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Percutaneous Cholecystostomy (PC) in the Management of Acute Cholecystitis in High Risk Patients

Shaista Afzal Saeed and Imrana Masroor

ABSTRACT

Objective: To determine the role of ultrasound -guided percutaneous cholecystostomy (PC) regarding complications and outcome in the management of acute cholecystitis in patients high risk for surgery and anaesthesia and not responding to conservative management.

Study Design: Observational case series.

Place and Duration of Study: The study was carried out at The Aga Khan University Hospital, Karachi, from January 2003 to December 2007.

Methodology: The study included patients admitted with acute cholecystitis considered unfit for immediate surgery but not responding to conservative management. Percutaneous cholecystostomy was conducted under ultrasound guidance. The studied variables included patients' demographics, co-morbid, ultrasound findings of biliary tree, indication for percutaneous cholecystostomy, its route, complication during or after procedure, patient's clinical outcome (upto 48 hours) and 30 days follow-up. Those with incomplete medical record and follow-up were excluded. Data were analyzed and results compiled using SPSS 16.0 version. Mean and standard deviation for quantitative variable like age was derived. Proportions were computed for complications and patient's clinical outcome.

Results: Forty one patients with complete medical record were studied including 15 (37%) males and 26 (63%) females. Mean age was 65 ±13.5 years. Indications for PC included calculus cholecystitis in 25, acalculous cholecystitis in 10, empyema in 04 and gallbladder perforation in 02 patients. No complication was seen during or after procedure in 31 (75%) patients. Complications occurred in 10 (25%) patients including vagal reaction, pain during procedure, tube blockage, catheter dislodgement and bile leakage. Favourable clinical response (improvement in clinical symptoms) was noted in 34 (83%) patients. Seven (17%) patients did not show any improvement in clinical condition after the procedure. On 30 days follow-up, 9 patients had undergone cholecystectomy, 5 (12%) patients expired due to underlying clinical conditions and the rest were settled without requiring an immediate cholecystectomy. There was no direct procedure-related mortality.

Conclusion: Imaging guided PC is a safe and effective procedure for immediate management of non-resolving acute cholecystitis in patients high risk for surgery and anaesthesia and not responding to conservative management.

Key words: *Percutaneous cholecystostomy. Acute cholecystitis. High risk. Ultrasound guidance. Safety.*

INTRODUCTION

One of the common causes of emergency surgical referral is acute cholecystitis of which 50-70% cases are seen in the elderly patients.¹ Cholecystectomy is considered as standard procedure for acute cholecystitis but in high risk patients since its morbidity and mortality rates are high, conservative management is an option. Although the technique of laparoscopic cholecystectomy is associated with less pulmonary dysfunction and complication,² a number of risk factors have been identified, that may result in conversion to open cholecystectomy.³ In patients not responding to conservative treatment percutaneous cholecystostomy (PC) is a treatment option. The technique is effective, minimally invasive and allows gallbladder decompression and

resolution of inflammation. The indications for PC are acalculous and calculus cholecystitis, perforated gallbladder, biliary obstruction etc.⁴ The procedure may be performed by either transhepatic or transperitoneal approach under ultrasound or CT guidance. The advantages of transhepatic approach are catheter stability, less chance of bile leakage and bowel injury. However, there is possibility of pneumothorax, bleeding and haemobiliary fistula.⁵ Transperitoneal approach is preferred in the presence of hepatic dysfunction or when the gallbladder is adequately distended.⁶ However, it carries the risk of bowel perforation. The reported minor complication rate of PC is 4-18%,⁷ while major complication rate of 3.9% is reported by Van Sonnenberg *et al.*⁸ In patients with acute acalculous cholecystitis or surgically unfit patients percutaneous cholecystostomy may be the definitive treatment.⁹

The idea of PC conducted by radiologists is still evolving in Pakistan. At present there is no published local data available on this procedure. This provided the rationale for highlighting the practice since it remains under recognized in clinical practice.

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The aim of this study was to determine the safety of ultrasound (u/s) guided percutaneous cholecystostomy regarding complications and outcome in terms of symptomatic improvement and survival in the management of acute cholecystitis in patients immediately unfit for surgery or anaesthesia and not responding to conservative management.

METHODOLOGY

This observational case series was carried out in the Radiology Department of the Aga Khan University Hospital and the medical record of patients who underwent image guided PC from January 2003 to December 2007 in ultrasound section were reviewed. In 2007 the procedure was shifted from ultrasound to VIR (vascular interventional radiology) section for administrative reason. The diagnosis of acute cholecystitis was based on clinical presentation, laboratory results and radiological imaging. The patients were evaluated and referred by the treating surgeons for PC, if not responding to conservative management and were high risk/unfit for surgery and anaesthesia due to old age and associated comorbidities e.g. myocardial infarction, chronic renal failure, hypertension, sepsis, diabetes, stroke etc. The patients with complete medical record and follow-up available for at least 30-days were included while those with incomplete follow-up were excluded.

The on-duty radiologist carried out the procedure. Patients' bleeding profile that included PT, APTT, INR and platelets was determined and corrected if abnormal. The procedure was performed using Seldinger technique. Under ultrasound guidance the gallbladder was punctured using 18 G spinal needle followed by placement of guide wire, tract dilatation and placement of 8 Fr. Pigtail catheter in the gallbladder lumen. (Figures 1 and 2) The catheter was secured by a suture to the abdominal wall.

