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ORIGINAL ARTICLE

# A Comparative Evaluation of Early and Interval Laparoscopic Cholecystectomy in the Management of Acute Cholecystitis

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**Khondokar Muhammad Abu Jalal[1], Ariful Islam[2], Niamul Islam[3]**

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**Correspondence to**
Khondokar Muhammad Abu Jalal



***ABSTRACT***

***Background:*** *Acute cholecystitis is a prevalent emergency condition with the optimal treatment in controversy, with the conventional method proposing a delay in the operation after the patient undergoes conservative management. This study aimed to determine the postoperative differences in operating in the initial phase and the interval phase in patients with acute cholecystitis.* ***Methods & Materials:*** *This comparative cross-sectional study was carried out in Kushtia Medical College & Hospital, Kushtia, Bangladesgh from January 2023 to February 2024. A total of 50 adult patients within 72 hours of the onset of acute cholecystitis were equally randomized into two groups, A and B. Group A was subjected to early laparoscopic cholecystectomy, whereas Group B was treated conservatively in the first instance, then laparoscopic cholecystectomy after 8-12 weeks. Demographic variables, clinical features, findings on ultrasonography, intraoperative, and postoperative information were assessed employing suitable statistical analyses with 'p' value < 0.05.* ***Results:*** *50 patients were randomized to early laparoscopic cholecystectomy (n=25) or interval surgery after conservative treatment (n=25). Early surgery required longer operative time (124.6 ± 36.7 vs 94.5 ± 26.4 minutes, p=0.01), with more acute inflammatory operative findings, including pus and pericholecystic collection, leading to more frequent decompression and drain use, while severe adhesions were more common in the interval group (60% vs 20%, p=0.003). Conversion rates (12% vs 20%, p=0.70) and minor postoperative complications were similar, with no major bile duct injury. Histopathology showed predominantly acute disease in the early group and chronic cholecystitis in the interval group. Total hospital stay was significantly shorter with early surgery (6.9 ± 3.5 vs 14.3 ± 9.8 days, p<0.001).* ***Conclusion:*** *Early laparoscopic cholecystectomy is a safe and viable method for acute cholecystitis, providing a substantial benefit in the overall hospital stay duration even with longer surgical time. Equivalence in complications and lower resource consumption suggests that the preferred strategy in qualified patients is early laparoscopic cholecystectomy.*

***Keywords:*** *Acute cholecystitis, Early laparoscopic cholecystectomy, Interval cholecystectomy*

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1. *Assistant Professor, Department of Surgery, Gopalganj Medical College, Gopalganj, Bangladesh (0009-0007-8416-2101)*
2. *Assistant Professor, Department of Surgery, Kushtia Medical College & Hospital, Kushtia, Bangladesh*
3. *Associate Professor, Department of Surgery, Sir Salimullah Medical College & Hospital, Dhaka, Bangladesh*

## INTRODUCTION

Acute cholecystitis is regarded as among the most frequent surgical emergencies observed in general surgery practice, as it affects around 10-15% of the entire adult population worldwide [1]. The arising problem occurs as a result of the inflammation within the gallbladder brought on mostly by the obstruction created by gallstones in the cystic duct, alongside the resultant severe inflammation in the event that the condition is left untreated [2]. The surgical intervention recommended in the current practice as a gold standard in the treatment of acute cholecystitis has undergone a profound transition over the last three decades, with advances in technology [3]. Despite the universal acceptance of the laparoscopic cholecystectomy procedure, there remains ongoing controversy about the optimal time of surgery in acute cholecystitis. Traditionally, the paradigm of the treatment of acute cholecystitis with surgery involved a conservative strategy where the patient underwent initial medical treatment with antibacterial and analgesic therapy and subsequent interval laparoscopic cholecystectomy carried out 6-12 weeks after the successful management of the acute inflammatory insult [4]. Surgeons who advocate the delayed strategy cited the dangers of performing surgery in the acute phase of the disease in the form of conversion rates of laparoscopic to open surgery and the rates of bile duct injury [5]. However, recent evidence has challenged this conventional wisdom, with a number of studies establishing the feasibility and safety of early laparoscopic cholecystectomy in the first 72 hours of onset of symptoms [6]. There are a number of theoretical benefits to early surgical therapy in patients with cholecystitis, which include providing definitive therapy at the time of index admission and eliminating recurrent biliary events, total hospitalization time, and total cost of hospitalization [7]. Additionally, improvements in laparoscopic surgical techniques and imaging evaluation have led to more successful outcomes in the face of acute inflammation [8]. There are a couple of global recommendations, such as those from the Tokyo Guidelines Committee, which include early

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laparoscopic cholecystectomy in the treatment protocol for acute cholecystitis in selected patients [9]. However, the adoption of such a strategy is not widespread, especially in developing nations, where it is likely to be affected by a lack of resources or surgical capabilities. There is also ambiguity in the current discussion surrounding criteria for the selection of patients, the extent of 'early' treatment, and predictive factors for successful laparoscopic versus open procedures [10].

