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Ultrasound-guided percutaneous cholecystostomy for acute cholecystitis in critically ill patients: One center's experience

Akut kolesistitli kritik hastalarda ultrason eşliğinde perkütan kolesistostomi: Bir merkezin deneyimi

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Background/aims: *The standard treatment for acute cholecystitis is cholecystectomy; however, cholecystectomy is not an option in some patients who are too high-risk for emergency surgery. Ultrasound-guided percutaneous cholecystostomy is an alternative for such patients. This study presents one center's five-year clinical experience with ultrasound-guided percutaneous cholecystostomy for treatment of acute cholecystitis.* ***Methods:*** *In this study the records of all patients (18 total; mean age, 68.2±15.4 years; range, 42-91 years) who underwent ultrasound-guided percutaneous cholecystostomy for acute cholecystitis between June 1998 and October 2003 were reviewed. Duration of hospitalization, duration of tube placement, mortality and morbidity after tube placement, complication rates, culture results for aspirated bile, and clinical outcomes were analyzed.* ***Results:*** *Fourteen patients were diagnosed with acute calculous cholecystitis and four were diagnosed with acalculous cholecystitis. The average hospital stay was 19±12.6 days (range, 5-52 days), and the average duration of catheter drainage was 20.5±19.1 days (range, 1-75 days). Six patients underwent open cholecystectomy between days 16 and 26 of catheter drainage, and none had postoperative complications.* ***Conclusions:*** *Ultrasound-guided percutaneous cholecystostomy is a relatively safe and easy method for treating acute cholecystitis in critically ill patients. The risk of complications is low and the likelihood of success is high.*

Key words: Acute cholecystitis, percutaneous treatment, cholecystostomy

Amaç: *Akut kolesititte standart tedavi kolesistektomidir; bununla birlikte bazı hastalar acil cerrahi için yüksek riskli olup, bu vakalarda kolesistektomi mümkün olamamaktadır. Ultrasonografi eşliğinde perkütan kolesistostomi bu hastalarda uygulanabilecek bir diğer alternatiftir. Bu çalışmada bir merkezin akut kolesistit nedeniyle ultrasonografi eşliğinde perkütan kolesistostomi uygulamasına ait 5 yıllık deneyimi sunulmaktadır.* ***Yöntem:*** *Bu çalışmada Haziran 1998 ve Şubat 2003 arasında ultrasonografi eşliğinde perkütan kolesistostomi uygulanan bütün hastalar (18 toplam; ortalama yaş, 68.2±15.4 yıl; aralık, 42-91 yıl) değerlendirildi. Hastanede yatma süresi, tüp kalma süresi, tüp yerleştirildikten sonraki mortalite ve morbidite, komplikasyon hızları, aspire edilen safra kültür sonuçları ve klinik sonuçlar analiz edildi.* ***Bulgular:*** *Ondört hastada akut taşlı kolesistit ve 4 hastadada akut taşsız kolesistit tanısı kondu. Ortalama hastanede kalış süresi 19±12.6 gün (5-52 gün) ve ortalama kateter drenaj süresi 20.5±19.1 gün (1-75) olarak tespit edildi. Altı hastaya kateter drenajı uygulanmasından sonra 16 ile 26. günler arasında açık kolesisektomi uygulandı ve bu hastalarda ameliyat sonrası komplikasyon gelişmedi.* ***Sonuç:*** *Ultrasonografi eşliğinde perkütan kolesistostomi kritik hastalarda akut kolesistit tedavisinde kullanılan güvenli ve kolay bir metoddur. Komplikasyon oranı düşük ve başarı oranı yüksektir.*

Anahtar kelimeler: Akut kolesistit, perkütan tedavi, kolesistostomi

INTRODUCTION

The standard treatment for acute cholecystitis is cholecystectomy. Most patients with acute cholecystitis undergo open or laparoscopic cholecystectomy; however, some have other significant medical problems that make general anesthesia and surgical management unsafe. The mortality rate for low-risk elderly patients who require emergency cholecystectomy is 10%, but the figure for high-risk older individuals is as high as 40%-50% (1-4).

Ultrasound-guided percutaneous cholecystostomy (USGPC) is a minimally invasive procedure that is

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performed under local anesthesia. This technique was first introduced by Radder in 1980 (5). We retrospectively investigated cases of acute cholecystitis that were managed with USGPC during a five-year period at our center. Here we report our findings and discuss the efficacy, advantages, complications, and long-term results of this procedure.

MATERIALS AND METHODS

We reviewed the records of all patients with acute cholecystitis who underwent USGPC in the Departments of General Surgery and Radiodiagnostics at Başkent University Hospital in Ankara, Turkey between June 1998 and October 2003. Acute cholecystitis was clinically diagnosed if a patient was febrile and had right upper abdominal quadrant pain and/or tenderness in the right abdomen. In each case, the diagnosis was confirmed with ultrasonography or computed tomography findings of gallbladder distention, sludge formation or cholelithiasis, or a thickened gallbladder wall.

