ORIGINAL ARTICLE

Should the severity of acute cholecystitis (Tokyo 2018 guideline) affect the decision of early or delayed cholecystectomy?

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ABSTRACT

BACKGROUND: In our study, we aimed to compare the complication rates of patients presenting with acute cholecystitis and undergoing surgery at the time of hospitalization (early cholecystectomy) and delayed cholecystectomy and also to examine whether the severity of cholecystitis has an effect on the timing of cholecystectomy.

METHODS: The study was planned retrospectively and the approval of the ethics committee of our hospital was obtained. The patient files of the patients who were admitted to our tertiary hospital with acute cholecystitis were accessed through the hospital archive system. The patients were divided into two groups, those who were admitted to the emergency department for acute cholecystitis and who underwent early cholecystectomy and delayed cholecystectomy. The Tokyo 2018 acute cholecystitis guideline was used to determine the severity of acute cholecystitis. Pre-operative and post-operative data of the patients were examined and their complications were evaluated.

RESULTS: The data of 158 patients who met the inclusion criteria were retrospectively analyzed. Compared with delayed cholecystectomy, complication rates increased in patients who underwent early cholecystectomy (8.1% and 32.2%, respectively, p<0.001). According to the Tokyo 2018 guideline, patients with acute cholecystitis were grouped as Tokyo 1, 2, and 3; and of Tokyo 1 patients, more complications were observed in those who underwent early cholecystectomy (22.6% and 4.2%, respectively, p=0.004). When the complications were examined, it was observed that pulmonary embolism, pneumonia, intra-abdominal abscess development, sepsis, and wound infection were significantly higher in those who were operated early. When the factors affecting complications are examined, having a Tokyo score of 2 and above (OR: 4.161), high creatinine levels (OR: 5.496), and presence of additional disease (OR: 4.238) increase the risk of developing complications.

CONCLUSION: More complications occur after cholecystectomy in patients with Tokyo 2 and above, when compared with patients with Tokyo 1. It was observed that more complications developed in patients with Tokyo 1 cholecystitis who were operated in the early period. Further studies are needed to determine the effect of acute cholecystitis severity in determining the timing of cholecystectomy.

Keywords: Acute cholecystitis; complications; delayed cholecystectomy; laparoscopic cholecystectomy; tokyo guidelines.

INTRODUCTION

Acute cholecystitis constitutes a significant proportion of patients admitted to the emergency service in general surgery practice. The Tokyo guideline revised in 2018 is used to make the decision of early cholecystectomy or delayed cholecystectomy and to assess the severity of acute cholecystitis.[1] In the Tokyo 2018 acute cholecystitis staging, patients are divided into three groups. Tokyo Stage 1 is called mild cholecystitis. It is a group of patients who are healthy individuals without organ dysfunction, who do not meet the Stage 2 and 3 criteria. Tokyo Stage 2 is referred to as moderate acute cholecystitis. In Stage 2, the white blood cell (WBC) count, which is one of the markers of inflammation, is more than 18,000/mm^3, a painful

Cite this article as: Dönder Y, Karagöz Eren S. Should the severity of acute cholecystitis (Tokyo 2018 guideline) affect the decision of early or delayed cholecystectomy? Ulus Travma Acil Cerrahi Derg 2022;28:1305-1311.

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Ulus Travma Acil Cerrahi Derg 2022;28(9):1305-1311 DOI: 10.14744/tjtes.2021.50241 Submitted: 26.02.2021 Accepted: 17.06.2021

and tender mass are palpated in the right upper quadrant, the patient's complaint has been ongoing for more than 72 h and signs of local inflammation (gangrenous cholecystitis, emphysematous cholecystitis, hepatic abscess, pericholecystic abscess, and biliary peritonitis) are observed. Stage 3 is referred to as severe acute cholecystitis. In Stage 3, cardiovascular, neurological, respiratory system, hepatic, and hematogenic problems accompanying acute cholecystitis are observed.[1] Acute cholecystitis diagnosis criteria in the 2013 Tokyo guide have not changed in the new guideline revised in 2018[2] (Table 1).