This study aimed to compare the results of early laparoscopic cholecystectomy, which was done at the time of hospital admission, and interval laparoscopic cholecystectomy that was performed after a period of conservative management for patients who had an acute cholecystitis within 72 hours of the onset of symptoms.

## METHODS & MATERIALS

This was a comparative, cross-sectional study, performed at the Department of Surgery at Kushtia Medical College & Hospital, Kushtia, Bangladesh over a period of six months from January 2023 to February 2024. The study population was all patients, irrespective of gender, seeking admission and diagnosed as acute cholecystitis, up to 72 hours from the onset of upper abdomen pain. A total of fifty patients satisfying predefined criteria were selected. Simple random sampling using a lottery system was used for selecting patients for the study. Patients presenting beyond 72 hours from the onset of upper abdomen pain, presenting with jaundice, biliary pancreatitis, common bile duct stones, previous upper abdomen surgery, underlying significant illness that made laparoscopic surgery unsuitable, and patients who refused surgery were excluded. Acute cholecystitis was diagnosed as upper abdomen pain, along with tenderness over the right hypochondrium, accompanied by fever, lab results showing inflammation, and supporting scintigraphic or ultrasonic changes, while complicated cholecystitis was characterized by emphysematous appearance, peri-cholecystic abscess, perforation, or secondary peritonitis. Patients, after being made aware through written consent, were then made aware of the nature of the illness as well as its treatment. Volunteers were then randomly allocated into two equal groups, comprising twenty-five patients in Group A, who were subjected to early laparoscopic cholecystectomy, while Group B was initially subjected to conservative antimicrobial treatment, along with follow-up treatment through interval laparoscopic cholecystectomy at a gap of eight to twelve weeks. The data was collected using qualitative as well as quantitative methods, including clinical, lab, surgical, as well as post-operational aspects. The data was treated using quantitative as well as qualitative analysis, using statistical methods, as appropriately applied, comparing results between both groups, using SPSS software, version 26, while all results were assumed significant at a confidence limit of $p < 0.05$.

## RESULTS

Table I shows that the mean age in early LC patients was 46.80±11.53 years, and in interval LC patients, it was 44.40±4.85 years. The majority of patients, 72%, were in the 31-50 years category. Both groups showed female preponderance, in early LC patients, 68%, and in interval patients, 60%. [Table I]

**Table – I: Baseline Demographic Characteristics of the Study Population (*n* = 50)**

| Variable | Category | Early LC (n=25) | Interval LC (n=25) |
|---|---|---|---|
| Age (years) | mean ± SD | 46.80 ± 11.53 | 44.40 ± 4.85 |
| | 11-20 years | 1 (4%) | 1 (4%) |
| | 21-30 years | 4 (16%) | 3 (12%) |
| | 31-40 years | 6 (24%) | 7 (28%) |
| | 41-50 years | 8 (32%) | 10 (40%) |
| | 51-60 years | 5 (20%) | 2 (8%) |
| | 61-70 years | 1 (4%) | 2 (8%) |
| Sex | Male | 8 (32%) | 10 (40%) |
| | Female | 17 (68%) | 15 (60%) |

Table II reveals that a higher incidence of previous biliary symptoms was found in the early LC group at 60% compared with 20%. However, there was no significant difference in presentation times for both groups at 2.20 ± 0.40 compared with 2.40 ± 0.50 days. fever was found to be present in 84% compared with 72%; however, leukocytosis was found to be present in 92% compared with 76% for early versus interval groups, respectively. The values for bilirubin and alkaline phosphatase levels remained acceptable for both groups, thus ruling out biliary obstruction according to exclusion criteria. [Table II]

