

Timing of cholecystectomy in recurrent attacks of acute cholecystitis

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ABSTRACT

BACKGROUND: Although laparoscopic cholecystectomy (LC) is the standard treatment for acute cholecystitis, its optimal timing is still controversial. In this study, our aim is to determine the appropriate cholecystectomy time by comparing the results of emergency and elective cholecystectomy in patients presenting with recurrent acute cholecystitis.

METHODS: Between January 2019 and January 2022, the data of 434 patients who were scheduled for late cholecystectomy and were admitted to our hospital with recurrent cholecystitis attacks during the waiting period were retrospectively evaluated. Demographic data of patients, stage according to Tokyo Guidelines 2018, duration of hospital stay before and after surgery, surgery duration, open surgery rate, drain use, hollow organ injury, biliary tract injury, bleeding, wound infection, post-operative collection, and mortality rates were analyzed.

RESULTS: Emergency LC (group 1) was performed in 176 (40.5%) of 434 patients presenting with recurrent cholecystitis, and elective LC (group 2) was performed in 258 (59.5%) patients. Pre-operative hospital stay was significantly longer in group 2, and mean surgery duration was significantly longer in group 1 ($p=0.001$ and $p=0.035$, respectively). Gastric or intestinal injury, biliary tract injury, wound infection, and mortality were not detected in either group. There was no significant difference between the groups in the rate of open surgery and postoperative collection rates ($p>0.05$).

CONCLUSION: In centers experienced in hepatobiliary surgery, LC can be safely performed in recurrent acute cholecystitis attacks, regardless of symptom duration and the number of attacks.

Keywords: Elective laparoscopic cholecystectomy; emergency laparoscopic cholecystectomy; recurrent acute cholecystitis.

INTRODUCTION

Acute cholecystitis is one of the most common emergency surgical diseases. Although laparoscopic cholecystectomy (LC) is the standard treatment for acute cholecystitis, the optimal time for LC is still controversial.^[1] In many randomized controlled studies and meta-analyses in the literature, it has been shown that early LC is more beneficial than late LC in terms of mortality rates, the incidence of complications, and cost.^[1-4] However, the definitions of early and late LC vary in studies. There are studies that define early LC as LC performed within the first 24^[5,6] h of admission to the hospital, within the first 72 h from the onset of symptoms^[7-9] or within

1 week.^[10] Late LC is generally defined as at least 6 weeks after diagnosis or symptoms subside.^[11] A new flowchart for the treatment of acute cholecystitis was developed by evaluating 15 randomized controlled trials in Tokyo Guidelines 2018 (TG18). Disease severities were determined according to risk factors such as the Charlson comorbidity index (CCI), American Society of Anaesthesiologists physical condition classification (ASA-PS), organ dysfunction, and were divided into three grades according to the severity of the disease. If a patient with grade 1 (mild) and grade 2 (moderate) acute cholecystitis was predicted to be able to withstand surgery, early surgery was recommended regardless of how much time had passed since its onset.^[11] Moreover, in these 15 randomized

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controlled studies, in 6–23% of patients who were scheduled for late LC, emergency LC was performed when symptoms suddenly recurred during the waiting period.

In patients scheduled for late cholecystectomy, recurrent attacks may occur during the waiting period. With recurrent attacks, tissues are increasingly injured, and surgery may become more difficult. In this study, our aim is to determine the appropriate cholecystectomy time by comparing the results of emergency and elective cholecystectomy in patients presenting with recurrent acute cholecystitis.