In the literature, there are some advocates of delayed cholecystectomy as well as those who report that early cholecystectomy is more effective. Studies have stated that if it is known that the symptoms have started within 72 h, it will be more appropriate to operate.[2] Different studies may recommend early cholecystectomy in the first 24 h or up to the 7th day of the onset of symptoms.[3] Laparoscopic cholecystectomy is preferred as the gold standard in gallbladder surgery. In laparoscopic cholecystectomies, transition to open surgery is recommended when "critical view of safety" cannot be revealed.[4] However, open cholecystectomy may not be easy either. Sometimes, cholecystectomy can be performed, sometimes, it may be better for the patient to perform a subtotal cholecystectomy. The treatment decision should be made for each individual case. To successfully complete the surgery without complications, one should not hesitate to convert to open surgery. Bile duct injury and prolonged operation time may increase morbidity and mortality in patients with comorbid diseases.[5] Early cholecystectomy may decrease the duration of hospital stay, but conditions such as age, presence of additional disease, transition to open surgery, and prolonged operation time are factors that increase post-operative complications.

In this study, we aimed to compare the complications seen in patients who underwent early and delayed cholecystectomy based on the Tokyo 2018 guideline and to discuss the factors affecting complications in patients who underwent laparoscopic cholecystectomy for acute cholecystitis.

Table 1. Tokyo 2018/2013 guideline diagnostic criteria for acute cholecystitis

Tokyo 2018/2013 guideline: Diagnostic criteria for acute cholecystitis
A. Local signs of inflammation etc. (1) Murphy's sign, (2) Right upper quadrant mass/pain/tenderness
B. Systemic signs of inflammation (1) Fever, (2) elevated CRP, (3) elevated WBC count
C. Imaging findings characteristic of acute cholecystitis
Suspected diagnosis: One item in A + one item in B
Definite diagnosis: One item in A + one item in B + C

CRP: C-reactive protein; WBC: White blood cell (1).

MATERIALS AND METHODS

Patients with acute cholecystitis who applied to our clinic between January 2019 and April 1, 2020, were included in the study. Since our hospital was chosen as one of the pandemic hospitals due to the COVID-19 pandemic, non-operative treatment was more prominent after this period, and patients with acute cholecystitis who admitted to our hospital after April 1, 2020, were not included in the study because it did not reflect our routine practice. The study was planned retrospectively as a file scan from the hospital data system and approval was obtained from the ethics committee of our hospital (decision no: 181, date: October 15, 2020). Patients with acute cholecystitis, within the 18–65 age group, who were operated in the early period and those who were operated late after medical treatment were included in the study. Patients who underwent percutaneous cholecystostomy for acute cholecystitis, patients with acute pancreatitis and acute cholangitis, and patients whose data were not available were excluded from the study. Classification of acute cholecystitis severity was made according to the Tokyo 2018 guideline. The patients were divided into Tokyo Grades 1, 2, and 3 according to their criteria. Age, sex, comorbidity, pre-operative ultrasonographic data of the patients (gallbladder wall thickness, stone presence, stone size, common bile duct diameter, gallbladder hydrops, and pericholecystic fluid), ASA score, operation procedure (laparoscopic and conversion to open surgery), operation time, perioperative and post-operative complications (bile duct injury, bleeding, bile leakage, intra-abdominal abscess, sepsis, wound infection, pneumonia, and pulmonary embolism), hospital stay, and mortality were recorded. Patients who were operated within the first 72 h of the onset of symptoms were called the group who underwent early cholecystectomy, while patients who were operated 4–6 weeks after the attack were called the group who underwent delayed cholecystectomy.

SPSS 23.0 package program was used for statistical analysis of the data. Categorical measurements were summarized as numbers and percentages, continuous measurements as mean, standard deviation, and minimum-maximum. Chi-square test and Fisher's exact test were used for the comparisons of categorical variables. The suitability of the variables to normal distribution was examined using the Kolmogorov–Smirnov/Shapiro–Wilk tests. Independent Student's t-test was used for binary variables in groups with normal distribution, and Mann–Whitney U-test was used in groups that did not comply with normal distribution. Multinomial logistic regression analysis was used to determine the independent variables affecting the dependent variable. $P<0.05$ was considered statistically significant.