**Table – II: Clinical Presentation and Laboratory Parameters on Admission**

| Parameter | Early LC (n=25) | Interval LC (n=25) |
|---|---|---|
| Previous biliary symptoms | 15 (60) | 5 (20) |
| Duration of acute symptoms (days) (mean ± SD) | 2.20 ± 0.40 | 2.40 ± 0.50 |
| Fever ≥ 37.5°C | 21 (84) | 18 (72) |
| WBC ≥ $10 \times 10^9$/L | 23 (92) | 19 (76) |
| Serum bilirubin (µmol/L) (mean ± SD) | 16.0 ± 7.7 | 19.8 ± 19.8 |
| Alkaline phosphatase (IU/L) (mean ± SD) | 91.0 ± 30.7 | 99.6 ± 43.8 |

Table III denotes that there was a remarkable variation between the inflammatory variables. The inflamed gallbladder wall was found to occur more in patients with early-LC (80% versus 36%, $p < 0.001$) compared to patients with interval-LC, while thickening was seen to occur more in patients with interval-LC (96% versus 60%, $p = 0.002$). The positive Murphy sign was observed to occur more in early-LC patients (92% versus 52%, $p = 0.001$). Also, gallstones were seen to occur uniformly. [Table III]

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**Table – III: Ultrasonographic Findings on Initial Admission**

| Ultrasonographic finding | Early LC n (%) | Interval LC n (%) | p-value |
|---|---|---|---|
| Thickened gallbladder wall | 15 (60) | 24 (96) | 0.002 |
| Edematous gallbladder wall | 20 (80) | 9 (36) | <0.001 |
| Distended gallbladder | 21 (84) | 15 (60) | 0.11 |
| Gallstones present | 25 (100) | 25 (100) | 1.00 |
| Positive USG Murphy's sign | 23 (92) | 13 (52) | 0.001 |
| Pericholecystic fluid | 4 (16) | 2 (8) | 0.66 |

Table IV revealed that the extent of surgery was different in both procedures. In early LC, there were high percentages of tense gallbladder (80% vs 20%), intraluminal pus (72% vs 4%; p = 0.04), pericholecystic fluid (80% vs 0%; p < 0.001), and the need for gallbladder decompression (84% vs 4%; p < 0.001), indicating acute inflammation. On the contrary, in Interval LC patients, high percentages were noted in severe adhesions (60% vs 20%; p = 0.003), indicating chronic fibrosis. Closed suction drains were more in early LC (36% vs 12%; p = 0.04). [Table IV]

**Table – IV: Intraoperative Findings and Technical Modifications**

| Variable | Early LC n (%) | Interval LC n (%) | p-value |
|---|---|---|---|
| Severe adhesions | 5 (20) | 15 (60) | 0.003 |
| Tense gallbladder | 20 (80) | 5 (20) | 0.06 |
| Pus in the gallbladder | 18 (72) | 1 (4) | 0.04 |
| Pericholecystic collection | 20 (80) | 0 (0) | <0.001 |
| Use of the fifth cannula | 2 (8) | 0 (0) | 0.10 |
| Gallbladder decompression | 21 (84) | 1 (4) | <0.001 |
| Cystic duct ligature | 2 (8) | 1 (4) | 0.10 |
| Umbilical incision enlargement | 10 (40) | 6 (24) | 0.22 |
| Closed suction drainage | 9 (36) | 3 (12) | 0.04 |

Table V depicts that operative performance parameters are followed by increased mean total operating time in early LC (124.56±36.69 vs 94.46±26.42, p=0.01) and increased mean successfully done laparoscopic time in interval LC (105.38±26.80 vs 79.85±16.24, p=0.02). The conversion to open cholecystectomy was increased in interval LC (20% vs 12%), but this was not significant (p=0.70). [Table V]

**Table – V: Operative Performance and Conversion Outcomes**

| Parameter | Early LC n (%) | Interval LC n (%) | p-value |
|---|---|---|---|
| Total operative time (minutes) (mean ± SD) | 124.56 ± 36.69 | 94.46 ± 26.42 | 0.01 |
| Operative time for successful LC (minutes) (mean ± SD) | 105.38 ± 26.80 | 79.85 ± 16.24 | 0.02 |
| Conversion to open surgery | 3 (12) | 5 (20) | 0.70 |

Table VI demonstrates that acute histopathological changes in the early LC group included acute gangrenous cholecystitis (36%), acute cholecystitis (40%), and acute on chronic cholecystitis (24%) versus only chronic cholecystitis (84%) in the interval LC group. There was no difference in the complications observed in the postoperative period. Hospital stay in the early LC group was shorter than in the interval group (6.89±3.5 days versus 14.27±9.8 days, p<0.001) due to the need for hospital readmission in the interval LC procedures. There was no difference in the pain medication use. [Table VI]

