ARAŞTIRMA MAKALESİ/ORIGINAL RESEARCH

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The Importance of Percutaneous Cholecystostomy Placement Time in Patients with Grade-III Acute Cholecystitis

Grade-III Akut Kolesistitli Hastalarda Perkütan Kolesistostomi Yerleştirme Zamanının Önemi

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ABSTRACT

Objective: The current treatment modality for acute cholecystitis is laparoscopic cholecystectomy. In some cases, it may be necessary to use alternative methods such as percutaneous cholecystostomy (PC), especially in grade III patients. Based on this problem, the aim of our study is to determine the effects of percutaneous cholecystostomy placed in the early (first 72 hours) or late (72 hours and later) periods, on mortality and morbidity, in patients with Grade III acute cholecystitis.

Method: Patients with acute cholecystitis treated between January 2012 and December 2018 were evaluated. The patients were divided into 2 groups as the group with PC placement in the first 72 hours of the symptoms started (Group-I, n= 19) and the group with PC placement after 72 hours (Group-II, n=13).

Results: A total of 32 patients with grade III acute cholecystitis who underwent percutaneous cholecystostomy between this period were included in the study. Early morbidity was observed in 7 (21.87%) patients, while hospital mortality was observed in 11 patients (34.37%). While there was no significant difference in morbidity between early PC (first 72 hours, Group-I) and late PC (72. hour and later, Group-II) in patients with grade III acute cholecystitis (p=0.67), there was a significant difference in mortality in Group-II compared to Group-I (p=0.001).

Conclusion: According to our study results, we strongly recommend that the procedure be applied to the required patients within the first 72 hours by making a quick decision on the implantation of a PC in a multidisciplinary manner.

Keywords: percutaneous cholecystostomy, acute cholecystitis, cholecystectomy, timing of placement

ÖZ

Giriş: Akut kolesistit için güncel tedavi yöntemi laparoskopik kolesistektomidir. Bazı durumlarda özellikle de Grade III hastalarda perkütan kolestostomi (PK) gibi alternatif yöntemlerin kullanılması gerekebilir. Bu sorundan yola çıkarak çalışmamızın amacı, Grade III akut kolesistitli hastalarda erken (ilk 72 saat) veya geç (72 saat ve sonrası) dönemlerde uygulanan perkütan kolestostominin mortalite ve morbidite üzerine etkilerini belirlemektir.

Yöntem: Ocak 2012 ile Aralık 2018 arasında tedavi edilen akut kolesistitli hastalar değerlendirildi. Hastalar semptomların başladığı ilk 72 saatte PK yerleştirilen grup (Grup-I, n = 19) ve 72 saat sonra PK yerleştirilen grup (Grup-II, n = 13) olarak 2 gruba ayrıldı.

Bulgular: Bu dönem arasında perkütan kolestostomi uygulanan Grade-III akut kolesistitli hastalar çalışmaya dahil edildi. Erken morbidite 7 hastada (% 21.87), hastane mortalitesi 11 hastada (% 34.37) gözlendi. Grade-III akut kolesistitli hastalarda erken PK (ilk 72 saat, Grup-I) ve geç PK (72. saat ve sonrası, Grup-II) arasında morbidite açısından anlamlı bir fark gözlenmez iken (p = 0.67), Grup-II' ye göre Grup-II' de mortalitede istatistiksel olarak anlamlı farklılık saptanmıştır (p = 0,001).

Sonuç: Çalışma sonuçlarımıza göre PK yerleştirilmesinin multidisipliner verilen karar ile hızlı bir şekilde ilk 72 saat içinde gerekli hastalara uygulanmasını şiddetle tavsiye ediyoruz.

Anahtar Kelimeler: perkütan kolesistostomi, akut kolesistit, kolesistektomi, yerleştirmenin zamanlaması

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INTRODUCTION

Acute cholecystitis is a disease with acute inflammation of the gall bladder and one of the most common causes of emergency admission with abdominal pain (1). Along with pain in the right upper quadrant, the most common symptoms are fever, nausea, andvomiting. Although gallstones are the most common cause of this inflammation (calculous cholecystitis), cholecystitis can also develop without gallstones (acalculous cholecystitis). The Tokyo Guidelines diagnostic criteria and severity grading of acute cholecystitis, first created in 2007 and subsequently revised twice (2013 and 2018), have been widely adopted in recent years (TG18). According to this guideline, acute cholecystitis can be defined as mild (Grade I), moderate (Grade II) and severe cholecystitis (Grade III) (2-6).