RESULTS

The data of 158 patients who met the inclusion criteria were retrospectively analyzed. Thirty of 59 patients who were operated in the early period were male (50.8%) and 29 (49.2%)

were female. It was observed that the patients who were operated in the early period were mostly male, and the patients who were operated in the delayed period were mostly female, and this difference was statistically significant. Of 99 patients who underwent delayed cholecystectomy, 26 (26.3%) were male and 73 (73.7%) were female. The mean age of the patients who were operated in the early period was 59.75±18.1 and the mean age of the patients who underwent delayed chole-

Table 3. Acute cholecystitis severity and laboratory data

Variable	Early cholecystectomy (n=59)	Delayed cholecystectomy (n=99)	Total (n=158)	p-value
Tokyo score. n (%)				
1	31 (52.5)	72 (72.7)	103 (65.2)	0.001
2	22 (37.3)	27 (27.3)	49 (31.0)	
3	6 (10.2)	0 (0.0)	6 (3.8)	
Laboratory data				
WBC (10^3/µl)**	12.02 (5.09–28.86)	7.24 (3.58–14.39)	4.865 (3.58–28.86)	<0.001
Neutrophil (10^3/µl)**	10 (2.4–26.1)	4.08 (1.78–12.65)	5.075 (1.78–26.1)	<0.001
Lymphocyte (10^3/µl)*	1.73±8.18	2.18±7.12	2.01±7.82	<0.001
PLT (10^3/µl)*	248.5±74.8	281.7±80.4	269.3±79.7	0.011
AST (U/L)**	22 (11–401)	17 (9–176)	18 (9–401)	0.002
ALT (U/L)**	18 (7–550)	19 (6–280)	18 (6–550)	0.983
GGT (U/L)**	30 (6–749)	22 (3–799)	23 (3–799)	0.215
ALP (U/L)**	89 (49–438)	76 (48–218)	81 (48–438)	0.049
T. Bil (mg/dL)**	0.7 (0.1–13.3)	0.4 (0.1–2.6)	0.5 (0.1–13.3)	<0.001
D. Bil (mg/dL)**	0.2 (0.1–10.9)	0.2 (0.1–0.8)	0.2 (0.1–10.9)	0.023
Amylase (U/L)*	50.21±23.67	58.68±56.0	55.56±21.78	0.024
Lipase (U/L)**	27 (8–84)	28 (16–96)	27 (8–96)	0.154
Cre (mg/dL)*	0.95±0.73	0.73±0.20	0.81±0.48	0.005
CRP (mg/L)*	194.91±144.99	268.0±0.0	204.05±136.7	0.654

*Mean±standard deviation (minimum-maximum). **Median (minimum-maximum). WBC: White Blood Cell; T. Bil: Total Bilirubin; D. Bil: Direct Bilirubin; PLT: Platelet; AST: Aspartat aminotransferase; ALT: Alanine aminotransferase; GGT: Gamma glutamyl transferase; ALP: Alkaline phosphatase; Cre: Creatinine; CRP: C-reactive protein.

Table 4. Comparison of early and delayed surgery patients

Variable	Early cholecystectomy (n=59)	Delayed cholecystectomy (n=99)	Total (n=158)	p-value
Tokyo score, n (%)				
1	31 (52.5)	72 (72.7)	103 (65.2)	0.001
2	22 (37.3)	27 (27.3)	49 (31.0)	
3	6 (10.2)	0 (0.0)	6 (3.8)	
Operation time (minute)*	100 (60–240)	120 (120–120)	120 (60–240)	<0.001
Hospitalization duration (day)*	3.5 (1–46)	1 (1–17)	2 (1–46)	<0.001
At least one complication, n (%)				
Any complication	40 (67.8)	91 (91.9)	131 (82.9)	<0.001
No complication	19 (32.2)	8 (8.1)	27 (17.1)	
Operation procedure, n (%)				
Laparoscopic	42 (71.2)	97 (98.0)	139 (88.0)	<0.001
Conversion to open	17 (28.8)	2 (2.0)	19 (12.0)	

