Urgent cholecystectomy for acute cholecystitis in a district general hospital – is it feasible?

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ABSTRACT

INTRODUCTION Laparoscopic cholecystectomy has become the gold standard for treatment of symptomatic gall stone disease. However, its place remains controversial in the management of acute cholecystitis due to a high reported incidence of bile leaks and conversion rate. Tertiary referral centres have reported good results. We present a series of cases after the introduction of an urgent cholecystectomy pathway in a district general hospital.

PATIENTS AND METHODS A practice of urgent cholecystectomy for acute cholecystitis was introduced by three consultant general surgeons. All prospective patients having an urgent laparoscopic cholecystectomy for acute cholecystitis, over an 8-month period were entered into a database. A dedicated ultrasound service was instituted to provide prompt diagnosis in these patients. Their demographic details, operative findings, laboratory results were recorded in a prospective database. Timing of ERCP, postoperative complications and conversion rate and hospital stay were also noted.

RESULTS There were 64 patients in the study with a median age of 51 years (range, 21–84 years). There were 21 males and 43 females. All patients underwent laparoscopic cholecystectomy during the index admission. Eleven patients had pre-operative ERCP and 12 patients had on-table cholangiogram. There were no conversions. Postoperative ERCP was required in six patients. The median time interval between admission and operation was 3 days (range, 2–7 days). There were two bile leaks but no common bile duct injury. There were two cases of superficial wound infection. One patient required re-operation for small bowel obstruction secondary to a port site hernia.

CONCLUSIONS Urgent laparoscopic cholecystectomy for acute cholecystitis is a feasible treatment option in a district general hospital. A safe practice can be ensured by adherence to a care pathway and a multidisciplinary, consultant-delivered service. Urgent cholecystectomy service can be provided safely in a district general hospital with outcomes comparable to previously published literature.

KEYWORDS

Acute cholecystitis – Laparoscopic cholecystectomy – Urgent cholecystectomy – Complications – Care pathway

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Laparoscopic cholecystectomy has become the gold standard for treatment of symptomatic gall stone disease.¹ Recently, this has also gained acceptance as the surgical treatment for acute cholecystitis. The traditional teaching has been a two-stage treatment for acute cholecystitis with an initial conservative management followed by an interval laparoscopic cholecystectomy.² This has been based on the experience of increased conversion and complication rate with early cholecystectomy in acute cholecystitis which overshadow all the advantages of the laparoscopic approach making this inefficient and unsafe.³ The conversion rates for elective laparoscopic cholecystectomy range from 3–7%.^{4,5} However, in the presence of acute inflammation, higher conversion rates of up to 30% have been reported.^{6,7}

Timing of surgery in acute cholecystitis has been controversial. Several studies have reported favourable outcomes with a low conversion rate if patients are operated within 96 h of admission.^{8–10} After that window period, surgeons have opted for interval cholecystectomy after a period of 6–8 weeks.⁸

Larger surgical centres have published their successful management of acute cholecystitis with urgent laparoscopic cholecystectomy.¹¹ We set out to discover if similar outcomes were reproducible in a district general hospital. The aim of this study was to determine the conversion rate and the risk of major complications with laparoscopic cholecystectomy for acute cholecystitis and to compare the results with the published data from specialist centres.

Figure 1 Operative picture of decompression of gall bladder with use of suction irrigation.

Patients and Methods

All consecutive patients admitted with acute cholecystitis over an 8-month period (January–September 2006) were included in this study. An urgent cholecystectomy pathway was introduced led by three consultant general surgeons at a district hospital. The aim was to offer emergency surgery for acute cholecystitis. A dedicated fast-track ultrasound service for all patients admitted with the provisional diagnosis of acute cholecystitis provided confirmation of the diagnosis within 24 h of admission. Abdominal ultrasound scans were carried out on the day of admission or next morning if patients were admitted out-of-hours. All patients with proven gall stones and acute cholecystitis were booked on the emergency list and a laparoscopic cholecystectomy was performed. We aimed to compare the results with other published studies and the primary end-points were conversion rate, bile leak, bile duct injury and other postoperative complications.

For the purpose of this study, diagnosis of acute cholecystitis was based on the presence of right upper quadrant pain with or without fever, with evidence of raised inflammatory markers, *i.e.* white cell count (WCC) and/or C-reactive protein (CRP), presence of ultrasonographic abnormalities (gall stones, thick-walled gall bladder, pericholecystic fluid collection, positive Murphy's sign). There was no specific on-call rota for this service but, between the three consultants, a regular service was provided over the week days. Weekends were, however, difficult to cover but patients admitted over the weekend were considered for surgery on Monday if they had proven gall stone disease. Two specialist registrars also participated in this service; however, they were supervised at all times. All data were entered into a prospective database. Demographic details, operative findings and laboratory results for all these patients were recorded. Timing of endoscopic retrograde cholangiopancreatography (ERCP), postoperative complications and conversion rate and hospital stay were also noted. All patients with acute cholecystitis were

offered urgent cholecystectomy. The option of conservative management with interval cholecystectomy was also discussed; however, all of these patients opted for urgent surgery.

