Bridge treatment for early cholecystectomy in geriatric patients with acute cholecystitis: percutaneous cholecystostomy

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ABSTRACT

BACKGROUND: The main cause of acute cholecystitis (AC) is gallstones. The incidence of gallstones in elderly patients are higher.

METHODS: In this study, we aimed to investigate the effectivity of percutaneous cholecystostomy (PC) before early cholecystectomy in geriatric patients with acute cholecystitis. This retrospective study included 85 patients undergoing to laparoscopic or conventional cholecystectomy in early stage of calculous AC. All of the patients were over 65 years.

RESULTS: The patients were divided into two groups. Group I; PC plus early cholecystectomy and Group II; only cholecystectomy without PC. Age, sex, status of PC before surgery, postoperative complications, postoperative mortality, surgical method and postoperative duration of hospitalization were recorded in our study. The average age in the groups were 75.7±7.5 and 73.7±7.2. The difference between groups was significant (p=0.041). While postoperative complication rate was two fold in the non PC group, PC plus cholecystectomy group has a few complications (p=0.032). Postoperative mortality is evidently lower in the patients who had PC firstly and followed by cholecystectomy (p=0.017). The average hospital stay in group I was 5.6±2.4 days and 11.2±7.7 days in group II (p<0.001).

CONCLUSION: Urgent LC is still the best surgical treatment modality in calculous AC. Besides in geriatric patients bridge treatment like as PC can be useful inorder to decrease the postoperative complication rates according to our study.

Keywords: Acute cholecystitis; cholecystectomy; early surgery; geriatric; hospital stay; percutaneous cholecystostomy.

ORIGINAL ARTICLE

INTRODUCTION

Acute cholecystitis (AC) is known to be an inflammatory status of the gall bladder. Etiology of AC is generally associated with gallstones.¹ Calculous AC is one of the most common disorder leading to patients emergency department admission in developed countries. Besides this, its incidence is increasing in elderly patients.² The mean age of the world is increasing day to day. Therefore elderly people treatment becomes more important. The patients over 65 years are grouped as geriatric patients. Especially in geriatric patients approach to the AC varies.³

Up to date, gold standart treatment for AC is laparoscopic cholecystectomy. However emergency cholecystectomy in geriatric patients with multiple comorbidities may result with higher morbidity and mortality rates.⁴⁻⁵

Percutaneous cholecystostomy (PC) treatment modality has been suggested for geriatric and high risk patients in recent years.⁶ PC is performed readily by a experienced surgeon or a interventional radiologist under local anesthesia in critically ill geriatric patients.⁷⁻⁹ PC is being preffered as a bridge treatment before cholecystectomy or a definitive non-surgical treatment method for AC in elderly patients.¹⁰⁻¹²
majority of the studies offer severely PC initially in AC patients to relieve clinical symptoms, sepsis and inflammation of the gallbladder. However a few studies reported any clinical benefit of PC.

Despite the timing of cholecystectomy following PC is still controversial for surgeons, general trend is delayed laparoscopic cholecystectomy (LC). There is not enough studies about early LC after PC. In this study, we investigated the efficiency of PC in geriatric patients. Besides this, we also evaluated the results of early cholecystectomy following PC with many parameters.

**MATERIALS AND METHODS**

This retrospective study was performed in the Department of General Surgery of ……… University ………. Training and Research Hospital between March 2011 and January 2016. Written informed consent was obtained from all patients. The patients’ identities and personal informations were not shared in this article.

Data of the patients who underwent surgery for calculous AC and over 65 years were enrolled. The patients; under 65 years old, having acalculous AC, having obstructive common bile duct stones and having delayed choleystectomy were excluded from study. Finally we included 85 geriatric patients operated for calculous AC in regard to data of anamnesis, physical examination (murphy sign positivity), hemogram parameters, biochemical analysis, c- reactive protein values, ultrasonography and computerized tomography scan results respectively. All of the AC patients were hospitalized. Intravenous antibiotic (sefazoline ) and fluid replacement treatments were applied initially. The patients who did not respond to medical treatment in 36 hours underwent directly to surgery or PC followed by cholecystectomy. LC or conventional cholecystectomy were performed 12-72 hours later following PC.