*Median (minimum- maximum).

cystectomy was 51.33±15.02. It was observed that the mean age of the patients who were operated in the early period was higher and this difference was statistically significant. While the gallbladder wall thickness increased in patients who were operated in the early period, it was observed that the gallbladder wall thickness of the patients who were operated in the late period was normal. Gallbladder hydrops and pericholecystic fluid were also found to be statistically significantly higher in patients who were operated in the early period. The average gallbladder stone size was found to be significantly higher in those who were operated in the early period when compared to those who were operated in the late period (16 [3–35] vs. 10 [3–40], respectively). While the common bile duct diameter was 6 mm (5–15) in those who were operated in the early period, it was found to be 5 mm (5–15) in patients who underwent delayed cholecystectomy. Although the difference was small, this difference was statistically significant (Table 2).

According to the Tokyo 2018 guideline, patients with acute cholecystitis were grouped as Tokyo 1, 2, and 3, and Tokyo 2 and 3 rates were higher in those who were operated in the early period, while patients who underwent delayed cholecystectomy were more likely to be Tokyo 1, and this was found to be statistically significant. In laboratory findings, WBC, neutrophil, aspartate aminotransferase, alkaline phosphatase, total bilirubin, direct bilirubin, and creatinine values were found to be significantly higher in patients who were operated early, while lymphocyte, platelet count, amylase, and C-reactive protein (CRP) values were found to be significantly higher in the patient group who underwent delayed cholecystectomy. There was no significant difference between the groups in terms of alanine aminotransferase, gamma-glutamyl transferase, and lipase (Table 3).

It was observed that the operation time was longer in the patient group who underwent delayed cholecystectomy. The mean duration of discharge for the patients who were operated in the early period was 3.5 (1–46) days, while it was 1 (1–17) day in the patient group who underwent delayed cholecystectomy (Table 4). As expected, the factor causing

Table 5. Evaluation of complications of patients undergoing early and delayed surgery

Variable	Early cholecystectomy (n=59)	Delayed cholecystectomy (n=99)	Total (n=158)	p-value
At least one complication, n (%)				
Any complication	19 (32.2)	8 (8.1)	27 (27.1)	<0.001
No complication	40 (67.8)	91 (91.9)	131 (82.9)	
Bile duct injury, n (%)				
Yes	2 (3.4)	0 (0.0)	2 (1.3)	0.065
None	57 (96.6)	99 (100.0)	156 (98.7)	
Other complications*				
Yes	15 (25.4)	6 (6.1)	21 (13.3)	0.001
None	44 (74.6)	93 (93.9)	137 (86.7)	
Hemorrhage, n (%)				
Yes	1 (1.7)	1 (1.0)	2 (1.3)	0.710
None	58 (98.3)	98 (99.0)	156 (98.7)	
Bile leak, n (%)				
Yes	1 (1.7)	1 (1.0)	2 (1.3)	0.710
None	58 (98.3)	98 (99.0)	156 (98.7)	
Intraabdominal abscess, n (%)				
Yes	5 (8.5)	0 (0.0)	5 (3.2)	0.003
None	54 (91.5)	99 (100.0)	153 (96.8)	
Sepsis, n (%)				
Yes	4 (6.8)	0 (0.0)	4 (2.5)	0.009
None	55 (93.2)	99 (100.0)	154 (97.5)	
Wound infection, n (%)				
Yes	7 (11.9)	2 (2.0)	9 (5.7)	0.010
None	52 (88.1)	97 (98.0)	149 (94.3)	

*Cholangitis, cardiovascular, pneumonia, respiratory failure, pulmonary embolism, pulmonary edema, pancreatitis.

the delay of discharge is the development of complications seen in the post-operative period. It was observed that the number of patients with at least one complication was higher in those who were operated early. When the complications were examined, it was observed that pulmonary embolism, pneumonia, intra-abdominal abscess development, sepsis, and wound infection were significantly higher. Delayed cholecystectomies have been found to have lower rates of conversion to open surgery, while the operative time is longer (Table 5).