**Table – VI: Postoperative Outcomes, Histopathology, and Hospital Stay**

| Variable | | Early LC | Interval LC | p-value |
|---|---|---|---|---|
| Histopathology | Acute gangrenous cholecystitis | 9 | 0 | - |
| | Acute cholecystitis | 10 | 4 | - |
| | Acute on chronic cholecystitis | 6 | 0 | - |
| | Chronic cholecystitis | 0 | 21 | - |
| Postoperative complications | Wound hematoma | 1 | 1 | - |
| | Wound infection | 2 | 1 | - |
| | Subhepatic collection | 1 | 0 | - |
| | Pulmonary complications | 1 | 2 | - |
| Postoperative analgesic doses | mean ± SD | 2.50 ± 1.4 | 3.45 ± 2.3 | 0.13 |
| Postoperative stay (days) | mean ± SD | 5.67 ± 4.8 | 4.28 ± 3.2 | 0.06 |
| Total hospital stay (days) | mean ± SD | 6.89 ± 3.5 | 14.27 ± 9.8 | <0.001 |

## DISCUSSION

Optimal timing of laparoscopic cholecystectomy for acute cholecystitis is still a matter of controversy, not only because of its implications on the course and outcome for patients but also on resource utilization and healthcare costs. The main goal of this investigation was to compare two different approaches to managing acute cholecystitis: early versus interval laparoscopic cholecystectomy. The findings from this study have provided some key lessons regarding the technical challenges, safety profile, and practical considerations for each

approach. Our findings showed that early laparoscopic cholecystectomy is technically feasible during the acute inflammatory phase, with certain operational challenges. The operative time was significantly longer in early LC (124.56±36.69 vs 94.46±26.42 minutes, p=0.01), which indicates increased technical difficulty due to acute inflammation, tissue edema, and friability encountered during the dissection. Similar findings have been reported by Lau et al. as prolonged operative duration during early intervention [11]. The tense gallbladder, intraluminal pus, and pericholecystic collections observed intraoperatively in patients undergoing early LC required gallbladder decompression and the placement of drains more often, similar to the observations by Gutt et al. in their multicenter randomized trial [12]. Notably, our study demonstrated a trend towards an early LC conversion rate (12% vs 20%). This contrasts with a previous study by Chandler et al., who reported higher conversion rates for the early intervention [13]. However, Cao et al. reported comparable or even lower rates of conversion with early surgery in cases where the surgery is performed by experienced laparoscopic surgeons [14]. The high rate of conversion in interval LC patients in our study was mainly due to dense fibrotic adhesions obscuring the anatomical planes, which is in line with Johansson et al., who stated that chronic inflammation results in more difficult dissection compared to acute inflammation [15]. Histopathological correlation gives a lot of insight into disease progression. Specimens from early LCs predominantly showed acute pathology, such as gangrenous changes in 36% of cases, highlighting that urgent intervention is appropriately performed to avoid complications [16]. In the interval LC group, 84% of the patients had chronic cholecystitis, indicating that the acute inflammatory process had resolved but was replaced by fibrotic changes that paradoxically complicated surgical dissection [17]. One of the major findings in this study is the significantly shorter total hospital stay in early LC patients: 6.89±3.5 vs 14.27±9.8 days, p<0.001. This advantage is due to definitive treatment during index admission, without the necessity of readmission and the interval waiting period. This result aligns with Gurusamy et al., who showed that healthcare cost benefits and decreased patient inconvenience with early cholecystectomy [18]. Furthermore, early intervention avoids an interval biliary event, occurring in 15-30% of patients while awaiting delayed surgery, which can further lead to emergency readmissions. The postoperative results indicated no significant differences in complication rates between groups, challenging the convention that early surgery is burdened with higher morbidity. This finding is consistent with Kolla et al., who showed comparable safety profiles [19]. The similar analgesic requirement and duration of postoperative stay suggest an equivalent postoperative recovery irrespective of timing. Early LC confers very significant benefits from the healthcare system's perspective in resource-poor countries like Bangladesh [20]. Early cholecystectomy can avoid protracted conservative management, readmissions, and possible emergency intervention for recurrent symptoms, thus optimizing bed utilisation and decreasing the overall healthcare burden [21]. Its successful implementation presupposes the availability of adequately trained laparoscopic surgeons, proper selection of patients, and sufficient institutional backup. Our findings thus support the emerging consensus, embodied in Tokyo Guidelines, among others, on the provision of early laparoscopic cholecystectomy as the standard of care for acute cholecystitis in a suitably selected subset of patients presenting within 72 hours [22]. Technical difficulties notwithstanding, early intervention is reasonable, considering the benefits accruing from shorter hospital stay, avoidance of recurrent episodes, and a safety profile comparable to that of delayed surgery. Counseling should be offered to all patients regarding these advantages, taking into consideration the slightly extended operative time [23]. Surgical training in the future has to emphasize techniques for the management of acute inflammatory conditions.