Age, sex, status of PC before surgery, postop complications (bleeding, incision site infection, biliary injuries, deep venous thrombosis, pulmonary embolosim) postoperative mortality, surgical method (laparoscopic or conventional surgery), postoperative duration of hospitalization and comorbidities were recorded in our study.

Then the patients were divided into two groups. The first group (PC performed group) was consisting of 40 patients who underwent ultrasound guided PC first and followed by early LC or conventional cholecystectomy. The second group (no PC group) was including 45 patients having only early LC or conventional cholecystectomy for AC. We compare

| Table 1. Differences between demographic and clinical data of patients in group I and group II |
|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| Parameters                                    | Percutaneous cholecystostomy (n=40)            | No percutaneous cholecystostomy (n=45)         | Statistical analysis (p)                        |
| Age (years)                                   | 75.7±7.5                                      | 73.7±7.2                                      | 0.223                                          |
| Gender (n, %)                                  |                                                |                                                | 0.960                                          |
| Female                                        | 18 (45)                                       | 20 (44)                                       |                                                |
| Male                                          | 22 (55)                                       | 25 (56)                                       |                                                |
| Postop complication (n, %)                    |                                                |                                                | 0.032                                          |
| No                                            | 33 (83)                                       | 27 (60)                                       |                                                |
| Yes                                           | 7 (17)                                        | 18 (40)                                       |                                                |
| Postop mortality (n, %)                       |                                                |                                                | 0.017                                          |
| No                                            | 36 (90)                                       | 30 (67)                                       |                                                |
| Yes                                           | 4 (10)                                        | 15 (33)                                       |                                                |
| Postop duration of hospitalization (days)     | 5.6±2.4                                       | 11.2±7.7                                      | <0.001                                         |
| Surgery Type (n, %)                            |                                                |                                                | 0.096                                          |
| Laparoscopic cholecystectomy                   | 25 (63)                                       | 20 (44)                                       |                                                |
| Conventional cholecystectomy                  | 15 (37)                                       | 25 (56)                                       |                                                |
| Conversion to conventional surgery (n, %)     | 4 (10)                                        | 9 (20)                                        | 0.041                                          |
| Comorbidities (n, %)                           |                                                |                                                | 0.833                                          |
| No                                            | 9 (23)                                        | 11 (24)                                       |                                                |
| Yes                                           | 31 (77)                                       | 34 (76)                                       |                                                |

Continuous data were presented as mean±standard deviation (SD). Categorical data were presented as number (n) and %. The differences between continuous variables in the study groups were analyzed with unpaired t test. The differences between categorical variables in the study groups were analyzed with Fisher’s exact test. A p value less than 0.05 was considered statistically significant.
early cholecystectomy with or without PC in calculous AC patients.

PC was performed transhepatically via a experienced interventional radiologist team under local anesthesia. Surgical methods were chosen by the surgeons’ request. Some of the LC procedures were converted to conventional cholecystectomy during operation because of inadequate Callot’s area dissection and bleeding. These patients were accepted as conventional cholecystectomy surgical method.

Statistical analyses were performed using GraphPad Prism version 6.05 (GraphPad Software, Inc., CA, USA). All data sets were tested for normality using Kolmogorov-Smirnov test. Data were presented as mean ± standart deviation (SD). Categorical data were presented as number (n) and %. The differences between continuous variables in the study groups were analyzed with unpaired t test. The differences between categorical variables in the study groups were analyzed with Fisher’s exact test. A P value less than 0.05 was considered statistically significant.

RESULTS

A total of 85 patients who encountered the inclusion criteria were enrolled in the study. Patients’ sociodemographic characteristics are illustrated in Table 1 and Figure 1. The average age in the first group and second group was 75.7±7.5 and 73.7±7.2 respectively with no significant differences.