The current treatment modality for a cutechole cystitis is laparoscopic cholecystectomy (LC) and the risk of death has been reported to be less than 0.8% (7). Although surgery is a feasible method in all three grades, in some cases, it may be necessary to use alternative methods such as percutaneous cholecystostomy (PC), especially in grade III patients. The purpose of PC in acute cholecystitis is to provide bile duct drainage to relieve acute symptoms and prevent the development of local and systemic complications. PC is indicated in grade III acute cholecystitis, elderly patients with multiple comorbidities, patients with American Society of Anesthesiologists (ASA) score>III, intensive care patients with acalculuschole cystitis, and patients with high surgical risk (8,9) (Table-1). It has been reported that procedure-dependent complications associated with PC may be low (10-12).

Although the indications for PC have been clearly stated in many guidelines and studies, a clear statement regarding the placement time of PC in these patients is not clear.

Based on this problem, theaim of our study is todetermine the effects of PC placed in the early (first 72 hours) or late (72 hours and later) periods, on mortality and morbidity, in patients with Grade III acutechole cystitis.

MATERIAL AND METHOD

Patients with acute cholecystitis treated between January 2012 and December 2018 were evaluated. The study was planned as a retrospective analysis and before starting the study ethical permission was provided by the local hospital ethics committee. The ethical number of this study is E-21-1526.
The diagnosis of acute cholecystitis was based on clinical presentation, physical examination, laboratory data, and imaging studies includin gabdominal ultrasonography and computed tomography, if necessary (12). When acute cholecystitis was diagnosed, the patients received immediate medical treatment and evaluated for their surgical risk based on the American Society of Anesthesiologists (ASA) classification (13). Patients were registered for their Grade according to the current Tokyo guideline (14). Similar to the suggestion in Tokyo Guideline (14) as a therapeutic approach; mild and moderate cholecystitis (Grade I-II) is operated in the first 72 hours if the patient is low-risk (ASA I-II). High-risk patients (ASA- III,IV) are operated after antibiotic and supportive treatment are given. In Severe (Grade III) cholecystitis, antibiotics and supportive treatment are started immediately and if there are serious organ failure and / or negative predictive factors

Table 1 : Indications for Percutaneous Cholecystostomy Placement	
Severe acute cholecystitis according to the 2018 Tokyo Guidelines	
Acute cholecystitis and ASA classification > 3 or Charlson comorbidity index 6	
Second-line pathway to access to the bile duct	Malignant lesion of the distal billiary tract
	Dilation of the bile duct stricture
	Fistula of the bile duct diversion
	Biliary tract decompression in cholangitis

for surgery, elective surgery is performed 4-6 weeks after emergency percutaneous drainage within the first 72 hours.

Patients with grade III cholecystitis were hospitalized and constituted the study pool of this study. After the patients were hospitalized, they were consulted with Pulmonology, Cardiology, Anesthesia and other departments when needed. A common consensus was formed and patients who were not suitable for emergency surgery were directed to the PC. All patients with Grade III AC and decided to place PC were treated within travenous fluids and antibiotics, most common lyusing a combination of Ceftriax one and Metronidazole with standard analgesics. PC was performed by an interventional radiolog using seldinger method in all patients with 8-F pigtail catheter through transhepatic route under ultrasound guidance and was technically successful in all patients (Figure 1).

Figure 1 (a) : Ultrasound image shows distantion and wall thickness of gallbladder which is full of bile mud and gallstone (black arrows).

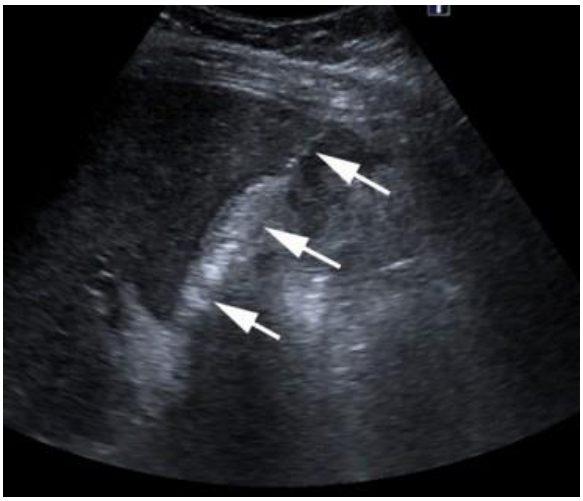

Figure 1 (b) : Ultrasound image shows percutain drainage catheter and decrease in gallbladder volume at first day control after cholecystostomy

The patients were divided into 2 groups as the group with PC placement in the first 72 hours of the symptoms started (Group I, n= 19) and the group with PC placement after 72 hours (Group II, n=13).

The patient characteristics including age, sex, comorbidities and ASA scores; clinical findings including time of symptom onset, indications of drainage, PC catheter culture results, hospital stay and pathology results were recorded. Morbidity andmortality rates were compared between the two groups.

