Re-interventions and re-admissions in a 13-year series following use of laparoscopic subtotal cholecystectomy

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INTRODUCTION

Laparoscopic cholecystectomy is the operation of choice for symptomatic gallstones. Safe dissection of Calot’s triangle can be rendered difficult in the presence of acute or chronic cholecystitis, dense omental adhesions or gangrene of the gallbladder, with associated higher rates of bile duct injury.[1] Laparoscopic subtotal cholecystectomy (LSTC) without cystic duct ligation is an alternative to conversion to open surgery, thus avoiding a potentially hazardous dissection in Calot’s triangle. The long-term outcomes of this procedure are not well reported. The aim of this study is to assess the rates of re-presentation, re-admissions, endoscopic interventions and completion cholecystectomy in patients who have undergone LSTC.

Background: Laparoscopic subtotal cholecystectomy (LSTC) without cystic duct ligation is an alternative to conversion to open surgery in a difficult cholecystectomy, thus avoiding a potentially hazardous dissection in Calot’s triangle. The long-term outcomes of this procedure are not well reported. The aim of this study is to assess the rates of re-presentation, re-admissions, endoscopic interventions and completion cholecystectomy in patients who have undergone LSTC.

Methods: Details of all patients undergoing cholecystectomy over a 13-year period (2003–2015) were entered on a prospective database. Further information on subsequent hospital attendances, biliary imaging, endoscopic interventions and re-operations following the index LSTC was collected retrospectively from hospital database.

Results: Overall, 2313 patients underwent laparoscopic cholecystectomy. Eighty-five patients (3.7%) underwent LSTC and the rest had standard laparoscopic cholecystectomy. A controlled bile leak was observed in 16 (19%) patients post-operatively, of which 3 resolved spontaneously. The remaining 13 were managed with an early endoscopic retrograde cholangiopancreatography (ERCP) and biliary stent. Twenty-seven patients (32%), who underwent LSTC, were re-investigated for the upper abdominal symptoms. The time range for re-investigation was 21 days–124 months. Eight patients underwent ERCP post-discharge, for suspected bile duct stones on radiological imaging. Two patients required open completion cholecystectomy for symptomatic stones in the gallbladder remnant.

Conclusion: LSTC is a feasible and safe alternative to open surgery with acceptable long-term consequences and re-interventions.

Keywords: Gallbladder, laparoscopic cholecystectomy, laparoscopic subtotal cholecystectomy, subtotal cholecystectomy
dissection of Calot’s triangle, which is often of equal difficulty following conversion to open surgery.

In 2007, we reported on the feasibility and safety of performing LSTC,[4] and subsequently, this has been our unit policy when encountering challenging laparoscopic cholecystectomy. This study aims to assess the outcomes and impacts of this policy, particularly on patient re-interventions, re-admissions and hospital resources. This was a retrospective study where the data were collected prospectively.

METHODS

LSTC has been routinely performed in our department, as an alternative to open cholecystectomy where safe dissection of the Calot’s triangle is not possible during laparoscopic cholecystectomy, since 2003. All patients undergoing laparoscopic cholecystectomy are informed of this possibility, during the process of obtaining informed consent for laparoscopic cholecystectomy. Approval from the hospital Ethics Committee (or Institutional Review Board) to conduct this study was not required, as LSTC is already a recognised practise in our department for the last 15 years.

Pre-operative work up
Details of all patients undergoing laparoscopic cholecystectomy over a 13-year period (2003–2015) under the care of two upper gastrointestinal surgeons were collected from surgical logbooks. Additional data on all patients who underwent LSTC were collected from prospectively maintained data on an Excel database. All patients had a pre-operative ultrasound scan of the liver, gallbladder and biliary tree. Magnetic resonance cholangiopancreatography was performed selectively to exclude bile duct stones in patients with deranged liver function tests (LFTs), pancreatitis or where an ultrasound scan was suggestive of common bile duct (CBD) stones.

Operative technique
The technique of LSTC involved a standard four-port approach. An early assessment was made of the safety and feasibility of laparoscopic cholecystectomy. If dissection of Calot’s triangle was deemed unsafe, an LSTC was performed. The anterior wall of the gallbladder was excised, leaving the posterior wall of the gallbladder in situ. All gallstones were retrieved and extracted in a bag along with the excised gallbladder wall. The gallbladder fossa was lavaged. No attempt was made to dissect out, divide or seal the cystic duct or artery. A drain was placed in the subhepatic space and was left in place for 24–48 h or until any post-operative bile leakage had ceased. A single prophylactic dose of antibiotic was given perioperatively. Post-operative endoscopic retrograde cholangiopancreatography (ERCP) with the placement of a bile duct stent was performed if there was any significant amount of bile leakage in the first 24–48 h.

Follow-up
All the data were recorded prospectively in an Excel database and were cross-checked with the hospital theatres, endoscopy and radiology systems.