MATERIALS AND METHODS

The data of a total of 3591 patients who were examined in the emergency department with the prediagnosis of acute cholecystitis between January 2019 and January 2022 in our clinic were retrospectively analyzed. The study protocol was approved by the institutional review board (Date: 29.12.2021 Decision No: 2021/514/216/8). A total of 434 patients, who were admitted to our hospital with recurrent cholecystitis attacks during the waiting period, diagnosed with grade 1 or 2 acute cholecystitis according to the TG18 criteria, and treated as inpatients were included in the study. Patients with a diagnosis of grade 3 (severe, organ dysfunction) acute cholecystitis, patients treated as outpatients with a diagnosis of grade 1 acute cholecystitis, and patients who underwent open cholecystectomy due to technical inadequacy were excluded from the study. Patients were divided into two groups. In recurrent acute cholecystitis attack, patients who underwent emergency LC by our team experienced in hepatobiliary surgery during hospitalization due to the lack of regression in clinical and infection findings despite antibiotic and supportive treatment were included in group 1, patients showing success with antibiotics and supportive treatment, and underwent elective LC 6–8 weeks after the attack due to high CCI and ASA-PS levels (CCI ≥ 6 , ASA-PS ≥ 3) according to TG18 were defined as group 2. Demographic data of patients, laboratory findings, ultrasonography findings, grade according to TG18, duration of hospital stay before and after

surgery, duration of surgery, open surgery rate, drain usage, morbidity (gastric or intestinal injury, biliary tract injury, bleeding, wound infection, postoperative collection) and mortality rates were evaluated.

Statistical Analysis

Study variables are shown as number and percentage of patients or median values. Analysis of data comparing patients was performed using commercial statistical software (SPSS for Windows, version 22.0; SPSS Inc., Chicago, IL, USA). All continuous data were analyzed with an independent-samples t-test. All categorical variables were described as percentages and compared by Chi-square test. Statistical significance was considered at a $p < 0.05$.

RESULTS

Emergency LC was performed in 176 (40.5%) and elective LC in 258 (59.5%) of 434 patients presenting with recurrent acute cholecystitis attacks. The median time between recurrent cholecystitis attack and surgery was 3 days (2–6 days) in the emergency LC group and 47 days (28–72 days) in the elective LC group. 9 (5.1%) patients in the emergency LC group and 16 (6.2%) patients in the elective LC group had a history of previous abdominal surgery. The demographic data of the patient groups are summarized in Table 1, and the comparative results between the groups are summarized in Table 2.

Pre-operative hospital stay was longer in group 2 (4.6 vs. 3.1 days, $p = 0.001$). The mean operative time was significantly longer in group 1 (126.5 vs. 116 min, $p = 0.035$). Gastric or intestinal injury, biliary tract injury, wound infection, and mortality were not detected in either group. There was no significant difference between the emergency LC and elective LC groups in terms of shifting to open surgery and postoperative collection rates. However, more patients in group 2 had intraoperative blood loss compared to group 1 (12.4% vs. 2.27%, $p < 0.001$). No mortality was detected in either group.

Table 1. Demographic data

	Group 1 (n=176)	Group 2 (n=258)	p-value
Age (years), median (range)	64.5 (27–76)	69 (25–82)	0.064
Women/men	68/108	91/167	0.438
TG18			
Grade 1	30 (17%)	4 (1.55%)	<0.001
Grade 2	146 (83%)	254 (98.45%)	
Diabetes mellitus	36 (20.45%)	76 (29.45%)	0.137
Chronic obstructive pulmonary disease	0 (0%)	2 (0.77%)	0.408
Ischemic heart disease	10 (5.68%)	24 (9.3%)	0.33
On anticoagulants	6 (3.41%)	28 (10.85%)	0.045

Table 2. Surgical outcomes

	Group 1 (n=176)	Group 2 (n=258)	p-value
Pre-operative hospital stay (days)	3.1 (2–6)	4.6 (3–12)	0.001
Post-operative hospital stay (days)	2.2 (1–5)	2.6 (1–7)	0.084
Mean operation duration (min)	126.5	116	0.035
Conversion to open surgery	0 (0%)	4 (1.55%)	0.241
Gastric or intestinal injury	0 (0%)	0 (0%)	
Bile duct injury	0 (0%)	0 (0%)	
Intraoperative bleeding	4 (2.27%)	32 (12.4%)	<0.001
Post-operative collection	4 (2.27%)	4 (1.55%)	0.698
Wound infection	0 (0%)	0 (0%)	
Mortality	0 (0%)	0 (0%)	

