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# Percutaneous cholecystostomy for the treatment of acute cholecystitis in the critically ill and elderly

# 利用經皮膽囊造口術治療重病和老年患者的急性膽囊炎

**Objective.** To evaluate the clinical efficacy and outcomes of percutaneous cholecystostomy as an alternative treatment option for elderly and critically ill patients who have acute cholecystitis.

**Patients and methods.** The medical records of patients who underwent emergency percutaneous cholecystostomy at the North District Hospital, Hong Kong from September 1999 to July 2002 were reviewed. Indications for the procedure, patient demographics, and other clinical details were recorded.

**Results.** A total of 25 patients (10 male, 15 female) with a median age of 81 years (range, 39-97 years) presented with acute cholecystitis and underwent percutaneous cholecystostomy with ultrasound guidance. Two patients required emergency cholecystectomy on day 1 after the procedures because of deteriorating conditions. The rest of the patients clinically improved after drainage. There was no major periprocedural complication, and four patients had their catheter accidentally dislodged but did not require re-insertion. There were five in-patient mortalities, although the majority of these deaths were from unrelated illness. Subsequently, only six patients underwent elective cholecystectomy, one open and five laparoscopic. Two patients were offered percutaneous endoscopic cholecystolithotripsy, one defaulted and the other could not tolerate the procedure. Eleven patients declined further intervention due to the high surgical risks, three of these patients developed biliary symptoms, one had acute cholecystitis, and the other two had cholangitis. The rest of patients had no symptoms related to the gallstones. The median follow-up period was 81 weeks (range, 27-162 weeks).

**Conclusion.** Percutaneous cholecystostomy is a viable treatment option for elderly and critically ill patients presenting with acute cholecystitis. It has a high success rate with minimal procedure-related complications. Elective cholecystostomy is the treatment of choice for low-risk patients after the initial acute cholecystitis.

***Key words:***
*Cholecystectomy;*
*Cholecystostomy*

***關鍵詞：***
*膽囊切除術；*
*膽囊造口術*

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**目的：**評估利用經皮膽囊造口術治療重病和老年患者急性膽囊炎的臨床成效和結果。

**患者與方法：**回顧1999年9月至2002年7月期間，於香港北區醫院接受緊急經皮膽囊造口術的病人病歷。記錄包括手術步驟、病人與人口調查有關的數據，以及其他詳細臨床資料。

**結果：**25名(10男15女)患上急性膽囊炎的病人接受超聲波引導經皮膽囊造口術，平均年齡為81歲(值域：39-97歲)。當中2名病人病情轉壞，須於術後一天接受緊急膽囊切除術，其餘在引流後病情好轉。病人沒有出現因手術引起的併發症，其中4名病者的導管意外扯脫，但無須重新置入。5名住院病人大部份因其他無關的疾病死亡。及後，只有6名病人接受非緊急膽囊切除術，1名為開腹，其餘則以腹腔鏡進行。我們建議2名病人接受經皮內窺鏡膽囊碎石術，其中1名放棄，另1名則無法忍受手術過程。基於手術風險高，11名病人拒絕進一步治療，其中3名出現膽功能障礙引起的症狀：1人患上急性膽囊炎，2人有膽管炎。其餘病人並無出現與膽石有關的症狀。隨訪期平均為81星期(值域：27-162星期)。

**結論：**經皮膽囊造口術是治療重病和老年患者急性膽囊炎其中一種可行的療法，不但成功率高，而且極少出現因手術出現的併發症。對風險低的急性膽囊炎初患者來說，非緊急膽囊造口術是最佳治療方法。

## Introduction

Acute cholecystitis is a frequent cause of acute surgical admissions, and between 50% and 70% of cases occur in elderly patients.[1] Early cholecystectomy is considered to be the appropriate treatment for patients with acute cholecystitis, but it carries a considerable chance of morbidity and mortality in high-risk individuals.[1] Initial conservative treatment with intravenous fluids and antibiotic therapy followed by early elective cholecystectomy is another option. The technique of percutaneous cholecystostomy (PC) was first performed in 1980[2] and has become a viable alternative treatment for the elderly or high-risk patients who have failed to respond to the conservative treatments.