## LIMITATIONS OF THE STUDY

The small sample size and single-center nature of this study are some factors that might limit the generalizability of findings. Long-term follow-up data and cost-effectiveness analysis have not been taken into account in this study, which might reveal more about the total benefit associated with each approach.

## CONCLUSION

Early laparoscopic cholecystectomy carried out within 72 hours of the onset of acute cholecystitis is a safe, effective, and advantageous approach compared to delayed interval surgery. Though technically difficult because of the acute inflammation and demanding longer operative time, early intervention provides the possibility of offering a definitive treatment during index admission with comparable safety profiles and postoperative outcomes. A significantly shortened total hospital stay, avoidance of interval biliary events, and optimized use of health care resources very strongly endorse early cholecystectomy as the preferred management strategy. Given adequate patient selection, experienced surgical expertise, and appropriate institutional support, an early laparoscopic cholecystectomy should be regarded as the standard of care for acute cholecystitis in suitable candidates when admitted within the optimal time window.

## RECOMMENDATION

Future multicenter randomized controlled trials with larger sample sizes and extended follow-up periods are needed to establish definitive protocols and identify specific patient subgroups who benefit most from early versus delayed intervention. Such studies should be complemented with cost-utility analyses using quality-adjusted life years to comprehensively assess the economic implications of each approach in resource-constrained settings.

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## REFERENCES

1. *Stinton LM, Shaffer EA. Epidemiology of gallbladder disease: cholelithiasis and cancer. Gut and liver. 2012 Apr 17;6(2):172.*
2. *Kimura Y, Takada T, Strasberg SM, Pitt HA, Gouma DJ, Garden OJ, Büchler MW, Windsor JA, Mayumi T, Yoshida M, Miura F. TG13 current terminology, etiology, and epidemiology of acute cholangitis and cholecystitis. Journal of hepato-biliary-pancreatic sciences. 2013 Jan;20(1):8-23.*
3. *Keus F, de Jong J, Gooszen HG, Laarhoven CJ, Cochrane Hepato-Biliary Group. Laparoscopic versus open cholecystectomy for patients with symptomatic cholecystolithiasis. Cochrane database of systematic reviews. 1996 Sep 1;2010(1).*
4. *Papi C, Catarci M, D'ambrosio L, Gili L, Koch M, Grassi GB, Capurso L. Timing of cholecystectomy for acute calculous cholecystitis: a meta-analysis. Official journal of the American College of Gastroenterology| ACG. 2004 Jan 1;99(1):147-55.*
5. *Özkardeş AB, Tokaç M, Dumlu EG, Bozkurt B, Çiftçi AB, Yetişir F, Kılıç M. Early versus delayed laparoscopic cholecystectomy for acute cholecystitis: a prospective, randomized study. International surgery. 2014 Jan 1;99(1):56-61.*