Statistical Analysis

The data were transferred to IBM SPSS Statistics program v. 20 IBM Corp: Armonk, NY, USA) for analysis. When evaluating the study data, frequency distribution (number and percentages) were used for categorical variables and descriptive statistics (median, minimum, and maximum) used for numerical variables depending on the results of the Kolmogorov-Smirnov test.

Continuous variables were expressed as mean ± standard deviation or median (minimum-maximum) where applicable. Mann-Whitney U-test and Fisher's Exact test were used where applicable. The chi-square test performed to examine the relationship between two categorical variables. A p value< 0.05was considered statistically significant.

RESULTS

A total of 32 patients with grade III acute cholecystitis who underwent PC between this period wereincluded in the study. Group I (<72h) consisted of 19 (%59.4) patients and Group II (>72h)consisted of 13 (%40.6) patients, respectively. Comparison of demographic and clinical characteristics of patients according to Group I and Group II are presented in Table 2.

The meanage of whole group was 74.28±15.32 years. Seventeen patients (53.1%) were female. Thirteen patients had coronary artery disease (CAD), seven patients had chronic obstructive pulmonary disease (COPD) and CAD, four patients had diabetes mellitus type II (DM) and CAD, four patients had DM and COPD, and four patients had severe COPD as comorbid disease. Fifteen patients (46.9%) were ASA III and 17 patients (52.1%) were ASA IV. While there was no difference between the two groups in terms of age, gender, and comorbidities, the rate of ASA IV patients in Group II was higher than Group I and this was statistically significant (p=0.026).

Cholangiography was performed for all patients who underwent percutaneous cholecystostomy. Bacterial growth was detected in culture taken during percutaneous procedure in thirteen patients. In Group I, culture results were Klebsiella pneumoniae in two patients, Pseudomonas aeruginosa in one patient, enterococcus faecium in one patient, methicillin resistant staphylococcus aureus in one patient, Streptococcus anginosus in one patient, Escherichia coli in one patient. In Group II, culture results were Klebsiella pneumonia was seen in four patients, Pseudomonas aeruginosa in one patient and Enterococcus hirae in one patient. Seven patients were stented with ERCP upon detection of stones in the common bile duct in cholangiography. There was no statistical difference between the two groups in terms of performing ERCP (p=0.4).Eight patients were underwent elective cholecystectomy, 11 patients were died before decision of surgery or follow up without surgery and the rest 13 patients were followed up without surgery. While patients undergoing elective surgery were not statistically

Table 2: Comparison of Demographic and Clinical Characteristics of Patients according to Group I and Group II

		Group I			Group II			p value
		n	%		n	%		
Variables number of patients		19	59.4		13	40.6		
Age (mean±SD)		74.84 ± 11.65			73.46 ± 20.03			0.83
Gender	Female	9	47.4		6	46.2		0.95
	Male	10	52.6		7	53.8		
Median hospital stay		range	min	max	range	min	max	
		12	3	48	14	2	106	0.74
ASA	III	12	63.15		3	23.08		0.026
	IV	7	36.85		10	76.92		
Morbidity	No	14	73.68		11	84.62		0.67
	Yes	5	26.32		2	15.38		
Mortality	No	17	89.47		4	30.76		0.001
	Yes	2	10.52		9	69.2		
ERCP	No	16	84.21		9	69.23		0.40
	Yes	3	15.79		4	30.76		
Elective operation	No	12	631.6		12	92.30		P=0.061
	Yes	7	36.84		1	7.69		

different between the two groups (p=0.061), no recurrence was observed in the patients who were followed up without surgery. These eight patients were operated on average four weeks after percutaneous cholecystostomy. Laparoscopic cholecystectomy was performed in seven patients and open cholecystectomy was performed in onepatient. Pathology of the operated patients were reported as chronicchole cystitis in seven patients and xanthogranulomatouschole cystitis in one patient.

In Group I, two patients died in the first 30 days due to sepsis (10.5%), four patients (26.3%) were treated for abscess and two patient was treated for hematoma in the subhepatic region. Three patients with stones detected during cholangiography control and were stented by ERCP. Six patients were undergone elective surgery, while 11 patients were followed by medical treatment and two patients were died in the first month after PC, before a surgical or medical treatment decision could be made.

In Group II, nine (69.2%) patients were died due to sepsis and multiple organ dysfunction syndrome in the first 30 days. Two (15.38%) patients were treated for abscess in the subhepatic region. Four (%30.8) patients were stented with ERCP upon detection of stones in control cholangiography. Two (15.38%) patients were undergone elective surgery and two (15.4%) patients were followed by medical treatment and nine patients were died in the first month after PC, before a surgical or medical treatment decision could be made.

