Surg Endosc (1996) 10: 1185–1188

Surgical Endoscopy

An alternative approach to acute cholecystitis

Percutaneous cholecystostomy and interval laparoscopic cholecystectomy

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Received: 25 March 1996/Accepted: 11 June 1996

Abstract

Background: The mainstay of therapy for acute cholecystitis is cholecystectomy, which has a mortality of 5–30% in high-risk patients such as the elderly or critically ill. An alternative treatment option in patients suffering from acute cholecystitis with contraindications to emergency surgery is percutaneous cholecystostomy (PC) followed by interval laparoscopic cholecystectomy. Percutaneous cholecystostomy yields 10–12% mortality in high-risk patients and is therefore a safe temporizing measure, allowing delayed, elective cholecystectomy when the patient is in better condition for surgery.

Methods: Hospital charts and radiology films were reviewed for all 50 patients who underwent PC for acute cholecystitis between January 1990 and September 1993. Most patients were high risk for emergency cholecystectomy by virtue of their critical illness or underlying medical condition. Twenty-five patients went on to have interval cholecystectomies. We recorded whether they underwent laparoscopic or open cholecystectomy, as elective or emergency procedures, and we recorded direct complications, mortality, and postoperative length of hospital stay.

Results: Relief of symptoms occurred within 48 h of PC in 90% of patients, and two patients had complications of PC. Laparoscopic cholecystectomy was attempted in 13 patients and competed in nine. Four patients (31%) required conversion from laparoscopic to open cholecystectomies due to extensive adhesions (3) or bleeding (1). Three patients had direct complications of laparoscopic cholecystectomy. There was no mortality or major bile duct injury.

Conclusion: Percutaneous cholecystostomy followed by interval laparoscopic cholecystectomy is a safe, minimally invasive approach which can be employed safely in the critically ill patient when contraindications to emergency surgery exist.

Presented at the annual meeting of the Society of American Gastrointestinal Endoscopic Surgeons (SAGES), Philadelphia, Pennsylvania, USA, 14–17 March 1996

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Key words: Laparoscopic cholecystectomy — Percutaneous cholecystostomy — Acute cholecystitis — High-risk patients

The mainstay of therapy for acute cholecystitis is open cholecystectomy, yet reported mortality rates are as high as 5%, increasing to 6–30% in high-risk patients such as the elderly or critically ill [6, 14]. Similarly, open cholecystostomy results in 6–28% mortality in high-risk patients. However, percutaneous cholecystostomy (PC), which was introduced in the early 1980s, yields 10–12% mortality in high-risk patients [9, 10, 12, 14, 15]. PC is therefore felt to be a safe temporizing measure, allowing delayed, elective cholecystectomy when the patient is in better condition for surgery.

Performed in North America since 1988, laparoscopic cholecystectomy was initially contraindicated in acute cholecystitis [4]. Recently, several surgeons have shown that although technically difficult, laparoscopic cholecystectomy can be safely performed for selected patients with acute cholecystitis [2, 5, 13, 16, 17]. These surgeons have employed major modifications to the operative technique such as a fifth cannula, angled laparoscopes, 10-mm toothed grasping forceps, routine intraoperative cholangiography, pre-tied loop ligatures, and sterile specimen bags to remove the gallbladder from the peritoneal cavity.

Decompression of the acutely inflammed gallbladder may decrease the technical difficulty of laparoscopic cholecystectomy, in addition to allowing the patient time to recover from the acute illness prior to surgery. This minimal-access gallbladder decompression followed by minimal-access elective cholecystectomy is the alternative to a general anaesthetic and emergency laparotomy or an open cholecystectomy for many patients. The purpose of this study was to review our initial experience in order to evaluate the safety of our approach to patients with acute cholecystitis and contraindications to emergency cholecystectomy: PC and interval laparoscopic cholecystectomy.

Table 1. Presentation of patients with acute cholecystitis ($n = 50$)

Symptom or finding	#	%
Upper abdominal pain	44	88
Right upper quadrant tenderness	43	86
Leukocytosis (>11,000)	35	70
Fever (>38.0°C)	25	50

Patients and methods

From January 1990 through September 1993, radiologically guided percutaneous cholecystostomy was performed in 50 patients with acute cholecystitis (29 calculous, 21 acalculous). There were 29 men and 21 women with a median age of 60.3 years (range 22–89 years).