6. *Gurusamy KS, Davidson C, Gluud C, Davidson BR. Early versus delayed laparoscopic cholecystectomy for people with acute cholecystitis. Cochrane Database of Systematic Reviews. 2013(6).*
7. *Gutt CN, Encke J, Köninger J, Harnoss JC, Weigand K, Kipfmüller K, Schunter O, Götze T, Golling MT, Menges M, Klar E. Acute cholecystitis: early versus delayed cholecystectomy, a multicenter randomized trial (ACDC study, NCT00447304). Annals of surgery. 2013 Sep 1;258(3):385-93.*
8. *Cao AM, Eslick GD, Cox MR. Early cholecystectomy is superior to delayed cholecystectomy for acute cholecystitis: a meta-analysis. Journal of Gastrointestinal Surgery. 2015 May 1;19(5):848-57.*
9. *Yokoe M, Takada T, Strasberg SM, Solomkin JS, Mayumi T, Gomi H, Pitt HA, Garden OJ, Kiriyama S, Hata J, Gabata T. TG13 diagnostic criteria and severity grading of acute cholecystitis (with videos). Journal of hepato-biliary-pancreatic sciences. 2013 Jan;20(1):35-46.*
10. *Ansaloni L, Pisano M, Coccolini F, Peitzmann AB, Fingerhut A, Catena F, Agresta F, Allegri A, Bailey I, Balogh ZJ, Bendinelli C. 2016 WSES guidelines on acute calculous cholecystitis. World journal of emergency surgery. 2016 Jun 14;11(1):25.*
11. *Lau H, Lo CY, Patil NG, Yuen WK. Early versus delayed-interval laparoscopic cholecystectomy for acute cholecystitis: a metaanalysis. Surgical Endoscopy and Other Interventional Techniques. 2006 Jan;20(1):82-7.*
12. *Gutt CN, Encke J, Köninger J, Harnoss JC, Weigand K, Kipfmüller K, Schunter O, Götze T, Golling MT, Menges M, Klar E. Acute cholecystitis: early versus delayed cholecystectomy, a multicenter randomized trial (ACDC study, NCT00447304). Annals of surgery. 2013 Sep 1;258(3):385-93.*
13. *Chandler CF, Lane JS, Ferguson P, Thompson JE, Ashley SW. Prospective evaluation of early versus delayed laparoscopic cholecystectomy for treatment of acute cholecystitis. The American Surgeon. 2000 Sep;66(9):896-900.*
14. *Cao AM, Eslick GD, Cox MR. Early cholecystectomy is superior to delayed cholecystectomy for acute cholecystitis: a meta-analysis. Journal of Gastrointestinal Surgery. 2015 May 1;19(5):848-57.*
15. *Johansson M, Thune A, Blomqvist A, Nelvin L, Lundell L. Management of acute cholecystitis in the laparoscopic era: results of a prospective, randomized clinical trial. Journal of gastrointestinal surgery. 2003 Jul 1;7(5):642-5.*
16. *Coffin SJ, Wrenn SM, Callas PW, Abu-Jaish W. Three decades later: investigating the rate of and risks for conversion from laparoscopic to open cholecystectomy. Surgical endoscopy. 2018 Feb;32(2):923-9.*
17. *Macafee DA, Humes DJ, Bouliotis G, Beckingham IJ, Whynes DK, Lobo DN. Prospective randomized trial using cost–utility analysis of early versus delayed laparoscopic cholecystectomy for acute gallbladder disease. Journal of British Surgery. 2009 Sep;96(9):1031-40.*
18. *Gurusamy KS, Samraj K, Fusai G, Davidson BR. Early versus delayed laparoscopic cholecystectomy for biliary colic. Cochrane Database of Systematic Reviews. 2008(4).*
19. *Kolla SB, Aggarwal S, Kumar A, Kumar R, Chumber S, Parshad R, Seenu V. Early versus delayed laparoscopic cholecystectomy for acute cholecystitis: a prospective randomized trial. Surgical Endoscopy and Other Interventional Techniques. 2004 Sep;18(9):1323-7.*
20. *Herdman MT, Maude RJ, Chowdhury MS, Kingston HW, Jeeyapant A, Samad R, Karim R, Dondorp AM, Hossain MA. The relationship between poverty and healthcare seeking among patients hospitalized with acute febrile illnesses in Chittagong, Bangladesh. PLoS One. 2016 Apr 7;11(4): e0152965.*
21. *Yokoe M, Takada T, Strasberg SM, Solomkin JS, Mayumi T, Gomi H, Pitt HA, Garden OJ, Kiriyama S, Hata J, Gabata T. TG13 diagnostic criteria and severity grading of acute cholecystitis (with videos). Journal of hepato-biliary-pancreatic sciences. 2013 Jan;20(1):35-46.*
22. *Borzellino G, Khuri S, Pisano M, Mansour S, Allievi N, Ansaloni L, Kluger Y. Timing of early laparoscopic cholecystectomy for acute calculous cholecystitis: a meta-analysis of randomized clinical trials. World Journal of Emergency Surgery. 2021 Mar 25;16(1):16.*
23. *Coccolini F, Solaini L, Binda C, Catena F, Chiarugi M, Fabbri C, Ercolani G, Cucchetti A. Laparoscopic cholecystectomy in acute cholecystitis: refining the best surgical timing through network meta-analysis of randomized trials. Surgical Laparoscopy Endoscopy & Percutaneous Techniques. 2022 Dec 1;32(6):755-63.*