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Percutaneous Cholecystostomy in Acute Acalculous Cholecystitis

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Summary

Percutaneous cholecystostomy was performed in 8 poor-surgical-risk patients with acute acalculous cholecystitis. Seven patients had had previous laparotomy, 1 patient a coronary bypass operation. A transhepatic approach was used in all patients. Insertion of the drainage catheters was guided by ultrasound and fluoroscopy. Percutaneous drainage was successful in all patients, with no need for further surgical intervention. Two patients died, for reasons unrelated to the gallbladder disease. Percutaneous cholecystostomy may be definitive treatment for acute acalculous cholecystitis in the critically ill patient.

Key words

Cholecystitis – Intensive care – Percutaneous cholecystostomy

Introduction

Acute acalculous cholecystitis is a well-recognized complication of major trauma and critical postoperative illness in intensive care patients. Its incidence is reported to be as much as 5% (1, 2). Dysfunction of the gallbladder and ischemia of the microcirculation are considered to cause inflammation of the acalculous gallbladder (3, 4, 5, 6). Cholecystectomy, the treatment of choice in acute cholecystitis, is often avoided in these high-risk patients, because of such complicating factors as cardiac, pulmonary or renal insufficiency and septicemia. Surgical cholecystostomy has been recognized as beneficial when the patient is considered too ill to survive cholecystectomy (1, 2).

Percutaneous cholecystostomy in experimental trials (7, 8), and several studies on its clinical application have been reported (9, 10, 11, 12). Ultrasound and fluoroscopic guidance are used to place drainage catheters. The importance of the transhepatic approach in preventing leakage is emphasized by several authors (12, 13, 14). Specially designed catheters and introducing techniques have been described (9, 15, 16). Indications, drainage technique and results of percutaneous cholecystostomy in acute acalculous postoperative cholecystitis in 8 patients are the subject of the present report.

Materials and methods

Percutaneous cholecystostomy was performed in 8 patients on intensive care. Their ages ranged from 46 to 77 years (mean age: 62 years). Both clinical symptoms of acute cholecystitis and ultrasonographic findings such as distended gallbladder, sludge, wall thickening and fluid around the gallbladder lead to the diagnosis of acute acalculous cholecystitis. In 2 cases CT additionally confirmed the clinical diagnosis.

Seven out of 8 patients had previous laparotomy. Percutaneous cholecystostomy was performed between 17 and 30 days (mean: 22 days) after surgery in 6 patients, and 64 and 69 days postoperatively in 2 patients, respectively. The patients had the following underlying diseases: blunt abdominal trauma (2), gastrectomy (2), rupture of an infrarenal aortic aneurysm (1), hemihepatectomy (1), mesenteric infarction (1) and triple coronary bypass (1). In 2 patients the percutaneous cholecystostomy was performed as a bedside procedure in the intensive care unit under ultrasonic control. Both ultrasound and fluoroscopic guidance was employed in 6 patients. An anterior-lateral transhepatic approach was carefully selected, entering the gallbladder where it is attached to the liver. Puncture was performed using a 4 French needle with a preloaded Teflon sheath. 7 French pigtail catheters (2 patients) and 8 French multipurpose drainage catheters (6 patients) were introduced, using Seldinger's technique, over 0.035 inch guide wires. For immediate decompression of the gallbladder, bile was aspirated and sent for bacteriological studies.

Cholecystography was performed with approximately 20 cc of nonionic contrast medium, with the exception of 2 patients drained in the intensive care unit.

Results

Ultrasonographically-guided puncture of the gallbladder via a transhepatic approach was successful in all cases. Catheter positioning over an exchange guide wire was performed without complication after careful dilatation of the needle track. Multiple-sidehole catheters ensured adequate drainage. At least 7 French catheters were used to obtain complete evacuation of the bile, which was rather viscous due to acute cholecystitis. Cholecystography performed immediately after evacuation of the gallbladder demonstrated correct catheter placement and no bile leakage. The cystic duct was not visualized in 5 out of 6 patients, whereas in 3 cases repeated cholecystography with the identical amount of contrast medium after several days of drainage revealed a patent cystic duct and common bile duct. No attempt was made to obtain cholangiography at the initial procedure due to the risk of causing or aggravating sepsis.

Immediate relief of the clinical symptoms of acute cholecystitis was observed after gallbladder decompression in all cases. Three patients had positive bile cultures: enterococcus (1), *E. coli* and *Pseudomonas aeruginosa* (1) and



Fig. 1 Percutaneous cholecystostomy:
A: Acute cholecystitis demonstrated on CT-scan: distended gallbladder, thickened wall and fluid collection around the gallbladder.