Postoperative collection developed in 4 (2.27%) patients in Group 1. Percutaneous drainage was applied to one of the patients; 75 mL of pus was drained. In Group 2, 2 of the 4 (1.55%) patients who developed collections underwent wick-drainage and serohemorrhagic fluid was drained. Other patients were treated conservatively with antibiotics as the collection was too small to be drained.

A total of 36 (8.3%) patients had bleeding from the liver bed. Among these patients, one patient in group 1 and seventeen patients in group 2 had anticoagulant use. In these patients who were using anticoagulants, a drain was placed in the gall-bladder lodge during the operation. When the fluid from the drain decreased below 50 cc, the drain was removed. The patients did not require blood replacement and recovered uneventfully.

DISCUSSION

LC is considered the gold standard of treatment for acute cholecystitis. There is still no consensus on the timing of cholecystectomy. The clinical findings of the patient and the experience of the center where the surgery will be performed are the most important factors that determine the timing. There are two basic approaches for the treatment of acute cholecystitis: early and late cholecystectomy. Early cholecystectomy was previously defined as LC performed within the first 72 h of symptom onset, whereas in TG18 this period was revised to within 7 days. TG18 argues that early cholecystectomy should preferably be performed within 72 h of symptom onset; however, it has been stated that a longer duration of symptoms in experienced centers does not constitute a contraindication.^[11] Late cholecystectomy is the cholecystectomy performed after a conservative antibiotic treatment followed by 6–8 weeks. In patients scheduled for late cholecystectomy, recurrent attacks may occur during the waiting period. It is known that emergency LC is performed at a rate as high as 45% in these patients who did not experience regression of symptoms under the first conservative treatment or were exposed to re-

currence of symptoms during the waiting period.^[12]

It is hypothesized that in the early stages of acute cholecystitis, hyperemia and edema may facilitate laparoscopic dissection. 72 h after the onset of symptoms, chronic inflammation and fibrosis can be technically more challenging and operative times are prolonged.^[13] In recurrent episodes, chronic inflammation and tissue fibrosis may complicate the dissection and prolong the operation time. In our study, the duration of surgery was found to be longer in patients who underwent emergency LC, which was statistically significant.

Our study showed that there was no significant difference in perioperative morbidity, except for intraoperative bleeding, between LC performed during hospitalization or in the late period in patients presenting with recurrent attacks, in line with studies comparing early and late LC.^[4,13,14] In the literature, the incidence of bile duct injury is reported as 0.26–1.2%.^[2,15] In our study, however, no biliary tract injury was detected. We think that this is due to our team of surgeons being experienced in hepatobiliary surgery.

Considering that it is not safe to dissect Calot's triangle during LC, we believe it is necessary to conversion to open cholecystectomy. In meta-analyses, it was shown that the conversion to open surgery in patients who underwent early LC and late LC ranged from 12.7% to 20.7% and from 13.9% to 23.6%, respectively.^[4,12,16–18] In our study, there was no conversion from laparoscopy to open surgery in the emergency LC group, whereas 4 (1.55%) patients in the elective LC group were converted to open surgery.

In studies, the mean hospital stay was found to be significantly lower in patients with early LC than in patients with late LC.^[18] In our study, the total length of hospital stay was found to be lower in the group of patients who underwent emergency LC, and the duration of hospital stay before surgery was significantly lower.

Conclusion

Emergency LC is associated with less overall morbidity and shorter hospital stay in recurrent episodes of acute cholecystitis. In our study, we showed that a team experienced in hepatobiliary surgery can safely perform LC in recurrent cholecystitis attacks. We recommend performing LC in experienced centers, regardless of the duration of symptoms and the number of attacks.

