure in either group.

METHODS

After approval from the Institutional Review Board at Mayo Clinic, Rochester, MN, institutional databases were used to identify all patients with BDIs that occurred as a consequence of LC managed at our institution from January of 1998 through December of 2007. Medical records of these patients were reviewed to obtain demographic information, patient characteristics, type of BDI, time to diagnosis, time to definitive treatment, treatment modality, and outcomes (clinical and biochemical). Survey questionnaires were mailed to patients for current follow-up to update our database.

All patients treated at our institution for BDI occurring after an LC during the time period specified met the inclusion criteria for our study whether the index operation (LC) was performed intramurally or extramurally.

All BDIs were classified per the Strasberg classification system[9] (Fig. 1). Patients with documentation insufficient to categorize the initial injury were excluded from the study. Patients were grouped into either an endoscopic or surgical group, based on the first treatment undertaken at the Mayo Clinic after the BDI (Table 1). Outcomes for both groups were based on previously defined criteria.[4] Briefly, absence of clinical symptoms and normal liver function tests, including transaminases, bilirubin, and alkaline phosphatase, were considered excellent outcomes; presence of nonspecific abdominal symptoms and/or mildly abnormal liver function tests were graded as good outcomes; and concomitant presence of symptoms (abdominal pain, jaundice, cholangitis) and markedly abnormal liver function tests were considered poor outcomes. Surgical treatment failure was defined as need for endoscopic therapy or surgical reintervention. Endoscopic failure was defined as the need for a subsequent surgical intervention. Follow-up was calculated from the time of injury until the last clinic visit or response to questionnaire.

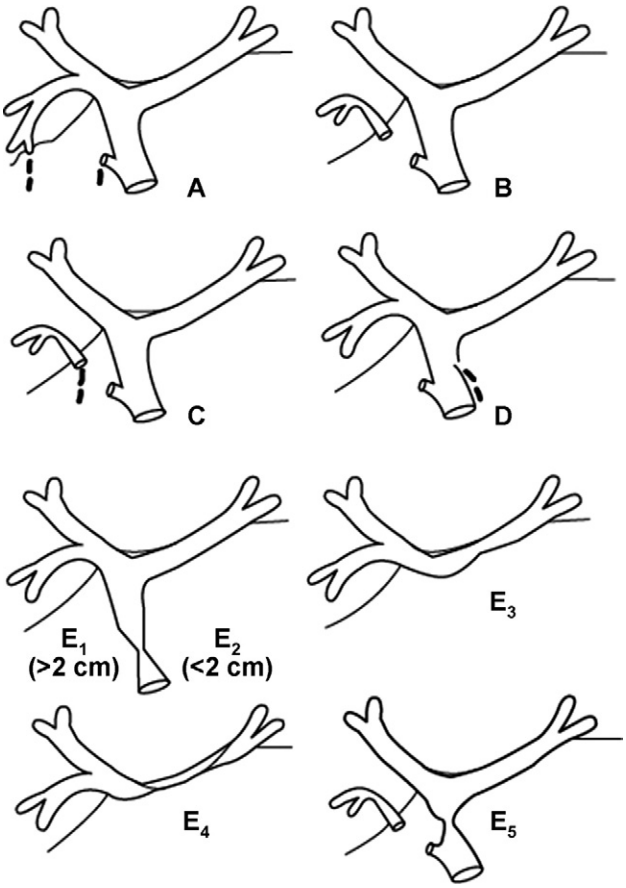

Figure 1. Strasberg classification of bile duct injuries and strictures. Class A: injury to small ducts in continuity with the biliary system, with a leak in the duct of Luschka or the cystic duct. Class B: injury to a sectoral duct, with resultant obstruction of part of the biliary system. Class C: injury to a sectoral duct with bile leak; bile leakage occurs from a duct not continuous with the biliary system. Class D: lateral injury to the extrahepatic biliary ducts. Class E1: stricture >2 cm from the bifurcation of the right and left bile ducts. Class E2: stricture <2 cm from the bifurcation of the right and left bile ducts. Class E3: stricture at the bifurcation of the right and left bile ducts. Class E4: stricture involving the right and left bile ducts, the left and right ducts are not continuous. Class E5: complete occlusion of all bile ducts, including sectoral ducts. Reprinted[4] with permission of Mayo Foundation for Medical Education and Research. All rights reserved.

Statistics

All data points are displayed as mean ± SEM, median (with range), or as frequency with percentages. Kaplan-Meier curves were used to estimate stricture-free survival for both surgical and endoscopic intervention groups.