When the regression analysis is performed, the presence of pericholecystic fluid, a Tokyo score of 2 and above, the presence of at least one additional disease, early surgery, advanced age, increased total bilirubin, direct bilirubin and cre-

Table 6. Multinominal logistic regression analysis of factors affecting complication

Variable		Univariate p-value	Multivariate HR (95%–CI)	p-value
Sex	Male	0.849	1.000	0.849
	Female		0.920 (0.389–2.173)	
Gallbladder wall thickness	Yes	0.948	1.000	0.948
	None		0.970 (0.391–2.406)	
Hydrops	Yes	0.543	1.000	0.544
	None		0.772 (0.334–1.782)	
Pericholecystic fluid	Yes	<0.001	1.000	**<0.001**
	None		0.174 (0.068–0.449)	
Tokyo score	1	0.001	1.000	**0.001**
	2 and above		4.161 (1.747–9.906)	
Comorbidities	None	0.001	1.000	**0.001**
	At least one		4.238 (1.757–10.220)	
ASA score	1	0.950	1.000	0.998
	2		1.015 (0.751–1.201)	0.997
	3		1.023 (0.758–1.105)	0.843
	4		1.034 (0.789–1.174)	0.984
Surgery timing	Early	<0.001	1.000	**<0.001**
	Delayed		0.185 (0.075–0.458)	
Surgical procedure	Laparoscopic	0.206	1.000	0.958
	Conversion to open		12.986 (4.423–38.163)	**<0.001**
Age		<0.001	1.059 (1.028–1.091)	**<0.001**
Aspartat aminotransferase		0.967	1.000 (0.992–1.009)	0.967
Alkaline phosphatase		0.126	1.005 (0.999–1.011)	0.114
Total bilirubin		0.002	2.032 (1.136–3.635)	**0.017**
Direct bilirubin		0.004	2.208 (0.986–4.945)	**0.044**
Amylase		0.461	0.992 (0.971–1.013)	0.462
Creatinine		0.002	5.496 (1.207–25.031)	**0.028**
Stone size		0.829	1.005 (0.944–1.069)	0.879
Choledochus diameter		0.759	0.977 (0.765–1.247)	0.849
Hospitalization duration		<0.001	2.304 (1.683–3.155)	**<0.001**
Operation time		<0.001	1.070 (1.026–1.116)	**0.002**
White blood cell		0.065	1.000 (1.000–1.000)	0.074
Neutrophil		0.074	1.000 (1.000–1.000)	0.140
Lymphocyte		0.069	0.999 (0.999–1.000)	0.156
Platelet		0.150	1.000 (1.000–1.000)	0.170

The bold value indicates statistical significance (p<0.05) ASA: American Society of Anesthesiology.

atinine levels, prolonged operation time, and discharge time increase the risk of developing complications (Table 6).

DISCUSSION

In the Tokyo 2007 acute cholecystitis guideline, it is discussed whether laparoscopic cholecystectomy is contraindicated in acute cholecystitis. Nowadays, with the increase of laparoscopic surgery experience, this discussion has left its place to the discussion of which patients with acute cholecystitis to operate on and when. In a Cochrane systematic review, it was observed that there was no significant difference between early and delayed cholecystectomy in terms of post-operative mortality, bile duct injury, and rates of laparoscopic conversion.[6] Rice et al.[7] recommended early cholecystectomy economically, and Zafar et al.[8] observed in a large series that mortality and morbidity are lower in patients who were operated within the first 48 h of symptoms. We have also been using the laparoscopic method in early cholecystectomy in the last few years. In our study, complication rates for early cholecystectomy were significantly increased compared to delayed cholecystectomy for acute cholecystitis (32.2% vs. 8%, respectively, $p<0.001$). While there was no difference between bleeding and biliary complications, complications such as intra-abdominal abscess, wound infection, sepsis, and pulmonary complications were more common in the early cholecystectomy. The presence of additional disease and higher ASA scores compared to patients with delayed cholecystectomy may contribute to lung complications. While two patients died among the patients who underwent early cholecystectomy, there was no statistically significant difference in mortality between the two groups.