Ethics Committee Approval: This study was approved by the Kartal Dr. Lutfi Kırdar City Hospital Ethics Committee (Date: 29.12.2021, Decision No: 2021/514/216/8).

Peer-review: Internally peer-reviewed.

Authorship Contributions: Concept: E.M.; Design: R.S.; Supervision: R.S.; Resource: E.M.; Materials: E.M.; Data: E.M.; Analysis: R.S.; Literature search: R.S.; Writing: E.M.; Critical revision: R.S.

Conflict of Interest: None declared.

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REFERENCES

1. Kohga A, Suzuki K, Okumura T, Yamashita K, Isogaki J, Kawabe A, et al. Outcomes of early versus delayed laparoscopic cholecystectomy for acute cholecystitis performed at a single institution. *Asian J Endosc Surg* 2019;12:74–80. [CrossRef]
2. Cao AM, Eslick GD, Cox MR. Early laparoscopic cholecystectomy is superior to delayed acute cholecystitis: A meta-analysis of case-control studies. *Surg Endosc* 2016;30:1172–82. [CrossRef]
3. Roulin D, Saadi A, Di Mare L, Demartines N, Halkic N. Early versus delayed cholecystectomy for acute cholecystitis, are the 72 hours still the rule?: A randomized trial. *Ann Surg* 2016;264:717–22. [CrossRef]
4. Wu XD, Tian X, Liu MM, Wu L, Zhao S, Zhao L. Meta-analysis comparing early versus delayed laparoscopic cholecystectomy for acute cholecystitis. *Br J Surg* 2015;102:1302–13. [CrossRef]
5. Kolla SB, Aggarwal S, Kumar A, Kumar R, Chumber S, Par-Shad R, et al. Early versus delayed laparoscopic cholecystectomy for acute cholecystitis: A prospective randomized trial. *Surg Endosc* 2004;18:1323–7.
6. Ozkardeş AB, Tokaç M, Dumlu EG, Bozkurt B, Ciftçi AB, Yetişir F, et al. Early versus delayed laparoscopic cholecystectomy for acute cholecystitis: A prospective, randomized study. *Int Surg* 2014;99:56–61. [CrossRef]
7. Saber A, Hokkam EN. Operative outcome and patient satisfaction in early and delayed laparoscopic cholecystectomy for acute cholecystitis. *Minim Invasive Surg* 2014;2014:162643. [CrossRef]
8. Rajcok M, Bak V, Danihel L, Kukucka M, Schnorrer M. Early versus delayed laparoscopic cholecystectomy in treatment of acute cholecystitis. *Bratisl Lek Listy* 2016;117:328–31. [CrossRef]
9. Miura F, Takada T, Strasberg SM, Solomkin JS, Pitt HA, Gouma DJ, et al. TG13 flowchart for the management of acute cholangitis and cholecystitis. *J Hepatobiliary Pancreat Sci* 2013;20:47–54. [CrossRef]
10. 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. *J Gastrointest Surg* 2003;7:642–5. [CrossRef]
11. Okamoto K, Suzuki K, Takada T, Strasberg SM, Asbun HJ, Endo I, et al. Tokyo guidelines 2018: Flowchart for the management of acute cholecystitis. *J Hepatobiliary Pancreat Sci* 2018;25:55–72. [CrossRef]
12. Gurusamy K, Samraj K, Gluud C, Wilson E, Davidson BR. Meta-analysis of randomized controlled trials on the safety and effectiveness of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. *Br J Surg* 2010;97:141–50. [CrossRef]
13. Gomes RM, Mehta NT, Varik V, Doctor NH. No 72-hour pathological boundary for safe early laparoscopic cholecystectomy in acute cholecystitis: A clinicopathological study. *Ann Gastroenterol* 2013;26:340–5.
14. Bozkurt MA, Gönenç M, Peker KD, Yırgın H, Aliş H. Admission after the gold interval in acute calculous cholecystitis: Should we really cool it off? *Eur J Trauma Emerg Surg* 2017;43:73–7. [CrossRef]
15. Navez B, Ungureanu F, Michiels M, Claeys D, Muysoms F, Hubert C, et al. Belgian group for endoscopic surgery (BGES) and the hepatobiliary and pancreatic section (HBPS) of the royal belgian society of surgery. Surgical management of acute cholecystitis: Results of a 2-year prospective multicenter survey in Belgium. *Surg Endosc* 2012;26:2436–45.
16. Gurusamy KS, Davidson C, Gluud C, Davidson BR. Early versus delayed laparoscopic cholecystectomy for people with acute cholecystitis. *Cochrane Database Syst Rev* 2013;6:CD005440. [CrossRef]
17. Cao AM, Eslick GD, Cox MR. Early cholecystectomy is superior to delayed cholecystectomy for acute cholecystitis: A meta-analysis. *J Gastrointest Surg* 2015;19:848–57. [CrossRef]
18. Menahem B, Mulliri A, Fohlen A, Guittet L, Alves A, Lubrano J. Delayed laparoscopic cholecystectomy increases the total hospital stay compared to an early laparoscopic cholecystectomy after acute cholecystitis: An updated meta-analysis of randomized controlled trials. *HPB (Oxford)* 2015;17:857–62. [CrossRef]