The standard technique for laparoscopic cholecystectomy was used with a 10-mm optical umbilical port, 12-mm epigastric port and two 5-mm ports in the right upper quadrant and right iliac fossa, respectively. Additional ports were used where necessary for retraction of the abdominal viscera. Gall bladder was extracted in a bag through the umbilical port. A subhepatic drain was placed in all cases. Tense gall bladder was decompressed by pushing a 5-mm trocar through the fundus of the gall bladder and irrigating with normal saline (Fig. 1). A combination of sharp and blunt dissection using a sucker was used to dissect the Calot's triangle. A selective policy for on-table cholangiogram was adopted especially in cases where the anatomy was difficult to define or there was suspicion of ductal calculi. Postoperative ERCP was performed in patients with bile duct stones and those who developed postoperative bile leak. Bile leak was defined clinically as a persistent leak of bile through the subhepatic drain. Chest infection was diagnosed on the basis of three or more of the findings including cough, phlegm, shortness of breath, chest pain, temperature above 38°C, and pulse rate above 100 beats per minute. Wound infection was defined using the CDC criteria for surgical site infections.¹²

Results

Over the period of 8 months, 64 patients underwent an urgent cholecystectomy for acute cholecystitis. There were 21 males and 43 females with a median age of 51 years (range, 21–84

Table 1 Patient demographics

Median age	51 years
(range)	(21–84 years)
Sex	
Male	21
Female	43
Median interval between admission and operation	3 days
	(range, 2–7 days)
Median interval between onset of symptoms and operation	5 days
	(range, 2–11 days)
Previous admission	
No admission	17
One admission	29
Two admissions	13
More than two admissions	5

Table 2 Laboratory findings in patients with acute cholecystitis

White cell count (WCC) ($\times 10^6/l$)	14 (9.9–19.1)
C-reactive protein (CRP) (mg/l)	21 (10–360)
Bilirubin ($\mu\text{mol/l}$)	11 (6–119)
Alkaline phosphatase (ALP) (U/l)	117 (66–1058)
Amylase (U/l)	41 (30–301)

Median values, range in parentheses.

years). Male to female ratio was 1:2. The demographic details are given in Table 1. The median values for WCC and CRP were 14 and 21, respectively (Table 2).

Eleven patients underwent pre-operative ERCP. These patients had deranged liver function tests with evidence of dilated common bile duct on ultrasound scan. On-table cholangiogram was carried out in 12 patients. Six patients were found to have ductal calculi. In two patients, the common bile duct was cleared at the time of cholecystectomy. The rest required postoperative ERCP. Laparoscopic cholecystectomy was completed successfully in all patients and, hence, there were no conversions to open procedure. The median operating time was 75 min. Postoperative ERCP was required in six patients. In four patients, the purpose was to remove the ductal stones. Two patients had postoperative bile leak and, as a result, investigated with ERCP. No major bile duct injury was identified. There was leakage from the cystic duct stump in one case and the other patient had an accessory cystic duct. In both cases, a stent was placed at ERCP and the leak was controlled effectively. Operative details are shown in Table 3.

A dedicated ultrasound service was provided for these patients and 64% (41 of 64) of these patients had ultra-

sonography performed on the day of admission. The median time interval between admission and operation was 3 days (range, 2–7 days). The median time from onset of symptoms to surgery was 5 days (range, 2–11 days). Overall, 73% of patients had previous admissions with similar symptoms (29 had one prior admission, 13 had two and 5 had more than two previous admissions).

There were two cases of wound infection. One patient was re-admitted because of a strangulated port site hernia and required re-operation for small bowel obstruction. Five patients developed chest infection postoperatively and all were managed successfully with antibiotics and chest physiotherapy. Other complications are shown in Figure 2. The median hospital stay was 4 days (range, 3–10 days).

Discussion

Open cholecystectomy was the gold standard for treatment of gall stone disease for more than a century since the first operation performed by Carl Langenbuch in 1882.¹⁵ Laparoscopic cholecystectomy was introduced in the late 1980s and rapidly became the treatment of choice because of its efficacy and advantages over open cholecystectomy particularly in terms of rapid recovery, smaller incision and earlier return to work.^{4,7,14,15} Acute cholecystitis was once thought to be a relative contra-indication for laparoscopic cholecystectomy, because of the higher complications rate, prolonged operative time and increased conversion rates.^{2,16,17} However, with increasing experience of the surgeons with laparoscopic procedures and advances in the imaging techniques and operating instruments, laparoscopic cholecystectomy is finding increasing application in the setting of acute cholecystitis.¹⁸ Many authors consider this as a treatment of choice for acute cholecystitis,^{19,20} and several studies have shown comparable mortality rates with significantly less morbidity.^{21–25}

Table 3 Operative findings

Median operative time	75 min (range, 45–120 min)
Conversion to open	0
On-table cholangiogram	12
Ductal calculi	6
Number of ports used	
Standard four ports	59
Extra port for retraction	5
ERCP	
Pre-operatively	11
Postoperatively	6

Figure 2 Postoperative complications after laparoscopic cholecystectomy for acute cholecystitis.

