Review Article

Conservative Treatment of Acute Cholecystitis: An UpdatedNarrative Review

Abstract

Conservative treatment of acute cholecystitis has been the initial treatment for acute cholecystitis, which involves the use of antibiotics to control the infection and prepare the patient for cholecystectomy. The Tokyo Guidelines have categorized patients who present with acute cholecystitis into three categories: Categories one, two and three. Although laparoscopic cholecystectomy is the gold standard of treatment, antibiotics and percutaneous cholecystostomy play a role in the management of patients with category two and three. This review aimes to examine the role of antibiotics and percutaneous cholecystostomy in the management of acute cholecystitis.

Keywords: Conservative treatment of acute cholecystitis, non-operative treatment of acute cholecystitis, antibiotics in acute cholecystitis, percutaneous cholecystostomy, tube drainage

Introduction

Acute cholecystitis is characterized by inflammation of the gallbladder secondary to obstruction of the cystic duct by gallstones. Up to 95% of patients with acute cholecystitis have gallstones and the incidence of acute cholecystitis is 20% of patients who present with symptoms of biliary colic. (1,2)

The Tokyo Guidelines (TG13) for the severity grading of acute cholecystitis divided it into three grades: grade 1, inflammation of the gallbladder with no organ dysfunction and mild inflammatory changes; grade 2, acute cholecystitis associated with any of the following conditions: leukocytosis, tender mass in the right upper abdomen, duration of symptoms of more than 72 hours, and marked local inflammation. Grade 3 is acute cholecystitis associated with dysfunction of any of the following organs: cardiovascular, respiratory, renal, hematological, and hepatic. (3)

The Tokyo Guidelines (TG18) validated the severity grading and were adopted with the Tokyo Guidelines (TG13) guidelines without any modification. Patients with Grade 1 were managed with elective cholecystectomy, patients with grade 2 were managed with antibiotics and cholecystectomy, and patients with grade 3 were treated with antibiotics

and percutaneous cholecystostomy. Severity grading was used to indicate prognosis and mortality, with grade 3 being associated with the highest mortality. (4,5)

The World Society of Emergency surgeons (WSES) in their guidelines on the management of acute calculous cholecystitis recommended antibiotics as initial supportive care for patients who present for the first time, and it is used to stabilize and prepare patients for cholecystectomy. (6,7)

The 2020 World Society of Emergency Surgery updated guidelines for the diagnosis and treatment of acute calculous cholecystitis recommend antibiotic treatment as an ancillary treatment for early surgery or as a treatment option in a nonoperative setting and to delay surgery. (8)

In addition to antibiotics, percutaneous cholecystostomy is often considered in Tokyo Guidelines grade 3 patients who are not fit for surgery. This procedure can be performed as a minimally invasive procedure using an ultrasound-guided method. Percutaneous cholecystostomy is done as a bridging procedure to stabilize the patient and perform a cholecystectomy once the patient is stable. (9–11)

Conservative treatment with antibiotics or percutaneous cholecystostomy is often associated with a higher recurrence rate; hence, it is not a definitive treatment option. Where possible, once the patient is fit, cholecystectomy should be offered as a definitive treatment. (12–15)

The management of acute cholecystitis in the elderly with conservative treatment and percutaneous cholecystostomy was associated with increased mortality and recurrence rate and laparoscopic cholecystectomy should be offered to these patients. (16)

There is no current consensus in the conservative management of acute cholecystitis regarding the treatment according to the Tokyo Guidelines, the role of antibiotics in the management of acute cholecystitis, and the duration of antibiotics. The role of percutaneous cholecystostomy in the management of acute cholecystitis has not been defined, the time of removal of tube has also not been defined. We conducted this review article by looking for answers to all these factors in the conservative management of acute cholecystitis. We conducted a literature review using PUBMED, the Cochrane database of systemic reviews, Google Scholar, and semantic scholars to search for randomized control trials, non-randomized trials, observational and cohort studies, clinical reviews, systemic reviews, and meta-analyses from 1990 to 2023.The following keywords were used, “conservative treatment of acute cholecystitis,” “non-operative treatment of acute cholecystitis,” “antibiotics in acute cholecystitis,” “percutaneous cholecystostomy “and “Tube-drainage for acute cholecystitis.” All articles were in English and assessed by manual cross-referencing of the literature. Commentaries, case reports, and editorials were excluded from this review. Adult patients were included in this study, and pregnant patients with acute cholecystitis were excluded.

Role of antibiotics in acute cholecystitis

Intravenous antibiotics commenced once patients were admitted for acute cholecystitis. They are administered to prevent progressive inflammation of the gallbladder, secondary infections, and sepsis. The most common organisms involved were Escherichia coli, Klebsiella, and Enterococcus species. Some of the most prescribed antibiotics are piperacillin/tazobactam or third generation cephalosporins, such as ceftriaxone, for mild to moderate cases. For patients who are immunocompromised, these antibiotics may be used with the addition of metronidazole. (17–20)

The immediate indications for antibiotics are abdominal pain over the right hypochondrium that spreads to the whole abdomen, temperature above 38 °C, leukocytosis, and other diseases. Although the Tokyo Guidelines recommend starting antibiotics after obtaining blood cultures, in currents practice it is rarely done and antibiotics are usually commenced empirically. (21)

The choice of antibiotic therapy depends on the severity of acute cholecystitis, the possibility of adequate source control, and local antibiotic sensitivity. Cultures of the bile and blood are not mandatory when staring intra-venous antibiotics. (22)

The Tokyo Guidelines of 2018 have recommended antibiotic therapy for grade 1 and 2 acute cholecystitis before or during surgery, and for patients with grade 3 acute cholecystitis, once the source of infection is controlled, the dosage is continued for four–seven days. (23)