ORJİNAL ÇALIŞMA - ÖZ

Tekrarlayan akut kolesistit ataklarında kolesistektomi zamanlaması**Dr. Ecem Memişoğlu, Dr. Ramazan Sarı**

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AMAÇ: Laparoskopik kolesistektomi akut kolesistit tedavisinde standart tedavi olmasına rağmen optimal zamanı hala tartışmalıdır. Bu çalışmadaki amacımız, tekrarlayan akut kolesistit tablosuyla başvuran hastalarda acil ve elektif kolesistektominin sonuçlarını karşılaştırarak uygun kolesistektomi zamanını belirlemektir.

GEREÇ VE YÖNTEM: Ocak 2019 ile Ocak 2022 tarihleri arasında geç kolesistektomi planlanan ve bekleme sürecinde tekrarlayan kolesistit atakları ile hastanemize başvuran 434 hastanın verileri geriye dönük olarak incelendi. Hastaların demografik verileri, Tokyo Guidelines 2018'e göre evresi, ameliyat öncesi ve sonrası hastanede kalış süresi, ameliyat süresi, açığa geçiş oranı, dren kullanımı, içi boş organ yaralanması, safra yolu yaralanması, kanama, yara yeri enfeksiyonu, ameliyat sonrası koleksiyon ve mortalite oranları değerlendirildi.

BULGULAR: Tekrarlayan kolesistit atağı ile başvuran toplam 434 hastanın 176'sına (%40.5) acil laparoskopik kolesistektomi (grup 1), 258'ine (%59.5) elektif laparoskopik kolesistektomi (grup 2) uygulandı. Ameliyat öncesi hastanede yatış süresi grup 2'de, ortalama ameliyat süresi grup 1'de anlamlı olarak daha uzun idi (sırasıyla, $p=0.001$ ve $p=0.035$). Her iki grupta mide veya bağırsak yaralanması, safra yolu yaralanması, yara yeri enfeksiyonu ve mortalite saptanmadı. Gruplar arasında açığa geçiş ve ameliyat sonrası koleksiyon oranlarında anlamlı bir fark yoktu ($p>0.05$).

TARTIŞMA: Hepatobiliyer cerrahide deneyimli merkezlerde, tekrarlayan akut kolesistit ataklarında semptom süresi ve atak sayısından bağımsız olarak laparoskopik kolesistektomi güvenle yapılabilir.

Anahtar sözcükler: Acil laparoskopik kolesistektomi; elektif laparoskopik kolesistektomi; tekrarlayan akut kolesistit.

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