The subsequent management of cases of gallstone after an acute episode of cholecystitis is still controversial. Early elective cholecystectomy in low-risk patients is associated with a good outcome.[3] Percutaneous tract dilation followed by successful endoscopic cholecystolithotripsy has also been reported.[4] In patients with a prohibitive operative risk or who have declined elective cholecystectomy, PC may be the definitive treatment.[5] This report aims to discuss the clinical efficacy and outcomes of PC in the treatment of acute cholecystitis in critically ill or elderly patients at a district hospital.

## Methods

The medical records of patients who underwent emergency PC at North District Hosptial, Hong Kong from September 1999 to July 2002 were reviewed. Twenty-five records were identified, including 15 female and 10 male with a median age of 81 years (range, 39-97 years). Seventeen patients were of anaesthesia grade III or above according to the American Society of Anesthesiologists (ASA) grading. The diagnosis of acute cholecystitis was based on the clinical parameters, laboratory data, and images from the radiology. However, the onset of symptoms more than 5 days after diagnosis was defined as delayed presentation. All patients were treated initially with antibiotics, nil by mouth, intravenous fluids, and analgesics. Our policy for PC was to select patients with acute cholecystitis whose general conditions were too risky to receive general anaesthesia (Fig 1), or who failed to improve after the initial conservative treatment.

Emergency PC was performed by the on-duty intervention radiologists using the Seldinger technique with ultrasonographic and fluoroscopic guidance. Either transhepatic (18 patients) or direct percutaneous (five patients) routes were used. The direct percutaneous route was used if there was enough contact area between the gallbladder fundus and the anterior abdominal wall to allow for direct puncture, otherwise, the transhepatic percutaneous route was taken. The route of gallbladder puncture did not alter the management of the catheter. The gallbladder was punctured using a 15-cm Chiba needle (Inrad, New Jersey, US), followed by the placement of a 0.018-inch micro-guidewire (Meditech, Massachusetts, US). The micro-guidewire was exchanged with a 0.035-inch extra-stiff Amplatz guidewire (Cook, Indiana, US) after tract dilation with the Accustick System (Meditech). A size 8-Fr pigtail nephrostomy drainage catheter (Angiomed, West Sussex, United Kingdom) was then inserted into the gallbladder. The final position of catheter was verified fluoroscopically following the injection of a water-soluble contrast medium. The catheter was then secured to the abdominal wall by a suture.

Data collection and analysis focused on the severity of the gallbladder disease, co-morbidities, ASA grading, the interval between admission and procedure, the duration of hospital stay, radiology reports, antibiotics regimen, microbiology reports, the interval between procedure and resolution, the duration of catheter retention, definitive treatment, complications, and mortalities.

## Results

Of the 25 patients that were included in this series, one was a 39-year-old woman with acute exacerbation of systemic lupus erythematosus. Seventeen patients were of ASA grade III or above, and the rest of the eight patients were all bed-bound and were dependent on help for normal daily activities.

Twenty-two patients presented with pain localised over right upper quadrant, pyrexia of greater than or equal to 38°C was recorded in 17 patients, and 23 patients had leukocytosis. The radiological investigations used for diagnosis were ultrasound scan of the abdomen in 18 patients, computed tomography of the abdomen in six patients, and the combination of the above techniques in one patient. The presence of gallstone was revealed in 23 patients. The median time from admission to cholecystostomy was 2 days (range, 0-13 days).