When we examine the complications in patients who underwent early and delayed cholecystectomy according to the severity of cholecystitis, it is observed that there is a higher risk of morbidity with early cholecystectomy for Tokyo Grade 1 patient subgroup. There was no difference in showing at least one complication in the early and delayed cholecystectomies included in the Tokyo Grade 2 patient subgroup. Tokyo Grade 3 patients could not be evaluated because none of them were in the delayed cholecystectomy group. Although we could not give definite statements about Grade 3 patients in our study, at least one complication was observed in all six patients with Tokyo 3. Rice et al.'s[7] study shows that there is a higher risk of morbidity and mortality with early cholecystectomy for the Grade 2 patient subgroup. When seven patients with early complications in Tokyo Grade 1 were examined, it was observed that three had wound infection, three had pneumonia, and one patient had bile leakage. Complications were mostly due to non-surgical reasons. It was observed that the patient with bile leakage was treated by decreasing the bile leakage by performing sphincterotomy with ERCP.

In cases where the Calot triangle cannot be revealed clearly, or adhesions cannot be separated laparoscopically due to a lack of experience or technical difficulties, or in cases, where laparoscopic intervention is difficult (such as bile duct injury and bleeding), it is recommended to convert to open surgery.[8] As stated by Abdelrahim et al.,[9] laparoscopic subtotal cholecystectomy decreases the rate of conversion to open surgery. When partial cholecystectomy is to be performed in our clinic, we often prefer to convert to open surgery. Although we do not consider open surgery as a complication, it was observed that the rates conversion to open surgery were higher in the early group than the delayed cholecystectomy group. This may be due to the higher male sex in patients undergoing early cholecystectomy and that cholecystectomies are more difficult in male patients.[10] We think that this situation also contributes to wound infection and sepsis.

It has been shown that an increase in the Tokyo score increases complications and conversion to open surgery for acute cholecystitis.[11] In another study, Atsushi et al.[12] examined 465 patients who were operated on for acute cholecystitis and found that the complication seen in Tokyo Grades 2 and 3 was high. Similarly, when regression analysis was performed in our study, it was observed that the presence of pericholecystic fluid and a Tokyo score of 2 and above increased the risk of developing complications.

Predictors of post-operative complications after laparoscopic cholecystectomy discussed in the previous studies include age, sex, body mass index, total bilirubin, WBC count, CRP level, and creatinine level.[13]

Giger et al.,[14] in the analysis of 22,953 cases from the Swiss database, reported that ASA score >2, conversion to open surgery, emergency surgery, acute cholecystitis, and old age were the determinants of the highest risk of causing post-operative systemic complications. In our study, it was observed that the presence of at least one additional disease, performing the surgery under emergency conditions, advanced age, high total bilirubin, direct bilirubin and creatinine levels, prolonged operation time, and discharge time increased the risk of developing complications.

The limitation of our study is that it is retrospective and was performed in a single center. As the patient population is very heterogeneous, the sensitivity of Tokyo criteria is decreased. We think that if each center publishes its own results, it will shed light on the new guidelines to be created. The low number of Tokyo Grade 3 patients may be due to the exclusion of patients who underwent percutaneous cholecystectomy. This is another limitation of our study.

Conclusion

When patients with acute cholecystitis who applied to our tertiary hospital were operated early and delayed; pulmonary complications such as pulmonary embolism, pneumonia, wound infection, intra-abdominal abscess, sepsis, conversion to open surgery, operation time, and duration of discharge were found to be superior in patients who were operated delayed. More complications develop after cholecystectomy

when patients with Tokyo 2 and above are compared with patients with Tokyo 1. More complications were observed in patients with Tokyo 1 cholecystitis who were operated in the early period. Further studies are needed to determine the effect of acute cholecystitis severity in determining the timing of cholecystectomy.

