



## Percutaneous Cholecystostomy in the Management of Acute Cholecystitis

Irith Hadas-Halpern MD, Michael Patlas MD, Michael Knizhnik MD, Ibrahim Zaghaf MD and Drora Fisher MD

Department of Radiology, Shaare Zedek Medical Center, Jerusalem, Israel

**Key words:** percutaneous cholecystostomy, acute cholecystitis, high risk patients

### Abstract

**Background:** The mainstay of therapy for acute cholecystitis is cholecystectomy, which has a mortality of 14–30% in high risk patients. An alternative approach in patients suffering from acute cholecystitis with contraindications to emergency surgery is percutaneous cholecystostomy.

**Objective:** To evaluate the efficacy and safety of percutaneous cholecystostomy as the initial treatment of acute cholecystitis in high risk patients.

**Methods:** Eighty consecutive patients (42 men, 38 women) underwent ultrasound-guided percutaneous cholecystostomy over a 5 year period. Sixty-five patients suffered from acute calculous cholecystitis, 4 patients had acalculous cholecystitis, and 11 patients had sepsis of unknown origin.

**Results:** Sixty-eight patients improved after the percutaneous gallbladder drainage, 10 patients died from co-morbid disease and 2 patients died from biliary peritonitis. During a 1 year follow-up, 32 of the patients underwent interval cholecystectomy, 4 additional patients died from a co-morbid disease, 18 patients did not suffer from any gallbladder symptoms, and 14 were lost to follow-up.

**Conclusions:** Percutaneous cholecystostomy is an effective contribution to the treatment of acute cholecystitis in high risk patients.

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The mainstay of therapy for acute cholecystitis is cholecystectomy, yet reported mortality rates are as high as 5%, increasing to 14–30% in high risk patients such as the elderly or critically ill [1]. In contrast, elective surgery in this group has a mortality rate as low as 0.7–2% [2]. Therefore, as a temporizing life-saving measure, high risk patients are treated with a regimen consisting of decompression of the gallbladder combined with broad-spectrum antibiotics. For more than a century, surgical cholecystostomy was the only available method for gallbladder decompression. This approach has been replaced by percutaneous cholecystostomy, a technique consisting of percutaneous, imaging-guided catheter placement in the gallbladder lumen [3]. The PC is left in the gallbladder for 2 weeks or longer. The reported clinical response rate of PC is 56–100%, the lower figures coming from series consisting exclusively or predominantly of critically ill patients [4,5]. However, complications like hematoma, biliary peritonitis and pneumothorax have been reported in up to 10% of patients after PC [5]. The catheter may

cause discomfort to the patient and accidental dislodgment may occur.

The purpose of the present study was to retrospectively review the indications for PC in acute cholecystitis at our institution and to evaluate the efficacy and safety of the procedure as the initial treatment in high risk patients.

### Materials and Methods

We retrospectively reviewed the clinical and radiologic records of all patients who underwent PC at our institution between January 1994 and December 1999. Patients were selected for PC if they were high risk candidates for emergent cholecystectomy or general anesthetic by virtue of their critical illness or underlying medical condition. Ninety-one PCs were performed in 80 patients (42 men, 38 women). The median patient age was 80 years (range 53–96 years). Seventy-two patients (90%) had severe cardiovascular disease, 21 (26%) were on mechanical ventilators in the intensive care unit, 41 (51%) were older than 80 years, and 2 (2.5%) were recovering from recent coronary surgery. The decision to perform gallbladder drainage was based on the clinical and laboratory data and the imaging findings. Sixty-nine patients (86%) had right upper quadrant pain and tenderness, fever, and elevated white blood cell count. The remaining 11 patients (14%) had sepsis of unknown origin. Sonography was the initial confirmatory imaging study for acute cholecystitis, obtained with ATL Ultramark 9 (Advanced Technology Laboratories, Bothell, WA, USA) with 3.5–5 MHz transducers. The diagnosis of acute cholecystitis was established by the sonographic findings of enlarged gallbladder, gallbladder wall thickening, pericholecystic fluid, and sonographic positive Murphy sign. Sixty-nine of the patients had sonographic findings of acute cholecystitis and 4 of them had acalculous disease.

The 11 patients who had sepsis of unknown origin underwent PC as a diagnostic and therapeutic trial. Under local anesthesia an 8F-10F pigtail catheter was inserted transhepatically using the Seldinger technique. A sample of bile was aspirated and sent for culture. Cholangiography was usually performed via the cholecystostomy tube 1 week post-PC insertion. A positive response to PC was defined as resolution of symptoms and signs, and reduction in WBC by at least 25% or to less than 10,000/mm within 72 hours of

PC = percutaneous cholecystostomy

WBC = white blood cells

the procedure. After recovery from acute cholecystitis, patients were followed for 1 year.