The USGPC procedure was performed under local anesthesia, and the steps were as follows: A cholecystostomy catheter was inserted percutaneously by an interventional radiologist under ultrasonographic (US) and fluoroscopic guidance. First, the gallbladder was located ultrasonographically, and transparietal puncture was performed by passing a Seldinger needle through the hepatic parenchyma and into the gallbladder. A sample of gallbladder fluid was collected for bacteriologic studies. An 8.5-F pigtail catheter was then placed under US guidance via a two-step method involving guide-wire exchange (Flexima, Boston Scientific, USA). After all bile was aspirated from the gallbladder, cholecystography was performed via the catheter to confirm the type of pathology present (calculous or acalculous cholecystitis). The catheter was left in place for drainage, and was flushed with saline solution every 48 hours. Approximately seven days after catheter placement, repeat cholecystography was done to investigate cystic duct patency and assess the common bile duct (Figures 1 and 2).

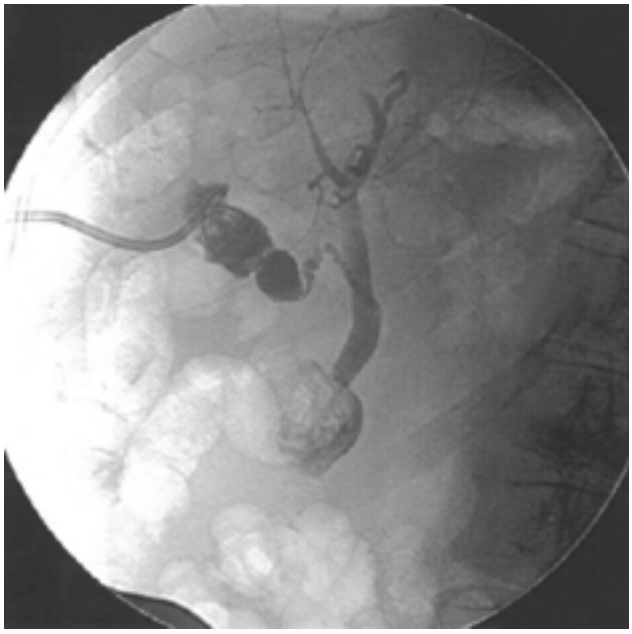

Figure 1. Cholecystography performed via the percutaneous cholecystostomy catheter seven days after placement: Note the irregular contour of the gallbladder wall and multiple filling defects in the lumen due to stones or sludge. In this case, there was also extravasation of contrast material into the perihepatic space

Figure 2. Cholecystography performed via the percutaneous cholecystostomy catheter seven days after placement in a different case from Figure 1. Observe the irregular gallbladder wall and contrast material passing into the intrahepatic bile ducts, the common bile duct, and the duodenum via the patent cystic duct. Note the diverticulum-like formation at the distal end of the common bile duct

RESULTS

Eighteen patients (12 men, 6 women; mean age, 68.2 ± 15.4 years; range, 42-91 years) were treated with USGPC during the study period. Before the procedure, all patients had pain (epigastric or in the right hypochondrium), 10 (55.6%) had fever (body temperature above 38.5°C), eight (44.4%)

reported vomiting, and two (11.1%) had jaundice. Ultrasound revealed a thickened gallbladder wall in 10 cases (55.6%) and pyocholecystitis in five cases (27.8%).

Twelve patients (66.7%) were diagnosed with acute calculous cholecystitis and six (33.3%) with acute acalculous cholecystitis. The medical risk factors were terminal-stage cancer (4 patients), uncontrolled hypertension and diabetes mellitus (3 patients), coronary heart disease (6 patients), hypertension and chronic renal insufficiency (1 patient), and acute renal failure (1 patient).

The mean hospitalization time for the 18 patients was 19 days (range, 5-52 days) and the mean drainage time was 20.5 days (range, 1-75 days). Twelve patients' (66.7%) symptoms resolved within six days. As noted, the catheters were flushed with saline solution every other day, and none became blocked or dislodged.

The findings for complications were as follows: none of the patients developed bile leakage; one (5.6%) developed hemorrhage that was drained via the catheter (Figure 3) and resolved spontaneously; and four (22.2%) had pain at the catheter site. There were no procedure-related deaths, but three patients (16.7%) died during hospitalization.