There were any morbidity and mortality due to PC. Nevertheless in one patient the drainage tube came away and did not work. Because of this PC was performed again. The mortalities were arised from high risk status and older age of patients. In the PC plus cholecystectomy group (group I) the LC rate was 63% and 44% in the non PC group (group II). Among groups there was not a significant difference for surgical method. On the other hand, the noteworthy was the conversion rate from laparoscopic to conventional technique was higher in non PC group. Although group I has a rate of 4 (10%) for conversion to conventional surgery, group II has a rate of 9 (20%). The difference between groups was significant (p=0.041). Postoperative complications seen in our study were bleeding, biliary injury, incision site infection, pulmonary embolism and deep venous thrombosis. Only in one patient of group I, deep venous thrombosis was detected postoperatively. In both groups pulmonary embolies were detected. In fact the other complications were higher in non PC group. Biliary injury and incision site infection were markedly higher in the second group (Figure 2). While postoperative complication rate was two fold in the non PC group, PC plus cholecystectomy group has a few complications (p=0.032).

In coordination to these values, postoperative mortality is evidently lower in the patients who had PC firstly.
DISCUSSION

In early stage of AC, LC or conventional cholecystectomy is the first choice of treatment according to Tokyo guidelines.\[15\] The geriatric patients who are unfit for emergency is still dilemma for surgeons. Although there are several studies about this subject, there is not an exact consensus in high risk geriatric patients. Medical treatment or interventional procedures are favourable in these patients.

PC is an interventional method used in calculous AC commonly as a definitive or bridge treatment modality. It is generally preferred in high risk and geriatric patients who are unfit for emergency surgery.\[7,12,16,17,19\] While in some of the studies PC procedures were suggested as a gold standard initially, a few studies offered only emergency cholecystectomy.\[14\] Especially in biliary sepsis, acute intervention is recommended to extinguish sepsis focus. Because of this, PC is not inevitable in geriatric and high risk patients.\[20,21\] On the other hand PC is an interventional treatment and it bears some risks and complications. The complication rates due to PC decrease in experienced physicians. However bleeding, biliary injury, biloma, catheter infection, tube removal from gallbladder and bowel injury may be seen after PC.\[9,16,17\] In our study one patient has catheter displacement and PC was performed again successfully.

In a recent study by Viste et al.\[22\] declared that, PC performed patients had a symptomatic relief with a 96% rate and a low complication rate. As parallel to these, our results suggested that there was a low complication rate in PC performed group. Also, in clinical practice we observed that, patients were relieved in 24 hours period after PC.

Actually, in clinical practice general approach to calculous AC in elderly and high risk patients is PC. Some of the physicians suggested PC in behalf of LC definitively. However PC performed patients might have recurrent AC as in medical treated patients and catheter depended complications. According to our opion, PC should be used as a bridge treatment until definitive surgery as in our research.\[1,13\]

Another controversiality in AC is the timing of cholecystectomy after PC. Most of the researchers performed delayed cholecystectomy.\[2\] In the literature there are a few studies investigating the early cholecystectomy after PC. Akyurek et al.\[23\] elucidated that, PC following early cholecystectomy is superior to PC following late cholecystectomy. Akyurek et al.\[23\] evaluated early or late cholecystectomy following PC. But we compared early cholecystectomy following PC with emergency cholecystectomy in geriatric patients.

Li et al.\[24\] clarified that PC is a viable treatment method with lower complication and mortality rates. Also in our study we denoted that, postoperative complication and mortality rates were lower in PC plus cholecystectomy than only cholecystectomy patients.

A systematic review via Ambe et al.\[14\] revealed that, PC is a safe method in critically ill patients. In this study, our sample was consisted of geriatric patients with many concomitant chronic diseases. The comorbidities between groups were similar. In PC plus cholecystectomy group, complications were markedly lower than only cholecystectomy group.