All 50 patients were diagnosed clinically with acute cholecystitis. Patients with acalculous cholecystitis were selected for PC as these episodes of gallbladder inflammation during physiologic stress usually resolve rapidly with drainage and do not recur; thus, cholecystectomy is not required.

Patients with acute calculous cholecystitis were selected for PC if they were high-risk candidates for emergency cholecystectomy or general anesthetic by virtue of their critical illness or underlying medical condition; 90% had associated diseases, 42% had multisystem disease, 40% were older than 65 years, 24% were in the intensive care unit (ICU), and 18% were recovering from recent operations. Two patients were pregnant, one patient was receiving chemotherapy, and one had AIDS.

The diagnosis of acute cholecystitis was established on the basis of clinical, laboratory, and ultrasound findings (Table 1). All patients had at least one positive ultrasonographic sign of acute cholecystitis: gallbladder wall thickening, sludge or calculi within the gallbladder, gallbladder distention, sonographic Murphy's sign, pericholecystic fluid, or an echolucent halo in the gallbladder wall.

There was not a defined, prospective management protocol for patients after PC; individual patient management was at the discretion of the attending surgeon. After a mean follow-up of 12 months post PC: Nine patients died from their underlying condition (a mean 16.3 days post PC), 13 patients had no further treatment; and three patients had percutaneous stone removal (Fig. 1) [3].

Twenty-five of 50 patients underwent cholecystectomy, 13 were approached laparoscopically and 12 open. Seven patients had emergency open cholecystectomies: Five had shown no improvement in 48 h and two pregnant patients had recurrent cholecystitis. Five patients had elective open cholecystectomies: because the attending surgeon was laparoscopically inexperienced at that time, or the cholecystectomy was done as a combined operation with another open abdominal procedure. Thirteen patients underwent laparoscopic surgery and are the focus of this report. There were seven women and six men with a median age of 47.7 years (range 23–68 years).

Percutaneous cholecystostomy technique

Percutaneous cholecystostomy was performed under ultrasound guidance, using sedation, local anesthesia and aseptic technique. A 6.7 French McGahan catheter was introduced into the gallbladder using a trocar technique in all cases. A direct transperitoneal route was used in 34 patients and a transhepatic route was used in 16 patients. A sample of bile was aspirated and sent for culture. Cholangiography was usually performed via the cholecystostomy tube 1 week post PC. If this examination demonstrated no stones and free flow of contrast to the duodenum, the catheter was removed [3].

Operative technique

The four-cannula technique of laparoscopic cholecystectomy was performed as described by Reddick et al. [4], with some minor modifications in a few patients. Rarely, a fifth cannula was used to provide additional visualization and retraction in patients who had undergone previous upper abdominal surgery. Closed-suction drainage catheters were used seldom, in the setting of minor but persistent bleeding or bile leakage from the liver bed. We did not employ major modifications to the laparoscopic technique described by other surgeons for use in patients with acute cholecystitis [2, 5, 16, 17].

In recording operative complications we used Strasberg et al.'s classification into *direct complications* of the specific operative technique and *indirect complications* which may occur after any abdominal procedure [11]. We report only *direct* complications of laparoscopic cholecystectomy: Trocar injuries, bleeding, bile duct injury, stone and bile spillage, and postoperative bile collection.

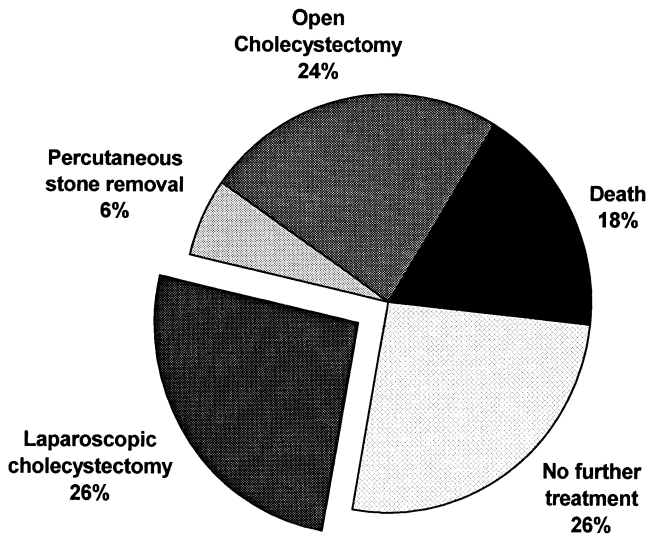

Fig. 1. Outcome in 50 patients treated with percutaneous cholecystostomy for acute cholecystitis.