We retrospectively analyzed the technical problems, the complications and the patients' response and outcome.

## Results

PC was successful in all cases, with no technical problems. The PC procedures were performed  $2.4 \pm 1$  days (mean  $\pm$  SD) after admission or appearance of signs.

Two patients (2.5%) experienced complications after the procedure: one suffered from hepatic abscess and the other from subphrenic abscess; both were successfully drained by sonographic guidance. Two patients (2.5%) died from biliary peritonitis several days post-PC insertion.

In both cases there had been severe necrotic perforated cholecystitis at the time of diagnosis, which necessitated immediate cholecystectomy but at very high surgical risk. The efficiency of the cholecystostomy was questionable from the beginning and their deaths were not attributed to the PC procedure. Ten patients (13%) died from a severe co-morbid disease with PC tubes in place. Fifty-two patients (65%) experienced relief within 72 hours after the procedure. Sixteen additional patients (20%) showed a positive response after more than 3 days. During the 1 year follow-up, 32 patients (40%) underwent interval cholecystectomy (15 laparoscopic and 17 open) with no mortality; 18 additional patients (23%) did not suffer from any gallbladder symptoms, 4 patients (5%) died from a co-morbid disease, and 14 (18%) were lost to follow-up.

The reason for the relatively large number of open cholecystectomies in our series was the high conversion rate. The PC catheter was left in place for less than 6 weeks in 32 patients (40%), for 45–180 days in 13 patients (16%), and 180 days or more in 9 patients (11%). Catheters remained in place for more than 45 days as prophylaxis against any future episodes of cholecystitis in 22 patients (27%). These patients were considered to have short life expectancies because of terminal malignant or cardiopulmonary disease and were not suitable for cholecystectomy. Seven patients with contraindications to surgery developed recurrent symptoms after tube removal. Symptoms were relieved after tube re-insertion. Our results are illustrated in Figure 1.

## Discussion

Percutaneous ultrasound-guided cholecystostomy is usually accomplished rapidly and successfully under local anesthesia. The obvious use of this procedure is to treat patients who are poor surgical risks, in whom emergent cholecystectomy results in a high mortality rate. The purpose is to stabilize the patient's condition and to operate later when the clinical condition is optimal. The aim of this study was to review a large cohort of patients treated with PC and to determine the safety and efficacy of the procedure. Our technical success of 100%, complication rate of 2.5%, and post-procedure gallbladder disease-related mortality of 3% are comparable with earlier reports [5,6]. In our series 10 patients (13%) died from severe co-morbid disease, and the PC resulted in resolution of

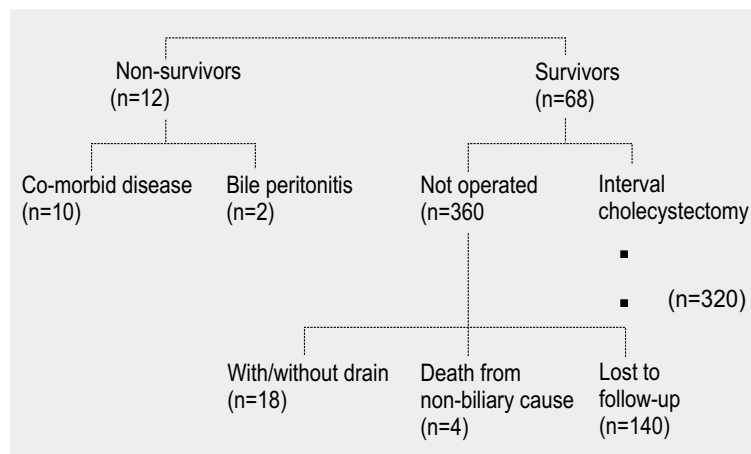


Figure 1. Outcome of percutaneous cholecystostomy in 80 patients

clinical symptoms and signs in 56 of the other 70 patients within 72 hours. Twelve additional patients improved during 4 or more days. Response rates to PC reported in the literature vary between 56 and 100% [5–7]. The two patients who developed non-fatal complications (infected biliary collections) were successfully treated under sonographic guidance. Patients who remain high surgical risks due to severe ongoing co-morbid conditions can be effectively managed with repeated PC if cholecystitis recurs, as shown in our series. If a patient's operative risk improves after treatment of a co-morbid condition, cholecystectomy should be considered as the definitive treatment.

In conclusion, percutaneous cholecystostomy as a temporizing measure for high risk patients is an effective and safe procedure with low morbidity and mortality. It is a valuable contribution to the treatment of acute cholecystitis in high risk patients.

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**Correspondence:** Dr. M. Patlas, Dept. of Radiology, Shaare Zedek Medical Center, P.O. Box 3235, Jerusalem 91031, Israel.  
Phone: (972-2) 655-5516  
Fax: (972-2) 585-6292  
email:patlas69@yahoo.com