Ethics Committee Approval: This study was approved by the Kayseri City Hospital Clinical Research Ethics Committee (Date: 15.10.2020, Decision No: 181).

Peer-review: Internally peer-reviewed.

Authorship Contributions: Concept: Y.D.; Design: Y.D.; Supervision: Y.D.; Resource: S.K.E.; Materials: Y.D.; Data: Y.D.; Analysis: S.K.E.; Literature search: S.K.E.; Writing: Y.D.; Critical revision: S.K.E.

Conflict of Interest: None declared.

Financial Disclosure: The authors declared that this study has received no financial support.

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ORİJİNAL ÇALIŞMA - *ÖZ*

Akut kolesistit şiddeti (Tokyo 2018 kılavuzu) erken veya geç kolesistektomi kararını etkilemeli mi?

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AMAÇ: Akut kolesistit nedeniyle başvuran hastalarda yatış anında yapılan (erken kolesisitektomi) ile gecikmiş kolesistektomi arasındaki komplikasyon oranlarını karşılaştırmak, aynı zamanda kolesistit şiddetinin kolesistektomi zamanlamasına etkisi olup olmadığını incelemeyi amaçladık.
GEREÇ VE YÖNTEM: Çalışma geriye dönük olarak planlandı ve hastanemiz etik kurul onayı alındı. Üçüncü basamak hastanemize akut kolesistit ile başvuran hastaların bilgileri hastane veri tabanından tarandı. Hastalar akut kolesistit nedeniyle acile başvuran, erken ve geç dönem kolesistektomi yapılan gruplar olarak ikiye ayrıldı. Akut kolesistit şiddetini belirlemek için Tokyo 2018 akut kolesistit rehberi kullanıldı. Hastaların ameliyat öncesi-sonrası verileri incelendi ve komplikasyonları değerlendirildi.
BULGULAR: Çalışmaya dahil edilme kriterlerini karşılayan 158 hastanın verileri geriye dönük olarak incelendi. Geç dönem kolesistektomi ile karşılaştırdığımızda, erken dönem kolesistektomi yaptığımız hastalarda komplikasyon oranları artmıştır (sırasıyla %8.1, %32.2 p<0.001). Tokyo 2018 rehberine göre akut kolesistit şiddeti Tokyo 1, 2 ve 3 olarak gruplandırıldığında Tokyo 1 olan hastalarda erken dönemde, geç dönem kolesistektomi yapılanlara göre daha fazla komplikasyon gözledi (sırasıyla, %22.6, %4.2, p=0.004). Komplikasyonlar incelendiğinde özellikle pulmoner emboli, pnömoni, intra abdominal apse gelişimi, sepsis ve yara yeri enfeksiyonunun erken dönem ameliyat edilenlerde anlamlı olarak daha yüksek olduğu görülmüştür. Komplikasyonlar üzerine etkili olan etkenler incelendiğinde Tokyo skorunun 2 ve üzeri olması (OR: 4.161), kreatin yüksekliği (OR: 5.496) ve ek hastalık varlığı (OR: 4.238) komplikasyon gelişim riskini arttırmaktadır.
TARTIŞMA: Tokyo 2 ve üzeri hastalar, Tokyo 1 olan hastalarla karşılatırıldığında kolesistektomi sonrası daha fazla komplikasyon gelişmektedir. Erken dönem ameliyat edilen hastalarda ise Tokyo 1 kolesistitli hastalarda daha fazla komplikasyon geliştiği görülmüştür. Kolesitektomi zamanlamasını belirlemede akut kolesistit şiddetinin etkisini belirlemek için ileri çalışmalara ihtiyaç vardir.
Anahtar sözcükler: Akut kolesistit; gecikmiş kolesistektomi; komplikasyonlar; laparoskopik kolesistektomi; Tokyo rehberi 2018.

Ulus Travma Acil Cerrahi Derg 2022;28(9):1305-1311 doi: 10.14744/tjtes.2021.50241