RESEARCH

CAN CHOLECYSTECTOMY BE PERFORMED AS SAFELY IN ELDERLY PATIENTS AS IT IS IN YOUNG PATIENTS?

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Abstract

Introduction: In this study, we aimed to compare the surgical outcomes between elderly and young patients undergoing surgery for gallstone disease and determine variations in patient characteristics, if any.

Materials and Method: Data of patients who underwent surgery for gallstone disease at a single center between 2010 and 2018 were analyzed retrospectively. Two patient groups were evaluated: patients <65 years and ≥65 years. Patient characteristics, preoperative outpatient clinic data, surgical data, and postoperative data were collected.

Results: In total, 1,198 patients with a mean age of 54.77 ± 15.03 (15–91) years were assessed. Comorbid conditions, including cardiovascular disease, pulmonary disease, renal disease, and diabetes mellitus were significantly more common in elderly patients ($p<0.001$). Acute cholecystitis in the preoperative period was noted in 15.36% of young patients and in 30.4% of elderly patients ($p<0.001$). Need for emergency surgery was higher in elderly patients than in young patients [13.86% (47) and 9.31% (80), respectively] ($p=0.021$). Laparoscopic cholecystectomy and open cholecystectomy were performed in 98.37% and 1.04% of young patients, respectively, and in 92.62% and 3.53% of elderly patients, respectively ($p<0.001$). Among factors affecting the length of hospital stay in elderly patients, the duration of hospitalization was significantly longer in elderly patients who underwent emergency surgery, open surgery, needed additional surgery, and who had high American Society of Anesthesiologists scores ($p<0.001$, $p<0.001$, $p=0.013$, $p<0.001$, respectively).

Conclusion: Complications rates associated with cholecystectomy are similar between young and elderly patients when appropriate surgical preparations are performed. Surgery for gallstone disease can be performed safely in elderly patients with low morbidity and mortality rates.

Keywords: Gall Stone; Cholecystectomy; Aged.

INTRODUCTION

Surgical procedures for gallstone disease (GD) are the most common abdominal procedures performed in elderly patients (1-3). The reluctance by surgeons to perform surgery for elderly patients stands out because of the fact that increased age is an independent risk factor for complications that may arise in elderly patients requiring surgery (4-5).

In addition to this negative prediction, some studies emphasize that complicated GD is more common in elderly patients (4,5), whereas other studies report that complicated GD is less common in elderly patients with early intervention for the symptomatic disease (6-8).

The United Nations estimates that in 2019, individuals aged >65 years will constitute 11% of the population and by 2050, 16% will be over age 65(9). The Turkish Statistical Institute (TUIK) announced that of the total population in Turkey, the ratio of the elderly population increased from 7.7% in 2013 to 8.5% in 2017 and that the expected life expectancy of an individual reaching the age of 65 is 17.8 years (10). The increasing elderly population brings with it increased health problems. Gallstone disease is one of them.

The aim of this study was to compare the surgical results of the elderly patients who underwent surgery for GD with the young patient group and to investigate complication development, length of hospital stay, and return to daily activities.

MATERIALS AND METHOD

This study is a retrospective single-center cross-sectional study. The data of 1,273 patients who underwent surgery for GD between 2010 and 2018 at our medical center were reviewed retrospectively. Seventy-five patients were excluded from the study because they underwent GD secondary to their original surgery.

Retrospective data were obtained from the computer-based data system of the hospital where the study was conducted. These data in the system were transferred to a database created by the researchers. These include demographic data such as age and gender of the patients, surgical notes such as surgical indications, degree of urgency, American Society of Anesthesiologists (ASA) score, type of surgery, duration of surgery (time between entry into and exit from the operating room), and length of hospital stay. Comorbidities of the patients in terms of cardiovascular disease, pulmonary disease, renal disease, and diabetes mellitus were retrieved from the database and recorded. Additionally, history of biliary tract diseases and interventions and previous abdominal surgery was obtained from the records. Lastly, data on postoperative complications were recorded in the hospital registry system as determined by the surgeons.

This study was performed using data of patients who underwent emergency and elective surgery for primary GD. Patients were operated on by four surgeons. Patients who were diagnosed with acute cholecystitis (AC), presented to the hospital within 72 h after the onset of abdominal pain, whose examination findings localized in the right upper quadrant, who had a C-reactive protein (CRP) level of <10 mg/dl and blood leukocyte count of <18,000 cells/µl, and those whose gallbladder wall thickness was <1cm on ultrasonography underwent emergency surgery. The initial surgical treatment in these patients was laparoscopic cholecystectomy (LC). Patients who had complaints for a longer term and presented to the hospital after 72 h and those with high CRP and leukocyte levels were hospitalized and placed under follow-up. These patients were administered parenteral antibiotics (third generation cephalosporin or ciprofloxacin and metronidazole for anaerobic activity) and fluid treatment along with symptomatic treatment and followed up with discontinuation of oral intake. Patients whose complaints regressed and who did not develop complications were

scheduled for elective surgery 4–6 weeks after discharge. However, patients who had a complicated disease, such as gallbladder perforation, at the time of admission and those whose complaints did not regress or who developed complications despite therapy underwent emergency surgery. Owing to the lack of an interventional radiology unit at our hospital, patients for whom cholecystostomy was indicated were referred to other medical centers for cholecystostomy with their own wish after being informed about surgical treatment and cholecystostomy, and patients who did not wish to undergo cholecystostomy were treated with emergency surgery. Open cholecystectomy (OC) was preferred inpatients who underwent delayed emergency cholecystectomy.