Traditionally, acute cholecystitis has been managed in two stages – an initial conservative management followed by interval cholecystectomy 6–8 weeks later.² However, with limited resources and pressure on the waiting lists in the NHS, these patients often have to wait for an average of 3–4 months.²⁴ Furthermore, almost 15% of these patients require emergency cholecystectomy and another 25% will have a re-admission prior to elective surgery.^{25,26} Prompt laparoscopic surgery for acute cholecystitis reduces re-admission rates and enables the patient to return to normal activity and work, whilst limiting the morbidity from their gall bladder disease. Sobolev *et al.*²⁷ have shown that, in patients on the waiting list for laparoscopic cholecystectomy, the relative risk for an emergency cholecystectomy increases by 3-fold after 20 weeks. Early cholecystectomy can reduce the hospital stay and prevent these complications.^{7,28} Recently, several reports from specialist centres have shown favourable results with laparoscopic cholecystectomy for acute cholecystitis.^{8,9,11,15,20,25}

Despite the evidence of efficacy and benefits to the patient with laparoscopic cholecystectomy for acute cholecystitis, general surgeons in the UK have been reluctant to use this approach. Only 15–20% of surgeons have adopted the policy of urgent cholecystectomy during the index admission.^{29,30} The perceived risk of higher complications (particularly bile duct injury and conversion rates) may be responsible for the unpopularity of early laparoscopic cholecystectomy. Other possible contributory factors could be the delays caused by availability of emergency operating lists and the radiology investigations, which essentially means that the surgeons miss the ‘window of opportunity’ for surgical intervention.^{11,30} It is interesting to note that the timing of surgery in acute cholecystitis has remained controversial. Surgical intervention after the first 96 h of onset of symptoms has been reported as difficult due to significant adhesions,^{21,51} and is associated with a higher conversion rate.⁹ The conversion rates for elective laparoscopic cholecystectomy are 4–5%.³² However, the average reported rates for laparoscopic cholecystectomy in acute cholecystitis are between 10–30% and can be much higher in patients with empyema or gangrenous gall bladder.^{7,53} Higher conversion rates are seen in male patients, old age, very thickened gall bladder, very high inflammatory markers and limited experience of the surgeon.¹⁵

There were no conversions in our series; however, we believe that conversion to open procedure is inevitable in laparoscopic management of acute cholecystitis, but the conversion rate should be kept around 10% in order to achieve the maximum benefit of an urgent cholecystectomy service. Patients were operated at variable times after their admission (median interval between admission and operation was 3 days). Most of the time, the delays were for logistical reasons, especially access to the operating theatre lists. We

did not find any association between the timing of surgery and the complication rate. Similar findings have been reported by studies from high-volume centres.^{11,54}

Bile leak and bile duct injury are the two most feared complications of laparoscopic cholecystectomy for acute cholecystitis. The risk of bile duct injury is between 0.3–1.3%.^{17,55} The reported incidence for bile leaks after laparoscopic cholecystectomy for acute cholecystitis is around 0.25% for elective laparoscopic cholecystectomy but rises to 2–3% in the presence of acute inflammation.^{9,56} We had two patients with bile leak (3.1%) but without any major bile duct injury: this compares favourably with the published literature.

Laparoscopic exploration of the common bile duct has not been standard practice at our institution due to the lack of equipment and expertise. Patients suspected of having common bile duct stones based on abnormal liver function tests, dilated common bile duct and evidence of ductal calculi underwent pre-operative ERCP. Intra-operative cholangiogram was mainly used in cases with difficult anatomy in the Calot’s triangle. In six patients, this confirmed the presence of ductal stones. All these patients had normal liver function tests and no evidence of biliary dilatation on ultrasound scanning. With increasing interest in laparoscopic common bile duct exploration, two patients had choledochoscopy and removal of stones. The other four patients underwent uneventful recovery after laparoscopic cholecystectomy and then had an ERCP to clear the duct. There were no complications in these patients: in particular, no bile leaks were observed. Magnetic resonance cholangiopancreatography (MRCP) was not used in any of these patients.

This study is not without limitations. It is not a randomised study and we did not have a comparative group. This is a case series with relatively small numbers, which describes our experience with laparoscopic cholecystectomy for acute cholecystitis. We have been able to show that the favourable results published from high-volume and tertiary care centres are reproducible in a district hospital setting. The key factor is adherence to a specific care pathway and a consultant-led service. Emergency laparoscopic cholecystectomy for acute cholecystitis is safe. Its importance will increase due to an ever increasing patient expectation and knowledge. This approach will minimise re-admission rates and morbidity allowing patients to return to work faster.

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