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Percutaneous Cholecystostomy is a Feasible and Safe Option for High-Risk Acute Cholecystitis Patients.

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ABSTRACT

Objective: The best option for treating high-risk patients with acute cholecystitis is still being determined. We evaluated our high-risk acute cholecystitis patients in whom we preferred percutaneous cholecystostomy and aimed to determine whether this approach was safe and feasible.

Methods: We retrospectively reviewed our 71 patients in whom we performed percutaneous cholecystostomy between May 2019 and July 2023. All procedures were performed with local anaesthesia under ultrasonographic guidance via the transhepatic route. The catheters were removed when the signs of acute cholecystitis were significantly regressed or when the catheters were found to be ineffective. The catheters of those eligible for surgery were removed during the operations.

Results: All procedures were successful without failure, and no significant complications developed in the post-intervention period. Pain at the catheter insertion site (20 patients) was the leading minor complication, and in one patient, bilioma was detected and percutaneously drained. The procedure was ineffective in 7 patients (9.85%), and the catheters were removed. In 22 patients (31%), interval cholecystectomy surgery was performed. In the subgroup of patients whose catheters were adequate and were not operated (5 patients), the catheters were removed after an average of 27.2 days. The mean length of stay was 9.6 days, and four patients died (5.6%) during the index hospitalization.

Conclusion: Our findings suggest that percutaneous cholecystostomy is a feasible, safe and highly effective treatment option for acute cholecystitis in high-risk patients.

Keywords: Acute cholecystitis; Percutaneous cholecystostomy; Patient outcomes.

1. INTRODUCTION

In the population, the estimated prevalence of gallstones is 10–15%, and at least one-fourth of patients with gallstones will develop complications. Acute calculus cholecystitis is the first clinical presentation in 10–15% of the cases (1). Cholecystectomy is the most common therapeutic approach, and the 2020 World Society of Emergency Surgery (WSES) updated its guideline and recommends laparoscopic cholecystectomy “as soon as possible, within seven days from hospital admission and ten days from the onset of symptoms” (2). However, considering the wide range of clinical scenarios, laparoscopic cholecystectomy can not be considered a ‘one fit all’ option. In high-risk patients, deciding the best option for the treatment is still complicated due to advanced-stage malignancies, severe comorbidities, and poor general conditions. For this subgroup of patients, Tokyo 2018 guidelines recommend considering percutaneous cholecystostomy as an alternative to emergent cholecystectomy (3).

We evaluated the electronic medical records of 71 high-risk patients diagnosed with acute cholecystitis between May 2019 and July 2023 in whom we preferred percutaneous cholecystostomy. We aimed to determine whether percutaneous cholecystostomy is a safe and feasible option to be preferred in this patient group by evaluating the procedure’s success rate, complications, efficacy and impact of this intervention on patient outcomes.

2. METHODS

The study was conducted following the Declaration of Helsinki (as revised in 2013) and was approved by Kartal Dr. Lütfi Kırdar City Hospital Cinical Trials Review Board and Ethics Committee (2022/5l4/238/8 – 29.11.2022).

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Percutaneous cholecystostomy was performed in 71 patients diagnosed with acute cholecystitis with clinical, laboratory or radiological findings between May 2019 and July 2023. The main reason for preferring percutaneous cholecystostomy in this patient group was the high risk of surgery due to comorbidities and age. Besides comorbidities and age, percutaneous cholecystostomy was preferred in patients whose primary or metastatic malignant diseases were localized in the periampullary region, causing obstruction and cholecystitis. However, surgery was not possible because of the extent of the disease.

The same interventional radiologist performed all percutaneous cholecystostomy procedures. The procedures were performed under local anaesthesia and ultrasonography guidance using the transhepatic and Seldinger techniques. The same interventional radiologist performed post-procedure follow-ups of the patients.

The catheters were removed when the signs of acute cholecystitis were significantly regressed or when the catheters were found to be ineffective. The catheters of those who became eligible for surgery were also removed during the operation.

3. RESULTS

In our percutaneous cholecystostomy cohort, 31 patients were male, 40 were female, and the mean age was 70.8 (40–99). Pre-procedure mean blood pressure of the patients was 115/75 mmHg, heart rate was 85/min, and body temperature was 36.9 ^{0}C. Fourty-four patients had significant abdominal pain and had Murphy positivity in their clinical examinations. Laboratory and ultrasonographic findings diagnosed 27 patients without significant abdominal pain. Forty patients (60.6%) had obstructive jaundice. The mean total bilirubin level was 9.58 mg/dl (0.3-22 mg/dl), direct bilirubin was 6.57 mg/dl (0.1-20.6 mg/dl), and white blood cell count was 11.159 /microliter (3-36 /microliter). Gallbladder wall thickness was normal in 19 patients (26.8%).

In thirty-four patients (48%), cholecystitis developed due to gallbladder stones. Mechanical compression of a primary periampullary tumour or metastases of a different primary in this localization was the aetiology of acute cholecystitis in 34 patients (48%). Gallbladder stones were not detected in 30 of these 34 patients. Three patients (4%) were diagnosed with acalculous cholecystitis, and all those patients were significantly symptomatic and had hydropic gallbladders (transverse diameter > 5 cm) that necessitated palliation.