This study was approved by the Medical and Health Sciences Research Ethics Committee of Başkent University (Project number: KA19/03) and was supported by the research fund of Başkent University. As this was a retrospective cross-sectional study, informed consent was not obtained from the patients.

STATISTICS

The data obtained from the study was analyzed using the Statistical Package for Social Science software version 15.0. Numbers and percentages were used to present numeric variables. Descriptive statistics were expressed in number and percentage. A Chi-square test was used to compare data, including descriptive characteristics and perioperative and postoperative outcomes, of patients. A p value <0.05 was considered statistically significant.

RESULTS

The study included 1,198 patients. The mean age of the patients was 54.77±15.03 (15–91) years. Of note, 28.3% (339) of the patients were aged ≥65years and 71.7% (859) were aged <65 years. The mean age of the patients was 47.97±11.76 (18–64) years in the <65 age group and 72.01±5.77 (65–91) years in the ≥65 age group. Female patients were significantly higher in number in both the elderly and young groups (p=0.006) (Table 1).

While most of the ASA I group patients were young, the majority of the ASA II group patients were in the elderly group and all ASA III patients were in the elderly group (p<0.001). The comorbid conditions, including cardiovascular disease, pulmonary disease, renal disease, and diabetes mellitus, were significantly more common in the elderly patients (p<0.001) (Table 1).

Although 15.36% of young patients had an episode of AC in the preoperative period, the rate of AC in elderly patients was 30.4% (p<0.001). Preoperative choledocholithiasis occurred in 2.79% of patients in the young group and 5.30% of patients in the elderly group (p=0.033). A history of preoperative pancreatitis was present in 0.93% of patients in the young group and 1.04% of patients in the elderly group. The rate of preoperative endoscopic retrograde cholangiopancreatography (ERCP) was 1.86% in the young group and 3.83% in the elderly group (p=0.045) (Table 1).

When the surgical diagnoses of patients in the elderly group were evaluated, the need for emergency surgery was observed to be higher owing to both AC and gallbladder perforation (p=0.038 and p=0.038, respectively) (Table 2).

The mean operation time was shorter in the young group than in the elderly group (80.45±26.71 and 88.14±33.87, respectively) (p<0.001). The need for emergency surgery was higher in the elderly group than in the young group [13.86% (47) and 9.31% (80), respectively] (p=0.021) (Table 3).

LC and OC were performed in 98.37% and 1.04% of patients in the young group, respectively, and in 92.62% and 3.53% of patients in the elderly group, respectively (p <0.001). The rate of conversion from LC to OC was 0.58% in the young group and 3.83% in the elderly group (p<0.001) (Table 3).

Table 1. Demographic data, clinical features, and associated diseases.

Age groups	<65 (n=859)	≤65 (n=339)	p
Sex (female/male)	605/254	211/128	0.006
Mean age	47.97±11.76	72.01±5.77	<0.001
ASA score			
I	610 (71.01%)	60 (17.69%)	<0.001
II	249 (28.98%)	269 (79.35%)	<0.001
III	0	10 (2.94%)	<0.001
Comorbidity			
Cardiovascular disease	196 (22.81%)	248 (73.15%)	<0.001
Pulmonary disease	23 (2.67%)	30 (8.84%)	<0.001
Renal disease	3 (0.34%)	5 (1.47%)	0.031
Diabetes mellitus	93 (10.82%)	86 (25.36%)	<0.001
Preoperative choledocholithiasis	24 (2.79%)	18 (5.30%)	0.033
Preoperative pancreatitis	8 (0.93%)	6 (1.76%)	0.224
Preoperative ERCP	16 (1.86%)	13 (3.83%)	0.045
Preoperative choledocholithiasis treatment without ERCP	9 (1.04%)	6 (1.73%)	0.311
Acute cholecystitis episode	132 (15.36%)	102 (30.4%)	<0.001
History of lower abdominal surgery	140 (16.29%)	49 (14:45%)	0.430
History of upper abdominal surgery	32 (3.72%)	11 (3.24%)	0.782

ASA: American Society of Anesthesiologists. ERCP: Endoscopic retrograde cholangiopancreatography.

Drain usage was more frequent in the elderly group than in the young group (10.02% and 4.65%, respectively) (p=0.001). The mean length of hospital stay was shorter in the young group that in the elderly group (1.06±0.36 days and 1.27±0.98 days, respectively) (p<0.001) (Table 3).

