
Short- and Long-Term Outcomes after a Reconstituting and Fenestrating Subtotal Cholecystectomy



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BACKGROUND: Multiple surgical techniques are recommended to perform cholecystectomy safely in difficult cases, such as conversion to open operation or subtotal cholecystectomy (STC). Reconstituting and fenestrating STC are 2 techniques for STC. The aim of this study was to investigate the short and long-term morbidity and quality of life associated with STC and to compare the outcomes after reconstituting and fenestrating STC.

STUDY DESIGN: Patients who underwent STC were identified. Short-term morbidity assessed included bile leakage, bile duct injury, intra-abdominal infection, reinterventions, and readmittance. Long-term morbidity included bile duct stenosis and recurrent biliary events. Differences in the outcomes of fenestrating and reconstituting STC were assessed. Quality of life was assessed by EuroQol 5 Dimensions, Short-Form 36 Questionnaire, and Gastrointestinal Quality of Life Index questionnaires.

RESULTS: Subtotal cholecystectomy was performed in 191 patients, of which 102 (53%) underwent fenestrating STC and 73 (38%) underwent reconstituting STC. Bile leakage was significantly more common after fenestrating STC (18% vs 7%, respectively; $p < 0.022$). After a median of 6 years follow-up (interquartile range 5 to 10 years), recurrence rate of biliary events was lower after fenestrating than reconstituting STC (9% vs 18%, respectively; $p < 0.022$). Overall reintervention rate did not differ between the 2 groups: 32% in the fenestrating STC group and 26% in the reconstituting STC group ($p = 0.211$). Completion cholecystectomy was performed significantly more in patients after fenestrating STC (9% vs 4%; $p < 0.022$).

CONCLUSIONS: Subtotal cholecystectomy is a safe and feasible technique for difficult cases for which conversion only will not solve the difficulty of an inflamed hepatocystic triangle. The choice for reconstituting or fenestrating STC depends on intraoperative conditions and both techniques are associated with specific complications. (J Am Coll Surg 2017;225:371–379. © 2017 by the American College of Surgeons. Published by Elsevier Inc. All rights reserved.)

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Laparoscopic cholecystectomy (LC) is the current gold standard treatment for uncomplicated and complicated gallstone disease. Multiple reviews have reported the benefits of LC over open cholecystectomy, even for complicated biliary disease such as moderate or severe cholecystitis and biliary pancreatitis.^{1,2}

One-third of cholecystectomies performed are due to complicated gallbladder disease. Postponement of operation in complicated cases is no longer advised, as several trials found low morbidity after early operation in patients with cholecystitis and with mild biliary pancreatitis.^{3,4} The overall rate of complications after LC is between 2% and 11%, with a rate of bile duct injury of 0.5% to 1.5% and bile leakage of 1% to 3%.⁵⁻⁷

Abbreviations and Acronyms

GIQLI	= Gastrointestinal Quality of Life Index
IQR	= interquartile range
LC	= laparoscopic cholecystectomy
QoL	= quality of life
STC	= subtotal cholecystectomy

After complicated gallstone disease, LC can be technically challenging due to edema, inflammation of the gallbladder, contraction of the gallbladder, fibrosis, or adhesions. Intraoperative conditions can limit correct identification of the anatomy (biliary and vascular) and “critical view of safety” might not be achieved.⁸ Complicated gallbladder disease, severe inflammation of the hepatocystic triangle, fibrosis, and unclear anatomy are associated with more postoperative complications and an increased rate of bile duct injury.⁹

Multiple surgical techniques are advised to safely remove the gallbladder in difficult cases, such as the critical view of safety technique, an intraoperative cholangiogram, and some groups advocate conversion to an open procedure and/or perform a subtotal cholecystectomy (STC).^{10,11} Conversion to open operation is associated with a relatively high overall complication rate of 20% to 30%¹² and does not avoid the risk of bile duct injury by itself.^{1,12-14} Subtotal cholecystectomy is a suggested bailout procedure in these situations that was first described in the 1990s as “a definitive and safe operation” and has been used steadily since then.¹⁵ Small series suggested that STC is associated with a decreased rate of bile duct injuries and a lower conversion rate, but also with an increase in bile leaks and retained stones needing reintervention.¹⁶⁻¹⁸ Recently, Strasberg and colleagues¹⁹ noted that the definition of STC varied in the available literature and the term *subtotal* or *partial* can encompass several different techniques. Strasberg and colleagues classified STC as fenestrating and reconstituting. However, the long-term outcomes of both techniques are scarcely described.

The aim of the current study was to assess the short- and long-term morbidity and quality of life after subtotal cholecystectomy. Difference in outcomes between fenestrating and reconstituting STC will be analyzed. To compare long-term patient-reported outcomes after STC with patients after a difficult cholecystectomy, patients that underwent conversion to an open procedure were selected and quality of life was compared.

METHODS**Study population**

Patients were identified by screening all operative records of patients who underwent cholecystectomy in 4 hospitals (2 teaching hospitals that are affiliated centers and 2 academic hospitals) between May 2005 and January 2013. All hospitals are high-volume centers that perform more than 250 LCs annually and have access to dedicated hepatopancreaticobiliary surgeons. Critical review of all operation reports was performed independently by 2 authors according to a list of predesigned items (AHvD and PRdR). Disagreements were discussed by the same 2 authors. All patients who underwent STC to open operation were included in this study.

Exclusion criteria were operation for acalculous disease, malignancy, and a cholecystectomy as part of a bigger operation (such as a Whipple procedure).

Patients that underwent conversion from LC to an open procedure were identified and were included for comparison of long-term morbidity and patient-reported outcomes.

Data collection

The following data were extracted from patient's files: demographics, history of abdominal operation, a history of complicated gallstone disease, indication for LC, reason for STC, intraoperative complications, and duration of operation.

The method of STC was classified according to the classification of Strasberg and colleagues.¹⁹ In a fenestrating STC, the remaining part of the gallbladder is left open. The cystic duct can be closed with a purse-string suture. The reconstituting technique is when the part of the gallbladder that is left behind is closed with sutures or staples, which essentially reconstitutes a remnant gallbladder.

Short-term outcomes were assessed by recording the following postoperative complications within 30 days: intra-abdominal infection (abscess or sepsis), wound infections, bile leakage, bile duct injury, reinterventions, reoperation, ICU admittance, and hospital readmittance. Postoperative bile leakage was defined as bile leakage resulting in persistent drain production of bile or postoperative intra-abdominal fluid collections with the appearance of bile after percutaneous drainage.

Bile duct injury was classified as cystic duct leakage (Strasberg classification type A) or any injury to the common bile duct (Strasberg classification type D and E).⁵

Long-term morbidity was assessed by recording the following complications: bile duct stenosis, completion cholecystectomy, complications after a completion

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