RESULTS

During the period of study, 2313 patients underwent laparoscopic cholecystectomy, of which 85 patients (3.7%) underwent LSTC. There were 32 male and 53 female, with a mean age of 59 years (median 61 years; range 25–88 years) [Table 1].

The indications for surgery were acute cholecystitis (n = 66), gallstone-induced jaundice and/or deranged LFTs (n = 15) and acute gallstone pancreatitis (n = 4) [Table 2].

Short-term results
There were no mortalities and no conversions to open surgery. The median operative time was 90 min, with a mean of 102 min. Intra-operative complications encountered were one minor bile duct injury (Bismuth Type I) and one iatrogenic bowel injury. Both these injuries were recognised intra-operatively and repaired immediately without any further sequelae.

Post-operative morbidities included myocardial infarction (n = 1), subhepatic collections (n = 3), retained CBD stones (n = 7) and persistent bile leakage from cystic duct (n = 16). Of these, three resolved spontaneously with no further intervention. The remaining 13 were managed by ERCP and biliary stenting. Two patients required relaparoscopy.

| Table 1: Preoperative characteristics |
|--------------------------------------|
| Total cholecystectomies               | 2313 |
| No. of LSTC                          | 85 (3.7%) |
| Males                                | 32 (37.6%) |
| Females                              | 53 (62.4%) |
| Mean age                             | 59 |

| Table 2: Indications for LSTC         |
|--------------------------------------|
| Indication                           | No. of patients |
| Acute cholecystitis                  | 66 (77.6%) |
| Jaundice/deranged LFT                | 15 (17.6%) |
| Pancreatitis                         | 4 (4.8%) |


and washout for sepsis on the 2nd post-operative day. Median length of stay was 2.5 days (mean 4 days; range 1–16 days) [Table 3].

Long-term results
Twenty-seven patients subsequently re-attended with upper abdominal symptoms and underwent further investigations. Of these, 14 were managed on an outpatient basis and 13 needed re-admission. The time range for re-investigation was 21 days–124 months. Reasons for readmission were upper abdominal pain with normal bloods \( (n = 5) \), jaundice \( (n = 3) \), cholangitis \( (n = 3) \), pancreatitis \( (n = 1) \) and subhepatic collection \( (n = 1) \) [Table 4].

Two patients \( (2\%) \) required open completion cholecystectomy for symptomatic stones in the gallbladder remnant; one also had a simultaneous bile duct exploration with removal of CBD stones, following failed ERCP.

Eight \( (9\%) \) patients underwent ERCP for suspected bile duct stones on radiological imaging. Stones were found and successfully extracted in two patients and one patient required extracorporeal shock wave lithotripsy at a tertiary hospital following multiple failed ERCP attempts. No stones were found on ERCP in four patients.

One patient \( (1\%) \) had percutaneous drainage of subhepatic collection [Table 5].

DISCUSSION
LSTC without cystic duct ligation is a surgical option for the difficult cholecystectomy where inflammation, fibrosis, adhesions and ischaemia result in a hostile Calot’s triangle, in which the risk of complications, especially CBD injury, is significant even with conversion to open surgery.

Our bile leak \( (19\%) \) rates and incidence of bile duct injuries \( (1\%) \) were in-line with the other reports for subtotal cholecystectomy as examined in a meta-analysis by Elshaer et al. \( (18\% \text{ and } 2.9\%, \text{ respectively}) \) [13].

The re-presentation rate was \( 32\% \ (n = 27) \) over 13 years for upper abdominal symptoms, of which 13 patients required re-admission. However, all the re-admissions except one (for a subhepatic collection), were due to retained stones in the bile duct and would have occurred irrespective of the initial surgical approach.

The overall impact of a policy of LSTC on other hospital resources could, therefore, be summarised as an additional 13 ERCPs for early biliary stenting and two subsequent completion cholecystectomies. This impact needs to be balanced against the more traditional approach of open cholecystectomy with a Kocher’s or midline incision, resulting in prolonged hospital stays, incisional hernia rates of between 5.9% and 14%[14,15] and re-admission rates for adhesional obstruction of 7.1% (compared to 0.2% for a laparoscopic procedure[16]).

The surgical management of gallstones has changed over the decades, from open cholecystectomy and open CBD exploration to laparoscopic management and ERCP. High standards of ERCP and CBD stone extraction have reduced the need for surgical CBD exploration. The additional impact on hospital resources of a policy of LSTC is not excessive. The benefits of this policy include the avoidance of open surgery and its associated post-operative pain, lengthier recovery and long-term comorbidities.

CONCLUSION
LSTC is a feasible and safe alternative to open cholecystectomy in patients where safe dissection of the Calot’s triangle is not possible. Long term results and re-intervention rates following LSTC are within acceptable limits.

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Conflicts of interest

There are no conflicts of interest.

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