The median length of stay in the hospital was 13 (2-106) days for the whole group. There was no statistical difference between the two groups in terms of hospital stay (p=0.74). Early morbidity was observed in 7 (21.87%) patients, while hospital mortality was observed in 11 patients (34.37%). While there was no significant difference in morbidity between early PC (first 72 hours, Group I) and late PC (72 hour and later, Group II) in patients with grade III acute cholecystitis (p=0.67), there was a significant difference in mortality in Group II compared to Group I (p=0.001).

DISCUSSION

PC is a minimally invasive technique performed under local anesthesia, under ultrasound guidance and was defined by Radder in the early 1980s (15). Although laparoscopic cholecystectomy is the gold standard treatment method in the treatment of acute cholecystitis, mortality rates after laparoscopic cholecystectomy range from 14% to 46%, especially in elderly patients (16). Therefore, PC can be used as a bridge treatment or as an alternative to surgery in high-risk patients (17).

There are many studies in the literature about the patient group in which PC was performed and the timing of cholecystectomy after placement but there are very few studies about the application time of percutaneous cholecystectomy and the results of this studies were suggested different timings from each other (18,19). Therefore, the time of application of PC has not been clarified. Our study showed that performing PC within the first 72 hours after the onset of symptoms reduces mortality and morbidity. According to our study results, we strongly recommend that the procedure be applied to the required patients within the first 72 hours by making a quick decision on the implantation of a PC in a multidisciplinary manner.

The most current and comprehensive study on this subject is the CHOCOLATE study published in the Netherlands (20). In this study, patients with severe risk cholecystitits were compared as percutanous cholecystectomy group versus laparoscopiccholecystectomy group. Although laparoscopic cholecystectomy seems more advantageous as a result of this study, there are methodological differences compared to our study. In both of the groups included in the study, the procedure performed within the first 24 hours. As our center was the nation wide reference center, the majority of patients were referred from external health care facilities usually for need of theintensivecareunit. Therefore, themajority of the cases were already referred us after performing medical treatment in external health care facilities and also this is the reason of the delay for performing the percutanous cholecystostomy in

our center.In addition, if we prefer surgery in the first stage in such patients, PC may be required in some cases. Our study shows that PC should be performed within the first 72 hours in these patients. In addition, our first choice management in such patients is surgical treatment, although in some cases PC may be required. Our study shows that PC must be performed within the first 72 hours in these patients.In addition, there is no suggestion for which patients should undergo percutaneous cholecystostomy.

In a randomized controlled study, authors compared patients with acute cholecystitis who received medical treatment with PC; since 87% of high-risk patients with acute cholecystitis respond to medical treatment in the first 3 days, the PC timing is 72 hours and later (19). However, current approaches have changed. Cohoce colleagues have shown that early PC reduces bleeding and duration of hospital stay (21). In our study, it was observed that implantation of PC in the early period shortened the duration of hospital stay but it was not statistically significant.

While the management is clear in Grade I and Grade II cholecystitis, there is no "must do" approach in patients with Grade III acute cholecystitis towards surgical treatment, medical treatment or invasive intervention. PC has various morbidities. Complications such as catheter dislocation (8.57%-13.2%), hemorrhage (1.5%), sepsis, bile leakage (1.6%), small bowel perforation, pneumothorax,or hematoma (1.6%) may occur (7). The morbidity rates of PC vary between 8% and 44% (22-23). In our study, hematoma was observed in two patient (6.25%), while abscess developed secondary to catheter dislocation in five patients (15.6%) and percutaneous drainage was performed again to these patients.

Tokyo guideline recommended surgery 3 months after percutaneous cholecystitis in grade 3 severe cholecystitis (24). On the other hand, there are studies recommending surgery in the early period after PC (25,26). We prefer to perform elective surgery in our cases after PC after 4-6 weeks, depending on the condition of the patients. The mortality rate due to the procedure of PC was reported as 0.36% and the 30-day mortality rate in patients treated with PC as 15.4% (27). In many studies, 30-day mortality rates ranged from 1% to 22.1%. Mortality was observed at a rate of 10.5% in PC performed in the first 72 hours (Group I), and 69.2% in PC performed at 72 hours and after(Group II) in our study. A limitation of this study is that it is not clear whether the high number ofASA IV patients in Group II is effective in the occurrence of this difference. Other limitations are that our study is a retrospective clinical study and the total number of cases is low. However, the number of studies published on this subject and the number of patients in the studies are alsolow too.

Conclusions

According to our study results, we strongly recommend that the procedure be applied to the required patients within the first 72 hours bymaking a quick decision on the implantation of a PC in a multidisciplinary manner.

Conflict of Interest

There is no conflict of interest.

Funding

There is no financial support.

Ethics Committee Approval

Since it was not affiliated with the university in the years of the study and it was a retrospective study, it was approved by the thesis advisor. And approved 2014/05 by the medical education specialty board.

Informed Consent

This is a retrospective study.

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