Table 2. Rationale for conversion to open cholecystectomy ($n = 13$)

Rationale	#	%
Adhesions	3	
Bleeding	1	
Total	4	31

Results

After percutaneous cholecystostomy 90% of patients experienced symptomatic relief within 48 h. Two patients had complications of the procedure: One patient went into septic shock and recovered in the ICU, and one patient had a perforated hepatic flexure and underwent emergency laparotomy and open cholecystectomy. Most patients with calculous cholecystitis (79.3%) had their gallbladder and/or stones subsequently removed, whereas most patients with acalculous cholecystitis (57.1%) had no further treatment and no further biliary complaints after a mean follow-up of just over 12 months post cholecystostomy.

Laparoscopic cholecystectomy was attempted in 13 patients (10 calculous and three acalculous) and completed in nine, on average 36 days after PC. Four patients required conversion to open procedures due to extensive adhesions (three) or bleeding (one) which precluded conclusive identification or safe dissection of the cystic duct (Table 2). Of note, two conversions (50%) to open procedures were in patients with prior acalculous cholecystitis (i.e., two out of three attempts at LC after acalculous cholecystitis converted).

Table 3. Direct complications of laparoscopic cholecystectomy ($n = 13$)

Complication	#	%
Trocar injury	0	
Bleeding	1	
Bile duct injury	0	
Stone and bile spillage	1	
Postoperative biloma	1	
Total	3	23

There were three direct complications (23%) of laparoscopic cholecystectomy: one bleeding right hepatic artery requiring laparotomy, one postoperative biloma aspirated percutaneously, and one spillage of purulent bile and stones resulting in sepsis (Table 3). There was no mortality or bile duct injury among patients undergoing laparoscopic surgery for cholecystitis. The median postoperative hospital stay was 4 days (range 2–51).

Discussion

Laparoscopic cholecystectomy was introduced in 1987 by Phillipe Mouret of Lyon, France, and has rapidly become the ''gold standard'' for the treatment of symptomatic cholelithiasis. In the ''early days'' of laparoscopic cholecystectomy (less than a decade ago) there were many contraindications, such as acute cholecystitis and previous upper abdominal surgery, which have gradually been whittled away by pioneer surgeons with increasing experience and skill. Increasing numbers of patients can therefore realize the benefits of laparoscopic cholecystectomy, such as shorter hospitalization, decrease in postoperative pain, better cosmesis, and earlier return to normal activities [13].

In an effort to extend the benefits of laparoscopic cholecystectomy to yet another subset of patients with biliary disease, we developed an alternative management approach for patients with acute cholecystitis and contraindications to emergency cholecystectomy. They were treated with PC for early decompression of the gallbladder, followed by elective laparoscopic cholecystectomy several weeks later, after the acute inflammatory process had resolved. An algorithm for the treatment of patients with acute calculous cholecystitis is presented in Fig. 2.

A conversion rate of 31% is comparable with previous studies on emergency laparoscopic cholecystectomy for patients with clinical acute cholecystitis [2, 5, 16, 17], and 13 is a small sample size. Some studies on laparoscopic cholecystectomy for acute cholecystitis report conversion rates around 5%, but their definition of acute cholecystitis is quite liberal, including a pathologic diagnosis in a clinically well patient (after an elective cholecystectomy) [13]. Conversion to open cholecystectomy should not be considered a complication, but rather, sound surgical judgment [17]. A low threshold for conversion to laparotomy is important to minimize the risk of major complications. We had a particularly low threshold for conversion to open procedures early in our laparoscopic experience, 1990–1993, which coincided with the time period of this study.

The complication rate of 23% is comparable with morbidity rates of 8–18% in studies on emergency laparoscopic