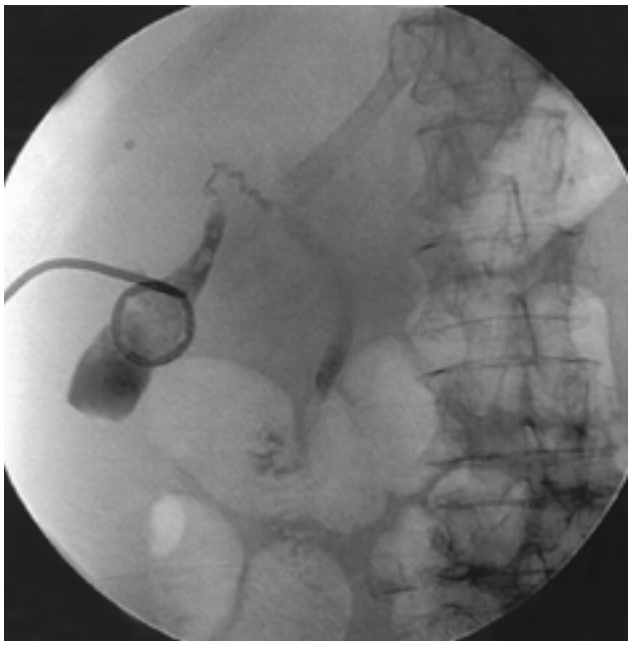

Figure 3. Cholecystography performed via the percutaneous cholecystostomy catheter three days after placement: Note the filling defects in the gallbladder lumen due to hemorrhage after catheter replacement, and the passage of contrast material into the duodenum via the cystic duct and common bile duct

The respective causes of death were sepsis caused by vancomycin-resistant *Staphylococcus aureus,* congestive heart failure, and acute renal insufficiency. One patient with lung adenocarcinoma was discharged from the hospital at his own request the day after tube placement.

Cultures of the bile aspirated from the patients' gallbladders revealed *Escherichia coli* in five cases (27.8%), *Klebsiella pneumoniae* in four cases (22.2%), *S. aureus* in one case (5.6%), and multiple isolates (Gram-positive and Gram-negative species) in six cases (33.3%). Two patients' cultures (11.1%) were negative. All 18 individuals were treated medically, including antibiotic therapy, before USGPC.

Six (33.3%) patients underwent cholecystectomy between days 16 and 26 of catheter drainage. None of these patients had shown clinical improvement despite USGPC and antibiotic treatment. There were no postoperative complications after cholecystectomy.

The other 12 patients showed good clinical improvement with USGPC and antibiotic treatment, and surgery was not performed in these cases. The main reasons for not performing surgery in these patients were terminal-stage carcinoma (4 patients), cardiac problems (1 patient with cardiac aneurysm and cardiac insufficiency, 1 patient with myocardial infarction), and refusal of elective cholecystectomy (3 patients).

DISCUSSION

Percutaneous cholecystostomy is an easy procedure to perform and, when carried out by experienced radiologists, is very successful with few complications. Patients who have acute cholecystitis but are poor surgical risks, and those who have already been hospitalized for another serious medical problem when they develop acute cholecystitis, are good candidates for USGPC (5, 6).

Twelve (66.7%) of our 18 patients with acute cholecystitis who underwent USGPC showed clinical improvement within six days. This level of response suggests that this procedure is an effective alternative to surgery, whether used as a stopgap measure until the patient is clinically fit for an operation, or as definitive management for those with serious comorbidity or terminal disease. One of the main advantages of percutaneous cholecystostomy is that it is performed under local anesthesia. If a patient is not well enough to be trans-

ferred to the radiology suite, this procedure can even be done at bedside in the intensive care unit.

All of the cholecystostomy tube placements in our series were done transhepatically. There is still debate as to whether the transhepatic route is preferable to the transperitoneal route; some have reported higher bleeding rates with the former (7-8). Aside from pain at the catheter site, the only early complication in our series was hemorrhage via the catheter (Figure 3). This occurred in one patient and resolved spontaneously. Other documented complications of USGPC include bile leakage, hypotension, bowel injury, and pneumothorax (9, 10). There were no delayed complications (leaking or blocked cholecystostomies or tube dislodgment) in our 18 cases, whereas previous reports have noted rates of catheter dislodgment or occlusion as high as 43% (10, 11). Careful attention to the care of cholecystostomy tubes, that is, secure fixation to the skin and use of self-retaining loop catheters, can help minimize the risk of dislodgment.

All the patients in our series presented with clinical and radiologic features of acute calculous cholecystitis, including a distended gallbladder. Intraluminal "sludge-like" material, which suggested the presence of pus, was observed in five cases. These five individuals' clinical symptoms improved dramatically after percutaneous cholecystostomy.

In patients treated with USGPC, once the symptoms of acute cholecystitis diminish, the choice of treatment depends on the patient's clinical status. Cholecystography can help with decision-making at this stage. The reported rates of acute cholecystitis recurrence after cholecystostomy in patients with gallstones range from 25%-30% (3, 12). This high frequency explains why elective surgery is always recommended for this patient group. It is still not clear whether patients who have acalculous cholecystitis or gallbladder sludge should be operated, especially if the individual is of older age. Opinions differ as to whether it is safe for patients who show normal passage of contrast into the duodenum on cholecystography to be followed without surgery (13).

In our experience, USGPC is a safe and effective procedure for treating elderly high-risk patients who present with acute cholecystitis. Once the acute symptoms diminish or resolve, USGPC should be followed by elective cholecystectomy, if possible, or by conservative management if the patient is inoperable due to systemic disease.

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