Problems related to the cardiovascular system were the leading comorbidity in our cohort, 29 patients had coronary artery disease, and 26 patients had high blood pressure. Chronic renal failure was present in 6 patients.

All percutaneous cholecystostomy procedures were uneventful, and no significant complications developed in the early post-procedure period. Among the minor complications, the most common was pain at the catheter insertion site, defined by 20 patients (28.2%). Bilioma was detected in one patient and drained. Five patients were followed up in the intensive care unit, and others were in the regular ward after the procedure. Bile samples were sent from all patients after the procedure, but only 18 patients had bile culture positivity. *Escherichia coli* was the predominant microorganism reported in 9 patients, and *Enterococcus faecium* was reported in four patients.

Despite revisions throughout the follow-ups, the procedure was ineffective in 7 patients (9.85%), and the catheters were removed.

In 22 patients (31%), interval cholecystectomy was performed alone or as a part of a more complicated operation like radical pancreaticoduodenectomy. The timing of those operations varied a lot from one day to seven months after the cholecystostomy procedures.

There was a subgroup of patients whose catheters were effective and were not operated. The number of patients in that subgroup was 5 (7%), and catheters of those five patients were removed after an average of 27.2 days (20-32 days).

The mean length of stay was 9.6 days, and four patients died (5.6%) during that index hospitalization. One patient died due to COVID-19 infection.

4. DISCUSSION

Emergency laparoscopic cholecystectomy and percutaneous cholecystostomy are the leading options for treating high-risk acute cholecystitis patients. Unfortunately, available data is limited; only a few studies compare the two treatment modalities and only one randomized clinical trial (4). A recent systematic review and meta-analysis stated that most studies have low-quality evidence (5). Meta-analysis notified that percutaneous treatment is inferior in treating acute cholecystitis in high-risk patients due to the higher incidence of complications than cholecystectomy. However, this inferiority is most likely related to an association between various patient-side factors and conditions and the severity of acute cholecystitis. We still need high-quality data and more concrete evidence to decide the preferred option for high-risk patients.

We retrospectively analyzed our 71 high-risk patients in whom we performed percutaneous cholecystostomy to palliate the emergent issue and improve the general condition. Our primary motivation for preferring percutaneous cholecystostomy for those critically ill patients with severe comorbidities was their increased postoperative mortality risk when undergoing a surgical procedure. This risk might reach up to 20%, according to our previous experiences and published series (6). In our study, we found that four patients died (5.6%) during that index hospitalization period, and one of those patients died not due to the underlying acute cholecystitis or our intervention but due to COVID-19 infection. Thus we can claim that percutaneous

cholecystostomy has a lower mortality risk than emergency surgery for this fragile group.

All our procedures were successful (100%) and only had minor procedural complications like pain at the catheter insertion site (28.2%) and bilioma. Indeed this high success rate with low procedural complications is familiar to us, and many authors published relatively same results (6).

One of the technique's most critical problems is drainage's ineffectiveness. In this subgroup of patients, adequate drainage cannot be achieved despite revision attempts, the procedure is considered ineffective, and the catheter is removed. In our study, we failed in 7 patients (9.85%), and despite the revision attempts, the procedure was considered ineffective, and the catheters were removed. Similar results were noted in different centres, and the authors reported that tube-related problems and tube dysfunction were more troubling than the complications of the procedure itself (7). Catheter dislodgement has also been frequently documented following placement by others (8.9), but we did not find any dislodgement in our cohort. All in all, our findings also support the idea that rates of procedural complications were low compared to dysfunction.

A recently published retrospective cohort study evaluated 132 patients who underwent percutaneous cholecystostomy for acute cholecystitis. No significant variations were detected in the intraoperative and perioperative outcomes between patients undergoing interval cholecystectomy within versus after eight weeks from percutaneous cholecystostomy placement. They found that patients may benefit from undergoing interval cholecystectomy after the 8-week cut-off after percutaneous cholecystostomy. However, they also showed that very long periods between percutaneous cholecystostomy and interval cholecystectomy procedures may increase the risk of more extended ICU stays (10). In our study, 22 patients (31%) had interval cholecystectomy. Cholecystectomy was performed either as a part of a more complex operation, like radical pancreaticoduodenectomy or alone. The timing of those operations also varied a lot, compatible with the published series. We found that surgeries had been scheduled the next day of the procedure or seven months after. On the flip side, we must be aware of the fact that an essential part of our study includes patients treated during the COVID-19 pandemic era and of course, it is tough, if not impossible, to express numerically the effect of the pandemic on the timing and delay of cholecystectomy operations. However, when we evaluated the details of the patient's electronic records, the impact of the pandemic was felt in patients who had late surgery. Nevertheless, when we consider the outcome data of our patients, we should be reluctant to early surgery.

We have certain limitations. Notably, it is a retrospective and non-randomized study evaluating a heterogenous and critically ill patient population. Since a part of the study was carried out during the pandemic, the different dynamics of this period may have impacted both the durations, like the timing of the surgeries and the results.

5. CONCLUSION

Our findings suggest that percutaneous cholecystostomy is a feasible, safe, highly effective and cost effective treatment option for acute cholecystitis in high-risk patients. We need prospective randomized studies to determine its superiority to emergency cholecystectomy in this fragile population. We also need high-quality data to decide the best timing of interval cholecystectomy after percutaneous cholecystostomy and have room for improvement for the tube dysfunction problems.

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