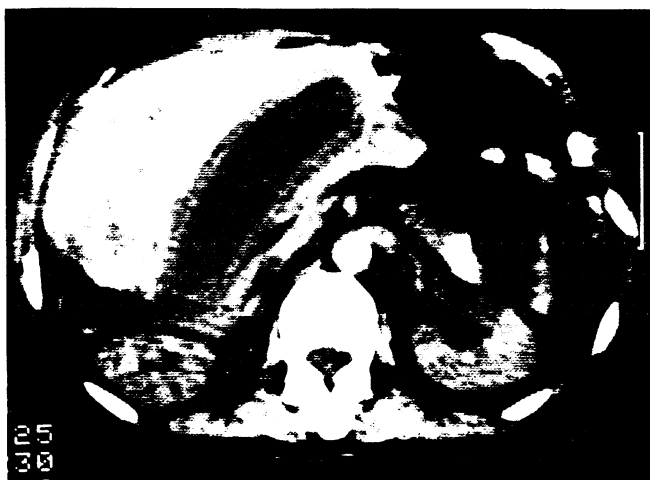


Fig. 1C: CT scan 5 weeks later: no evidence of inflammation



Fig. 1B: Normal cholecysto-/cholangiogram after several days of drainage.

enterococcus and *Pseudomonas aeruginosa* (1). A concomitant liver abscess with an identical bacteriological culture was drained percutaneously in one patient. This patient died 17 days after the procedure due to multiorgan failure. Another patient died more than 3 months after cholecystostomy, of the underlying malignant disease. In all cases cholecystostomy proved to be definitive with no need for further surgical intervention. Duration of drainage varied from 2 to 28 days. There were no complications related to the percutaneous intervention.

Discussion

Acute acalculous cholecystitis in critically ill patients is observed mainly after abdominal surgery, prolonged sepsis and in polytraumatized patients (1, 2, 5). Factors which cause inflammation of the gallbladder include mucosal ischemia with consecutive thrombosis and inhibition of the gallbladder motility, sometimes aggravated by analgesic drugs (3, 4, 5, 6). Immediate therapy is advocated to prevent perforation. Early cholecystectomy is the treatment of choice. Surgical cholecystostomy as a temporizing procedure is performed only if the patient is considered a poor surgical risk (1, 2, 12).

The diagnosis of acute acalculous cholecystitis in postoperative, often comatose, patients is difficult (3, 9, 18). The decision in favor of percutaneous intervention in this study was based largely on clinical information supported by CT and US findings which demonstrated a distended gallbladder, sludge, wall abnormalities or fluid around the gallbladder. The bile aspirated at the initial puncture was thick and black in all patients, 5 out of 6 cholecystograms demonstrated a blocked cystic duct without calculi. In our experience both observations suggest an acute inflammation of the gallbladder. The immediate clinical response to percutaneous cholecystostomy and the return of bile viscosity and color to normal after several days of drainage, may be considered proof of acute cholecystitis.

Positive bile cultures in postoperative cholecystitis were obtained in only 8 out of 25 patients treated with cholecystectomy or percutaneous cholecystostomy between 1978 and 1987 in our department (17). Seventy-two per cent of these patients with cholecystectomy had necrotic ulcers in the gallbladder wall, 5 already had a perforation. Only 3 out of 8 percutaneously drained patients had positive bile cultures, and similar results are reported by *Lameris* (14), *Shaver* (12) and *v. Sonnenberg* (9). Negative bile cultures do not exclude acute cholecystitis.

A number of reports in the literature support the effectiveness of percutaneous cholecystostomy in gallbladder disease (7, 8, 9, 10, 11, 12, 20). With respect to catheter drainage of acute acalculous cholecystitis several cases have been reported in the literature (9, 10, 12, 13, 14, 15, 18, 21, 22). Poor surgical risk patients are considered candidates for percutaneous drainage. Additional cholecystectomy in acute



Fig. 2 Ultrasound demonstrates an enlarged gallbladder with sludge (above left), cholecystography reveals occlusion of the cystic duct; after several days of drainage echolucent gallbladder; the drainage catheter is still in place (above right)

acalculous cholecystitis, as reported by *Pearse* (10) in 15 out of 22 patients, does not seem to be necessary in the view of some authors (13, 14, 21, 22) including those of the present report: 6 surviving patients in this study proved percutaneous cholecystostomy to be definitive treatment. Complications during the drainage period, such as bleeding, perforation or necrotic ulcers are considered the only reasons for surgical intervention (13, 14). No bile leakage or bile fistula was observed after catheter removal. The transhepatic approach reduces the risk of a permanent fistula or intraperitoneal bile leakage if patency of the cystic duct is provided (9, 12, 14, 22).

Adverse side effects related to the puncture procedure were not encountered. The combination of ultrasound and fluoroscopy provides permanent control during the procedure, and permits safe insertion of the catheter using Seldinger's technique (9, 13, 16). Even in cases performed as a bedside procedure without fluoroscopy, a guide wire exchange technique should be used, avoiding direct insertion with the trocar technique (9, 22). Vagal hypotension, as mentioned in one report (23), was not observed. Immediate decompression of the gallbladder reduces the risk of perforation or bile leakage (9, 13).

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