In our patients we did not see catheter dependent complications. Because we performed early cholecystectomy following PC. When we looked at the other complications, we detected that incision site infection and biliary injury is much more common in cholecystectomy group without PC. In our own mind, this was caused because of the selection of geriatric patients with chronic diseases as a sample in the study. In addition to this, after 36 hours following AC symptoms the complication rates are increasing including biliary injury in LC.\[25\] Yeo et al.\[25\] found that, in the patients with LC following PC, biliary injury rate was lower LC. According to our study, injury of biliary tract is two times more common in non PC performed patients.

In both of the groups there were only one pulmonary embolism an done deep venous thrombosis in group 2. These results may arise from the geriatric patients with concomitant chronic diseases.

Furthermore, conversion to conventional surgery results were investigated in our study. Some of the patients were under gone to LC or conventional cholecystectomy due to surgeon’s preferences. Karakayali et al.\[26\] claimed that, conversion to open procedure was higher in emergency cholecystectomy patients. The frequency of conversion to conventional cholecystectomy in both groups are similar to literature rates. In addition to this, conversion from LC to conventional cholecystectomy is higher in non PC performed group.

Therefore the parameters discussed above affect hospital stay and cost-effectivity. A study via Chou et al.\[19\] and Kapan et al.\[27\] indicating that PC performed patients had a decreased duration of hospital stay. In this study we also investigated the postoperative duration of hospitalization between groups. We found that, PC plus cholecystectomy performed patients had a lower hospital stay. This was the result of the lower complication rate in PC performed patients.

To the best of our knowledge, this is the first study compar-
ing emergency cholecystectomy with urgent cholecystectomy without PC in geriatric patients interms of postoperative complications and duration of hospital stay.

Conclusion

Calculous AC, may result in with serious complications including sepsis. Because of this, urgent surgery is needed in geriatric patients. PC should be performed in geriatric patients to lower postoperative complications, mortality, morbidity and duration of hospital stay. In case of emergency surgery without PC can conclude with higher mortality and complication rates.

Conflict of interest: None declared.

REFERENCES

Akut kolesistitli yaşlı hastalarda erken kolesistektomi için köprü tedavisi; Perkutan kolesistostomi

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GEREÇ VE YÖNTEM: Bu retrospektif çalışma konvansiyonel veya laparoskopik kolesistektomiye (LC) giden 85 erken evre akut taşlı kolesistitli hasta içermektedir. Tüm hastalar 65 yaş üzerindedir.

BULGULAR: Hastalar 2 gruba ayrıldı. Grup I; PC+erken kolesistektomi ve Grup II; yalnızca kolesistektomi. Çalışmamızda yaş, cinsiyet, cerrahi öncesi PC durumu, postoperatif komplikasyon, postoperatif mortalite, cerrahi yöntem ve postoperatif hastanede kalış süresi kaydedildi. Ortalama yaş 75.7±7.5 ve 73.7±7.2 idi. İki grup arasında anlamlı fark yoktu (p=0.041). Postoperatif komplikasyon oranı PC uygulanmayan grupta iki kat iken, PC ile kolesistektomi yapılan grupta az komplikasyon mevcuttu (p=0.032). Postoperatif mortalite bazı şekilde PC sonrası kolesistektomi uygulanan hastalarda düştü (p=0.017). Ortalama hastane yatış süresi grup I’dede 5.6±2.4 gün ve Grup 2’de 11.2±7.7 gündü (p<0.001).

TARTIŞMA: Akut taşlı kolesistitten açılcı laparoskopik kolesistektomi hala en iyi cerrahi yöntemdir. Ayrıca, çalışmamızda göre; geriatrik hastalarda perkutan kolesistostomi geçici tedavi postoperatif komplikasyon oranı azalmıştır faydalanabilir. Anahtar sözcükler: Akut kolesitit; erken cerrahi; geriatrik; hastanede kalış; kolesistektomi; perkutan kolesistostomi.