For critically ill patients who present with acute calculous cholecystitis, blood and bile cultures should be obtained, and if positive, adequate empirical antibiotics should be started. Wider empirical coverage should be obtained against enterococcus type of bacteria. (24)

A systemic review was conducted by Van Dijk et al on the role of antibiotic therapy for acute calculous cholecystitis.24 studies that included 5380 patients were included in this study, which included twelve randomized trials, four prospective and ten retrospective studies. This study concluded that due to the treatment failure rate of 20%, antibiotics are not indicated for the treatment of acute cholecystitis, but this systemic review was hampered by risk bias, heterogenicity of the studies and it included only one randomized control trial. (25)

Conservative treatment for acute cholecystitis was assessed in a systemic review and pooled analysis by Loozen et al. A total of 1841 patients were included, comprising 10 randomized control trials and 14 nonrandomized studies. The success rate of conservative treatment was 86%, with a mortality rate of 0.5% and recurrence rate of 20%. This systemic review concluded that conservative treatment was safe and effective in the management of acute calculous cholecystitis. (26)

Percutaneous cholecystostomy in the management of acute cholecystitis

Percutaneous cholecystostomy (PC) is an interventional radiological procedure performed to decompress the gallbladder in patients with acute cholecystitis. It is indicated for patients who are unfit to undergo cholecystectomy due to sepsis, shock, and multiple comorbidities. Therefore, it can be used as a bridging procedure for surgery. The Tokyo Guidelines recommend the use of percutaneous cholecystostomy for patients in category 3. The World Society OfEmergency Surgeons (WSES) also recommends it for patients with acute cholecystitis who are unfit for surgery. (27–32)

This procedure can be performed via the transhepatic or transperitoneal route, which is determined by the performing radiologist. The transhepatic approach is the most preferred route, as it allows proper fixation of the tube and decreases the risk of tube dislodgement. The transperitoneal approach is used when the transhepatic approach fails. (33)

The most common complications of percutaneous cholecystostomy are tube displacement or dislodgement. The other complications include bleeding, bile leakage, bile peritonitis and infection. (34)

Early percutaneous cholecystostomy, which is performed within 24 hours of admission for acute cholecystitis, is associated with a reduced length of hospital stay and decreased instances of procedure-related complications such as bleeding and bile leak. (35)

The reported recurrence rate for acute cholecystitis after removal of the percutaneous cholecystostomy tube is 20 to 30%, hence the tube should be kept for six weeks and clamping of the tube should be done for 1 to 2 weeks to assess for symptoms of recurrence before removal of the tube. (36)

Percutaneous cholecystostomy was compared with conservative treatment with antibiotics alone in the management of acute cholecystitis, and the recurrence and readmission rates were higher in the percutaneous cholecystostomy group; hence, it should only be indicated for patients with comorbidities and those who are not fit for surgery. (37,38)

A systematic review of cholecystostomy as a treatment option for acute cholecystitis was performed by Winbladh et al. This study included 1918 patients from 53 studies, and the success rate of percutaneous cholecystostomy was 85.6%, with a post-procedure mortality of 0.36% but a 30-day mortality of 15.4%. This systemic review was not able to conclude if percutaneous cholecystostomy was better than cholecystectomy in the management of acute cholecystitis in the elderly and critically ill patients. (39)

Markopoulos et al. conducted a systematic review and meta-analysis of the outcomes of percutaneous cholecystostomy in elderly patients. A total of 19 studies were included in this study which included 689,874 patients. This study concluded that percutaneous cholecystostomy was associated with increased mortality and readmission rates compared with cholecystectomy. However, percutaneous surgery should still be considered a bridge to surgery for those who are unfit for surgery. Another systemic review and meta-analysis by Cirocchi et al comparing percutaneous cholecystostomy against emergency cholecystectomy also showed an increased mortality and recurrence rate for percutaneous cholecystostomy and hence emergency cholecystectomy was recommended for high-risk patients who present with acute cholecystitis. (40,41)

A laparoscopic cholecystectomy versus percutaneous catheter drainage for acute cholecystitis in high-risk patients (CHOCOLATE) multicenter randomized clinical trial was conducted by Loozen et al. A total of 142 patients were randomized into 68 patients who underwent percutaneous cholecystostomy and 66 who underwent laparoscopic cholecystectomy. This study showed that the complication rate was 65% in patients who underwent percutaneous cholecystostomy and 12% in those who underwent laparoscopic cholecystectomy. The recurrence rate was 53% in patients who underwent percutaneous cholecystostomy, and only 5% in those who underwent laparoscopic cholecystectomy. This study concluded that laparoscopic cholecystectomy was better than percutaneous cholecystostomy in the treatment of high-risk patients with acute cholecystitis. (42)

Conclusion

Conservative treatment for acute cholecystitis is often used to control symptoms and prepare patients for cholecystectomy. The role of antibiotics is important, as they help control infections and prevent complications. The most administered antibiotics are third generation cephalosporins, such as ceftriaxone or piperacillin/tazobactam. Antibiotics need only be given for four days. There is no need to obtain bile cultures, and empirical antibiotics can be administered to patients with acute cholecystitis.

For elderly patients who are ill with comorbidities and present with severe acute cholecystitis, percutaneous cholecystostomy is performed and antibiotics are started. This procedure is used as a bridge between surgery and cholecystectomy once the patient is stabilized. Although recent meta-analyses and randomized control trials have shown that percutaneous cholecystostomy is associated with increased mortality compared to emergency cholecystectomy, it is still a useful procedure in patients with

sepsis and acute cholecystitis. Currently, there is no consensus on the duration of percutaneous cholecystostomy and when the tube should be removed.

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