

Outcomes of Percutaneous Cholecystostomy in the Presence of Ascites

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ABSTRACT

Purpose: To evaluate whether the presence of ascites increases complications following placement of percutaneous cholecystostomy tubes (PCTs).

Materials and Methods: Retrospective review of all transhepatic PCTs placed between January 2005 and June 2014 was performed: 255 patients were included (median age of 65 y; range, 20–95 y). Of these patients, 97 had ascites and 158 had no ascites or only pelvic fluid. In all, 115 patients had calculous cholecystitis (45%), 127 had acalculous cholecystitis (50%), and 13 had common bile duct obstruction (5%). The primary outcome of interest was all complications, including bile peritonitis, pericatheter leakage requiring PCT change, pericholecystic abscess formation, drain dislodgment, or death from biliary sepsis within 14 days of initial PCT insertion.

Results: The overall complication rate was 11% among patients with ascites ($n = 11$), compared with 10% in those without ($n = 16$; $P = .834$). No difference was found between the two groups in any one complication. The overall outcome of PCT drainage differed between groups, with significantly shorter survival times in patients with ascites. Patients with ascites underwent cholecystectomy less often than patients without ascites (21% vs 39%; $P = .002$). Likewise, patients with ascites were more likely than those without ascites to die with the PCT in place (49% vs 25%; $P = .001$).

Conclusions: Frequencies of complications following PCT insertion were similar in patients with and without ascites. Additionally, the overall complication rate was low and not significantly different between the two groups. These observations support the use of PCT placement in patients with ascites.

ABBREVIATION

PCT = percutaneous cholecystostomy tube

Percutaneous cholecystostomy tube (PCT) placement is a common procedure performed in patients presenting with clinical diagnosis of acute cholecystitis and extensive comorbidities (1). The placement of a PCT is relatively safe even in critically ill patients and is an accepted part of the treatment paradigm (1,2).

A potential obstacle to safe percutaneous catheter drainage is the presence of ascites, with few studies investigating contraindications to PCT (3,4). The present

study was undertaken to evaluate whether the presence of abdominal ascites increases the incidence of complications following placement of PCTs.

MATERIALS AND METHODS

Patient Selection and Data Collection

In accordance with the institutional review board, a retrospective review of all patients who underwent a transhepatic percutaneous cholecystostomy procedure from January 2005 until June 2014 at an academic medical center was performed by examining the records from a dedicated interventional radiology database (HI-IQ; ConexSys, Lincoln, Rhode Island). In total, 255 patients were identified. All catheters were placed by interventional radiologists (mean experience, 12 y; range, 1–22 y) with combined ultrasound (US) and fluoroscopic guidance via Seldinger technique (5) in an inpatient interventional radiology suite. No catheters were placed via trocar technique. No catheters were placed at bedside.

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Table E1 is available online at www.jvir.org.

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All catheters were 8 or 10 F in size and secured in place with sutures.

The electronic medical records of these patients were examined for procedure details including technical success, complications, and concurrent paracentesis or ascites drainage if performed. The indication for PCT placement was reviewed and recorded as calculous cholecystitis, acalculous cholecystitis, or common bile duct obstruction. Follow-up PCT cholangiograms and tube exchanges were reviewed, and outcomes including the duration of PCT therapy were recorded. The medical record of each patient was reviewed for comorbidities, age at PCT placement, duration of PCT therapy, surgery for acute cholecystitis, PCT complications if applicable, and outcome of PCT therapy. Intentional removal of PCTs was performed following cholecystographic documentation of patent cystic and common bile ducts as well as a trial of intentional PCT occlusion without clinical symptoms of cholecystitis.

The presence or absence of ascites was determined by examining images from PCT placement and all other available diagnostic imaging studies (abdominal US, abdominal computed tomography, or abdominal magnetic resonance imaging) obtained during the hospital encounter within 1 week before and as long as 2 weeks after PCT insertion. From the available imaging, the quantity and location of simple abdominal fluid was classified into one of the following categories: none, pelvic fluid, perihepatic fluid, or diffuse abdominal fluid. Diffuse ascites was defined as fluid interspersed contiguously throughout the abdomen and pelvis. Patients with only pelvic fluid were not included in the ascites group. Perihepatic fluid was defined as at least 1 cm deep, on the axial or transverse axis, of nonoculated simple fluid around the liver without contiguous fluid in the pelvis. Intraprocedural imaging and documentation was inconsistent and unreliable to determine the extent of ascites traversed during PCT placement, but all PCTs placed in patients with ascites traversed at least 1 mm of measurable fluid on follow-up imaging when imaging was available. The primary outcome of interest was tube complications, which were defined as bile peritonitis, pericatheter leakage requiring PCT change, pericholecystic or hepatic abscess formation, hemoperitoneum, drain dislodgment requiring tube change or reinsertion, or biliary sepsis within 14 days of initial insertion of the PCT. Complications were deemed related to the PCT if clinically suspected and included in the medical record. If clinical deterioration occurred following PCT placement and suspicion of a biliary or PCT source was not included in the patient's medical record, further analysis was performed and the clinical judgment of the researchers was used to determine the source.

There were 255 patients included in the study, with a median age of 65 years (range, 20–95 y). Of these patients, 97 had ascites and 158 had no ascites or only pelvic fluid (Table 1). In all, 115 patients had calculous

Table 1. Categorization of Abdominal Fluid

Finding	Ascites	No Ascites
No. of pts.	97 (38)	158 (62)
Pelvic fluid		
Present	–	16 (6)
Absent	–	142 (56)
Fluid location		
Perihepatic	47 (18)	–
Diffuse	34 (13)	–
Massive	16 (6)	–

Note—Values in parentheses are percentages. Categorization of abdominal fluid in patients who underwent transhepatic percutaneous cholecystostomy tube placement. Perihepatic, diffuse, and massive abdominal fluid were considered ascites for this study.

cholecystitis (45%), 127 had acalculous cholecystitis (50%), and 13 had common bile duct obstruction (5%; Table 2). All patients with ascites underwent transhepatic PCT placement. Nine patients received paracentesis at the time of PCT insertion at the interventional radiologist's discretion. All nine patients had diffuse ascites and exhibited reaccumulation of ascites during the treatment course, with one patient requiring tube upsizing for pericatheter leakage. Mean follow-up was 19 months (range, < 1 to 99 mo).

Data Interpretation and Statistical Analysis

Statistical analysis was performed by using SPSS statistical software (version 18; SPSS, Chicago, Illinois). Categorical variables were analyzed by χ^2 test and Fisher exact test as appropriate based on sample size. Continuous variables were analyzed by two-sided Student *t* test or analysis of variance as appropriate. The significance level was defined as $P < .05$ on two-tailed tests. When analyzing the association of complications with ascites, patients with diffuse and perihepatic ascites were categorized as having ascites present, whereas those with only pelvic fluid or no fluid were categorized as having no ascites (Table 1).

RESULTS

The overall incidences of PCT complications were similar between the two groups. Complications occurred in 11% of patients with ascites ($n = 11$) compared with 10% of those without ascites ($n = 16$; $P = .834$). No difference was found between the two groups for any one type of complication. The incidences and types of complication for patients with and without ascites are further detailed in Table 3. Analysis of complications was also performed when only diffuse ascites was categorized as ascites to evaluate the hypothesis that only large volumes of fluid would increase the risk of complications. Again, no significant difference was detected between patients with and without ascites when

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