Cholecystostomy was performed successfully in all patients (Fig 2). There were no major complications, such as bleeding, bile duct or adjacent organ injury. Two patients had accidental catheter dislodgement during hospitalisation and two after discharged home. All four patients did not need a revision of the cholecystostomy treatment. Bile cultures were obtained from 23 patients, with positive findings in 20 of the cases. Twelve of the culture infections were caused by single pathogen and eight of the cultures had mixed growths; the most common pathogen was *Escherichia coli* (11/23). The antibiotics, cefuroxime and metronidazole were administered in 19 patients, and a combination of the above drugs with ampicillin was used in four other patients. The clinical symptoms of an acute cholecystitis attack were resolved in

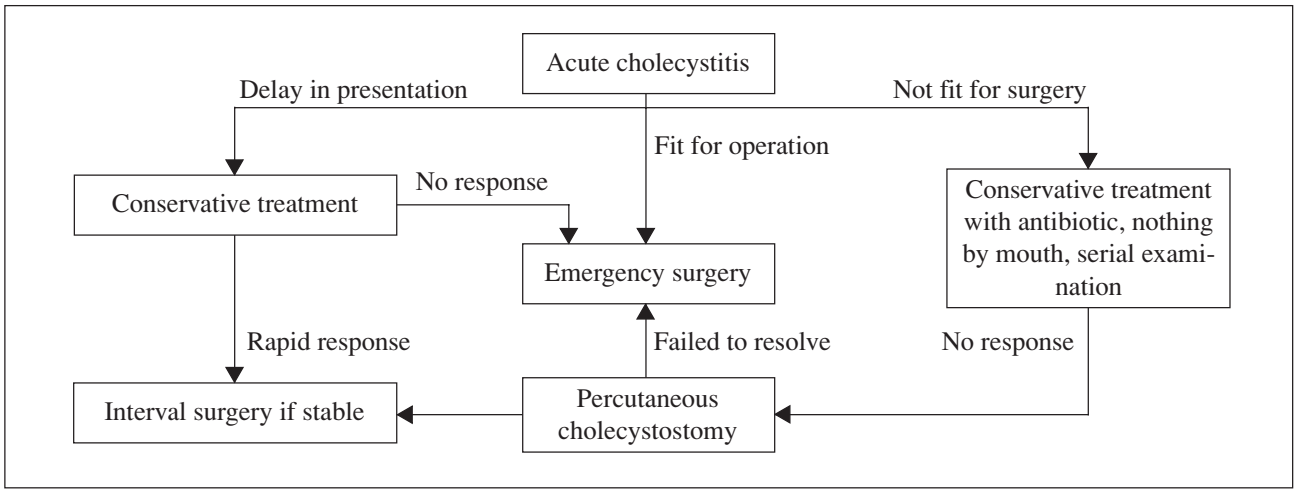


**Fig 1. Algorithm for the treatment of patients with acute cholecystitis**

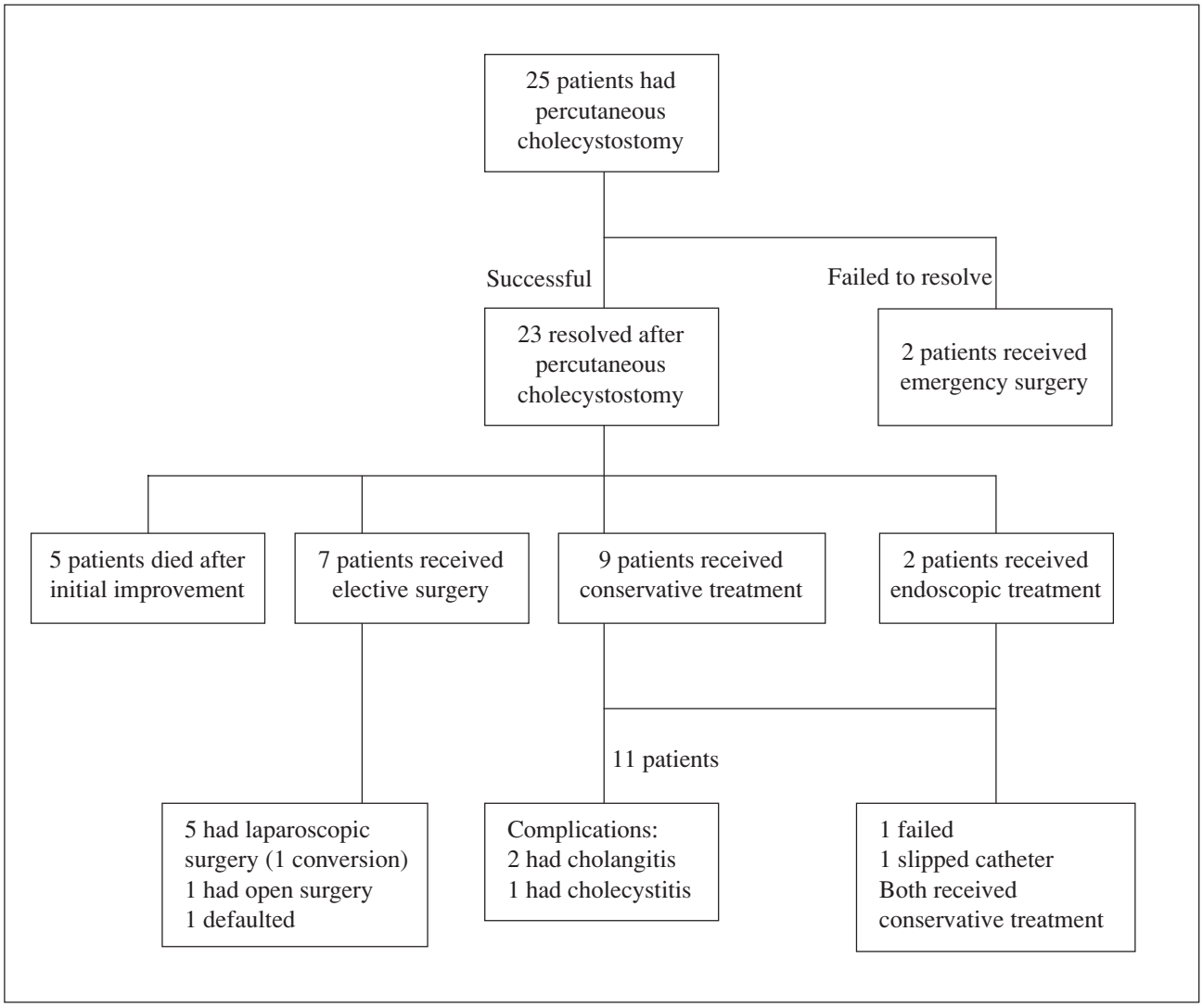


**Fig 2. Outcomes of patients after percutaneous cholecystostomy**

23 patients after a median period of 2 days (range, 1-6 days), with the decrease of abdominal pain, temperature, and white blood cell counts.

The two patients, whose condition failed to be resolved after the initial cholecystostomy, had emergency open cholecystectomies on the following day. One of these patients

had gangrenous gallbladder with perforation unrelated to the cholecystostomy and he died of pneumonia 16 months after discharge. There were five in-patient mortalities in this study and all of them were older than 80 years. Three of them died of pneumonia and generalised sepsis after having improved initially; they died on days 13,14, and 18, respectively. One patient who died on day 11 had an associated liver abscess around the gallbladder bed and was critically ill on presentation. Another patient was diagnosed as having metastatic carcinoma and she died 45 days after admission.

Seven patients were offered elective surgery, of these one had open cholecystectomy due to previous gastric surgery, five underwent laparoscopic cholecystectomy (one of them was converted to the open procedure), and one defaulted surgery and presented 6 months later with abdominal pain. She was found to have cholecystoduodenal fistula with stones in duodenum and stomach. She was subsequently treated with open surgery.