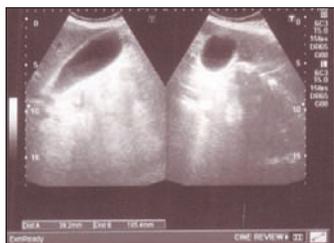


Figure 1: Ultrasound image showing slightly thickwalled distended gallbladder with sludge.



Figure 2: Same patient as in Figure 1, after Cholecystostomy showing the tip of pigtail catheter (arrow) within the gallbladder and the resultant decompression.

Patients' data collection and analysis included demographics, patients comorbidities, ultrasound findings, laboratory results, indication for the procedure and its approach, complications during or after the procedure, (major complications defined as death, bowel/organ perforation and haemorrhage requiring blood transfusion

and minor complications defined as bile leakage, tube dislodgement/blockage, vaso-vagal reaction or pain). Patient's clinical outcome at 48 hours was recorded favourable as suggested by resolution of symptoms, reduction of body temperature by at least 1°C or reduction of WBC count of greater than 25%. Patient's postprocedure 30 days follow-up was also recorded. The data was analyzed and results compiled using SPSS version 16.0. For quantitative variable like age, mean and standard deviation was derived. Proportions were computed for complications during or after the procedure, patient's clinical outcome at 48 hours and post procedure 30 days follow-up.

RESULTS

A total of 63 patients during the study period underwent the procedure, however, due to unavailability of complete medical records and follow-up 22 were excluded. Out of the 41 patients who were finally included there were 15 males and 26 females with mean age of 65±13.5 years (range 16-88). The Indications for PC included calculus cholecystitis (n=25), acalculous cholecystitis (n=10), empyema (n=4) and gallbladder perforation (n=2). The procedure was done through transperitoneal route in 6 (15%) patients and through transhepatic approach in 35 (85%) patients and was successfully carried out in all 41 patients. There were no major complications however, minor complications were seen in 10 (24%) patients and these included tube dislodgement in 5 (12%), tube blockage in 2 (5%), bile leak, vagal reaction and pain in one patient each (Table I). Favourable clinical outcome was seen in 34 (83%) patients. No clinical improvement was seen in 7 (17%) patients. On 30 days follow-up 9 (22%) patients underwent operative cholecystectomy; 5 (12%) patients expired due to underlying clinical condition as 2 patients died of sepsis, 2 from multi-organ failure and one from cardiac failure. The rest were stable not requiring immediate surgery. There was no procedure related death.

Table I: Complications during or after the procedure. Number of patients = 41

Complication	Number of patients (%)
Major complications	Nil
Minor complications	10 (24%)
Tube dislodgement	5 (12%)
Tube blockage	2 (5%)
Bile leak, vagal reaction and pain	3 (7%)

DISCUSSION

The management of acute cholecystitis in elderly and high risk patients is challenging as emergency cholecystectomy carries a high mortality rate (4.4-7.5%)¹⁰ and an increased conversion rate (8.7-35%).¹¹ In this group PC results in resolution of inflammation and an elective interval cholecystectomy can be carried out later and in cases of acalculous cholecystitis it may be the only definitive treatment.

Since the introduction of the procedure in 1980,¹² many reports have described its safety and efficacy as a treatment for acute cholecystitis. In this study the procedure was performed successfully with a technical success rate of 100% which is comparable to other studies.¹³ Clinical outcome following PC is usually immediate and no response should prompt the clinician of an alternative source of infection or a complication like necrosis of gallbladder. Improved clinical response was seen in 83% of patients in this study and compares favourably with other series reporting response rate of 81-93%.¹⁴

PC was performed by transhepatic approach in 35 (85%) and transperitoneal approach in 6 (15%). The comparison between the two techniques was not possible in this study due to small numbers of patients. Selection of either approach is dependent on operator preference and do not show significant difference in complication rate.¹⁵

The complication rate of the procedure is 24% in this study and is slightly towards the higher side however, there were no major complications. Procedure related complications reported in literature ranges from 0-25% with the most frequent being catheter displacement.¹⁶ This was also noted in 5 patients in this study. Mortality rate on 30 days follow-up was 12% and was due to severe comorbid illness in these patients. In literature the overall mortality ranges from 5.5-41% and mortality due to procedure related complications ranges between 0-4.5%.¹⁷ There were no deaths directly related to the procedure in this study. However, the comparison of mortality rates in the different series is not justifiable due to the difference of the involved risk factors.¹⁸

There were certain limitations that need to be stated and may raise further future research questions. Retrospective data collection is one of those limitations. In this study the procedure was performed by general radiologists with varied experience and its impact on complication remains questionable. The severity of acute cholecystitis and the ASA (American Society of Anaesthesiologist) physical status classification of the patients were not objectively scored which may have affected the outcome and follow-up. Further research may answer questions whether an objective scoring may alter results. In the current series, the procedure was conducted by general radiologists, a later audit may identify if there was any change in the outcome in terms of success rate (presently 83%), complication rate (presently 24%) or change in the adopted route (presently transhepatic in 85%) when the procedure was performed by a dedicated interventional radiologists.

CONCLUSION

Ultrasound guided PC is a safe and effective procedure to treat non-resolving acute cholecystitis in high risk

patients. Due to its high technical success rate and few procedure related complications it remains as an important treatment option in management of acute cholecystitis.

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