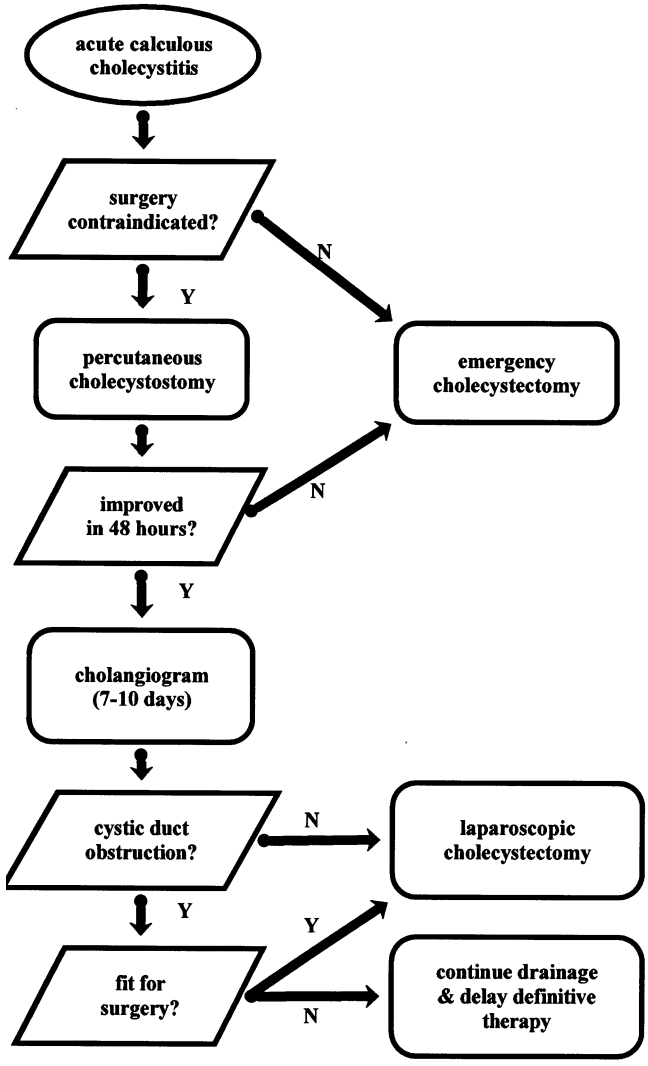

Fig. 2. Algorithm for the treatment of calculous cholecystitis.

cholecystectomy on patients with acute cholecystitis [5, 16, 17]. Relatively ''minor'' complications were included which are probably underreported in many series as they are not considered complications, such as postoperative biloma or spillage of bile and stones. The patient groups are not comparable, however, since our patients were selected for PC only if they were considered unfit for a general anesthetic, and were therefore elderly and critically ill.

Some complications of laparoscopic cholecystectomy, such as bile and stone spillage, are probably underreported in this paper as in most. Many surgeons don't consider spillage of bile and stones a complication since it occurs so often—in approximately 30% of cases—and yet serious sequelae of spilled stones are rare [7, 8].

Interestingly, our most serious complication (bleeding right hepatic artery), and half of the conversions, occurred in patients with acalculous cholecystitis. These operations may have been unnecessary as it now seems that most patients with acalculous cholecystitis can be treated definitively with PC. They remain asymptomatic after cholecystostomy tube removal and do not need cholecystectomy [1, 3, 14].

The perioperative mortality for our laparoscopic series was zero, which compares favorably with the mortality for emergency open cholecystectomy of 0% to 5%, which increases to between 6% and 30% for cholecystectomy patients at high risk [6, 14]. However, 18% of patients died of their underlying condition within 30 days of successful PC, which is a reflection of the severity of comorbid disease in these patients.

The cholecystostomy tubes themselves did not seem to add very much morbidity. Tubes were in place for an average of 27 days and they did not prolong hospital stay. Patients either went home shortly after PC, or they were still recovering from their primary condition after 27 days, so the presence of the tube did not prolong the illness. Fourteen of 18 patients who underwent elective cholecystectomy had the PC tube in situ at the operation. The presence of the tube did not appear to make subsequent laparoscopic cholecystectomy more difficult or more dangerous as no such difficulties were mentioned in the operative notes. The usual finding was additional adhesions at the entry site of tube into the gallbladder, which were easily lysed with cautery.

Since the beginning of this study in 1990, there has been a rapid increase in utilization of laparoscopic cholecystectomy and shrinkage of the list of contraindications. There is a new trend toward early laparoscopic cholecystectomy for selected patients with acute cholecystitis, but this should not be attempted by all surgeons or in all patients. For poor-risk or debilitated patients with an obstructed gallbladder, in whom open operation or laparoscopic interventions are considered high risk, a safe and minimally invasive treatment option is percutaneous cholecystostomy at the bedside under local anesthesia, followed by laparoscopic cholecystectomy. Decompression of the gallbladder by PC allows for resolution of acute cholecystitis and treatment of comorbid disease. Elective interval laparoscopic cholecystectomy can then be safely performed.

Acknowledgment. We would like to thank Dr. Alex Nagy for his valuable comments and for help editing the manuscript.

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