Two other patients were offered percutaneous cholecystolithotripsy. One of these patient's catheter slipped out on day 14, but he refused revision of catheter and preferred conservative treatment. He had an attack of cholangitis 30 months later. The other patient was aged 62 and had required long-term oxygen because of severe emphysema of the lung. He developed desaturation during the procedure and part of stone was left behind. The cholecystostomy catheter was still in situ at the time of evaluation 14 months later, because he could not tolerate another procedure.

Nine patients had conservative treatment at the beginning. Seven of them had catheters removed before being discharged home after the cholecystogram confirmed a patent cystic duct. One of the nine patients had kept his catheter for 4 months. He was finally diagnosed as having cholangiocarcinoma and survived for 17 months. The catheter in the other patient slipped out 2 months after insertion. Two further patients presented with complications: one with cholangitis at 20 months and the other with cholecystitis at 2 months. Both of these cases were managed with conservative treatments. The patient with recurrent cholecystitis died 23 months later because of a chest infection. Another patient died during the follow-up period of 37 months later because of unrelated disease.

All other patients reported no symptoms related to gallstone during follow-up (median follow-up period was 81 [range, 27-162] weeks). The median duration of the catheter being left in situ was 22 days (range, 1-427 days). The median duration of hospital stay for the first presentation was 16 days (range, 5-56 days).

## Discussion

The incidence of gallbladder disease has been shown to increase with age.[6] Acute cholecystitis in the elderly is of clinical importance because of the high mortality rate of emergency cholecystectomy in critically ill patients.[1] Percutaneous cholecystostomy allows adequate resolution of the acute phase of cholecystitis, and the coexisting common bile duct stone can also be managed endoscopically. These patients can then be allowed to recover adequately. In our institution, PC is reserved for patients who are poor candidates for an immediate operation. In contrast, interval laparoscopic cholecystectomy is the procedure of choice in patients who can tolerate general anaesthesia.

Percutaneous cholecystostomy is carried out under local anaesthesia with radiological guidance, and the procedure itself is usually uncomplicated. The complications related to the procedures quoted in the literature include failure in placement of catheter, catheter displacement, peripheral bile duct injury, and intracholecystic haemorrhage.[3] The incidence of tube exchange for a dislodged catheter or occlusion was up to 43%.[7] Pain during and after the procedure is common but can usually be resolved using analgesics.[3] In our series, all the procedures were completed successfully. There was no major complication related to catheter insertion, but four patients had their catheter slipped out. Two of our patients required emergency cholecystectomy during the acute stage of their illness, and both of them recovered well. There was one open conversion for the early elective cholecystectomy group in our study, and there was no complication related to the surgery. Five of the in-patients died and this figure is acceptable in the critically ill and the elderly.[8] Those patients who had elective surgery recovered well and those who had conservative treatments also recovered, except three gallstone-related complications (one cholecystitis and two cholangitis). Both of the cholangitis patients were given non-operative treatments. During the follow-up period, three out of 11 patients with the gallbladder left behind died (in 16, 23, and 37 months later, respectively).

The subsequent management after the resolution of an acute episode is still controversial. The management options include elective cholecystectomy,[3] endoscopic cholecystolithotripsy,[4] and leaving the gallstones and gallbladder intact. Patients in our study were selected for elective cholecystectomy on the basis of their relative fitness. In a recent series, up to 59% of patients settled after acute episodes and were able to undergo delayed surgery. The conversion rate for laparoscopic cholecystectomy in that study was 20% with no major complications.[5] For patients who are not suitable for elective surgery, conservative treatment with early recognition and treatment of complications is acceptable.

Our results showed that PC is safe with low overall mortality and morbidity rates. As a relative low-risk procedure, it can play a role in management of acute cholecystitis allowing patients to recover before other definite treatments. We conclude that PC is a useful tool for the

treatment of acute cholecystitis in critically ill and elderly patients.

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