Laparoscopic subtotal cholecystectomy without cystic duct ligation

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Background: Cholecystectomy is made hazardous by distortion of the anatomy of Calot’s triangle by acute or chronic inflammation. Laparoscopic subtotal cholecystectomy (LSTC) without cystic duct ligation is an alternative to conversion to open surgery in difficult cases.

Methods: This prospective study included all cholecystectomies performed in a district general hospital upper gastrointestinal unit between 2003 and 2005, after the introduction of LSTC.

Results: Of 889 laparoscopic cholecystectomies, 28 LSTCs without cystic duct ligation were performed in 18 men and ten women of median age 68 years. Median operating time was 90 min and median duration of hospital stay was 3 days. Two temporary bile leaks resolved spontaneously on days 14 and 19. Three patients required endoscopic retrograde cholangiopancreatography, extraction of bile duct stones and stent insertion for persistent leaks. All five bile leaks were expected from peroperative findings. One patient had a myocardial infarction and one developed a subphrenic abscess. There were no deaths. Open conversion rates were reduced from 5\% to 0\% per cent in 1997–2002 to 0\%–0\% per cent in 2005 (P < 0\%–001).

Conclusion: LSTC without cystic duct ligation is an alternative to open conversion when dissection of Calot’s triangle is hazardous. Bile leaks are predictable and readily managed.

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Introduction

Since its introduction in the early 1990s, laparoscopic cholecystectomy has replaced open cholecystectomy as the surgical procedure of choice for symptomatic gallstones. Whichever approach is used, standard cholecystectomy requires safe dissection of the structures in Calot’s triangle. This is rendered difficult in the presence of acute or chronic inflammation, dense omental adhesions or gangrene of the gallbladder, with associated higher rates of bile duct injury. The traditional response to a difficult laparoscopic cholecystectomy is conversion to an open procedure, but this may result in increased postoperative pain, delayed mobility, prolonged hospital stay, adhesion formation and incisional hernia. In addition, a dissection that is difficult laparoscopically is often equally difficult at open operation, and conversion does not guarantee the avoidance of inadvertent biliary or vascular injury.

Laparoscopic subtotal cholecystectomy (LSTC) has been reported as a safe and feasible alternative to conversion to open surgery during difficult laparoscopic cholecystectomy. These reports describe excision of the anterior wall of the gallbladder, largely as a means of avoiding undue bleeding from the gallbladder fossa. All except one combined this with a standard cystic duct dissection and ligation. This study assessed the feasibility of LSTC without cystic duct dissection or ligation, thus avoiding a potentially hazardous dissection in Calot’s triangle. The safety of this approach was compared with that of standard practice and its impact on conversion rates was assessed.

Methods

The study was set in the upper gastrointestinal unit of a district general hospital, which maintains a prospective database of all cholecystectomies performed. Since 2003
LSTC has been used as an alternative to conversion to open surgery in selected patients. 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. Drains were placed in the gallbladder fossa and subhepatic space. These were left in place for 48 h, or until any postoperative bile leakage ceased. A single prophylactic peroperative dose of intravenous antibiotic was given. Postoperative endoscopic retrograde cholangiopancreatography (ERCP) was used selectively if there was prolonged biliary leakage, or if common bile duct stones were suspected.

Statistical analysis
Statistical analysis of contingency tables was performed using the χ² test.

Results
Between January 2003 and December 2005, 889 laparoscopic cholecystectomies were performed, of which 28 (3.1 per cent) were subtotal cholecystectomies without cystic duct ligation. There were 18 men and ten women, of median age 68 (range 38–87) years. The indications for cholecystectomy are shown in Table 1. The median operating time was 90 (range 60–180) min.

Five patients had a temporary postoperative bile leak. In two patients the leak was managed conservatively and resolved spontaneously on days 14 and 19. The remaining three patients underwent postoperative ERCP and stent insertion on days 4, 5 and 18. Of these, two had previously unsuspected common bile duct stones extracted at ERCP. Stent placement led to complete resolution of bile leakage in all patients within 96 h. In all five patients, bile leakage was seen immediately on opening the gallbladder at the time of the initial cholecystectomy and continued into the postoperative period. No postoperative bile leaks developed in the remaining 23 patients in whom no bile leakage was seen at operation.

One patient had a postoperative myocardial infarction and one patient was readmitted on day 21 with a subphrenic abscess requiring radiological drainage. There were no deaths and no bile duct injuries.

In the 6-year period before the introduction of LSTC (January 1997–December 2002) the rates of open conversion and common bile duct injury were 5·0 per cent (46 of 917) and 0·2 per cent (two of 917) respectively, with no significant change year on year. Between 2003 and 2005, following the introduction of LSTC, open conversion rates progressively fell to 3·8 per cent in 2003 (11 of 293), 2·0 per cent in 2004 (six of 297) and 0·3 per cent in 2005 (one of 299). The overall conversion rate for 2003–2005 was 2·0 per cent (18 of 889) (P < 0·001 versus rate before introduction of LSTC). The bile duct injury rate for the same period was 0·1 per cent (one of 889) (P = 0·582 versus rate before introduction of LSTC).

Discussion
Safe dissection of the structures in Calot’s triangle can pose a considerable challenge during both laparoscopic and open surgery. During open surgery a partial cholecystectomy with drainage of the gallbladder stump is used occasionally when the tissues in Calot’s triangle are hostile. As in many other areas of surgical practice, the lessons of open surgery can be relearned and adapted to laparoscopy. This study has shown that LSTC without cystic duct ligation represents an alternative to open conversion when dissection of Calot’s triangle is deemed unsafe.

All five bile leaks were expected from intraoperative findings, thus making bile leaks predictable and potentially simplifying postoperative management decisions. The first two bile leaks were managed expectantly and took at least 2 weeks to settle spontaneously. Following this, a policy of early postoperative ERCP and stent insertion was adopted, with the aim of shortening the time to resolution of bile leakage and hastening discharge from hospital. An alternative approach in the event of an obvious bile leak would be to attempt closure of the cystic duct orifice within the opened gallbladder, for example by suturing

<table>
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<tr>
<th>Table 1</th>
<th>Indications for surgery in 28 patients undergoing laparoscopic subtotal cholecystectomy without cystic duct ligation</th>
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<tbody>
<tr>
<td></td>
<td>No. of patients</td>
</tr>
<tr>
<td>Acute cholecystitis</td>
<td>14</td>
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<tr>
<td>Chronic cholecystitis</td>
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<td>Biliary colic</td>
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<td>Previous cholangitis</td>
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<td>Empyema</td>
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or by using an endoloop. Although this may be feasible, it runs the risk of inadvertent impingement on the main biliary tree, and would have to be undertaken with caution. In contrast, it was evident that no postoperative bile leak developed if the gallbladder stump was dry at the end of LSTC. In the light of this, the current policy of leaving two abdominal drains in place for 48 h could be deemed unduly cautious.

The rarity of bile duct injuries overall means that much larger patient numbers would be required to assess any potential impact of LSTC without cystic duct ligation on bile duct injury rates. It is clear, however, that rates of conversion to open surgery can be reduced significantly by adopting a policy of LSTC for selected patients.

References