Incisional hernia, intestinal injury, bleeding, biliary leakage, and common bile duct injury were the complications that occurred during the postoperative period, and no significant difference was observed between the groups (Table 4).

Postoperative choledocholithiasis occurred at a rate of 0.46% and 1% in the young and elderly group, respectively. Only one patient in the young group developed postoperative pancreatitis. Postoperative ERCP requirement was 0.23% in the young group and 1.76% in the elderly group (p=0.003) (Table 4).

Table 2. Diagnoses.

	<65 (n = 859)	≥65 (n = 339)	p
Symptomatic cholelithiasis	759 (88.35%)	288 (84.95%)	0.110
Acute cholecystitis	77 (8.96%)	44 (12.97%)	0.038
Acalculous cholecystitis	1 (0.11%)	0	0.530
Gallbladder perforation	1 (0.11%)	3 (0.88%)	0.038
Polyp in gallbladder	17 (1.97%)	4 (1.17%)	0.342
Polyp + symptomatic cholelithiasis	4 (0.46)	0	0.208

Table 3. Surgery data.

		<65 years (n = 859)	≥65 (n = 339)	p
Anesthesia (GA/RA)		857/2	339/0	0.374
Duration of surgery (minutes)		80.45±26.71	88.14±33.87	<0.001
Type of surgery	Emergency	80 (9.31%)	47 (13.86%)	0.021
	Elective	779 (90.69%)	292 (86.14%)	
Additional Surgery		21 (2.44%)	19 (5.6%)	0.005
Hospital stay (days)		1.06 ± 0.36	1.27±0.98	<0.001
Method of surgery				
Open		9 (1.04%)	12 (3.53%)	<0.001
Laparoscopic		845 (98.37%)	314 (92.62%)	
Conversion to open surgery		5 (0.58%)	13 (3.83%)	<0.001
Drain Usage		40 (4.65%)	34 (10.02%)	0.001

GA: General anesthesia. RA: Regional anesthesia.

When the patient groups were compared, the factors that affected the duration of surgery in the elderly patient group were a high number of previous episodes, emergency surgery, conversion to open surgery, and a higher rate of initial open surgery decision. In addition, the length of hospital stay was longer for patients who developed complications. However, there was no significant difference in the length of hospital stay between patients with a history of previous surgery and a history of an episode of cholecystitis (p=0.618 and p=0.093, respectively) (Table 5).

DISCUSSION

Studies show that life expectancy is increasing in the world and in Turkey, where it has reached 65 years of age (9,10). Prevalence of gallbladder stone is 50% in patients aged 70 and over and gallbladder disease is the most common cause of

acute abdominal pain in elderly patients (11,12). In this retrospective study, 28.3% of patients who underwent surgery for primary GD between 2010 and 2018 were under the age of 65. These patients constituted almost one-third of the total number of patients operated for GD. Given the increase in the elderly population in the world and in Turkey, findings of the present study indicate that the number of elderly patients needing surgical intervention for GD will increase.

Fukami et al. (2014) reported that AC occurred with more severe inflammation in elderly patients, and for this reason, elderly patients had a longer recovery period after undergoing surgical treatment for AC. However, they stated that this did not make a difference in postoperative morbidity and length of hospital stay compared with young people (13). Huber et al. (1983) and Kuy et al. (2011) reported that the clinical outcomes of elderly patients requiring emergency cholecystectomy for GD were poor (14,15). In the present study, emergency cholecystectomy was performed in 13.86% of patients in the elderly group, and 44.7% of these patients were hospitalized for more than 1 day regardless of the type of surgery ($p<0.001$). This rate was 7.9% for elderly patients undergoing elective cholecystectomy. According to these results, both surgical procedure and presence of comorbidities in elderly patients undergoing emergency cholecystectomy adversely affect the length of hospital stay and recovery. Consistent with the literature, the results of the present study also showed that both the surgical process and the presence of comorbidities adversely affected the duration of hospital stay and time to recovery in elderly patients undergoing emergency cholecystectomy. In addition, in this study, the duration of hospital stay was significantly longer in the elderly patient group compared with the younger patient group in relation to the type of surgery, degree of urgency, and comorbidities ($p < 0.001$).

The frequency of AC episodes was significantly higher in elderly patients, but this did not affect the length of hospital stay. With the technological improvement of laparoscopy devices and the increase in surgical experience, the threshold of surgeons to convert to open surgery increases. Therefore, there is an increasing tendency to complete the surgery laparoscopically.

Elective cholecystectomy was performed in 32% of elderly patients in the study by Magnuson et al. (1997), whereas the rate was as high as 73.2% in the study by Majeski et al. (2004) (16,17). The reason for this was that all patients in their clinic with acalculous cholecystitis who had symptomatic cholelithiasis or whose gallbladder ejection fraction was <35% were scheduled for elective surgery (17). Nielsen et al. (2014) stated that age was independently associated with poor outcomes and that there morbidity and mortality rates will be low if patients with symptomatic gallstones undergo surgery before inflammatory complications occur (18). Yetkin et al. (2009) did not report a significant difference between elderly and young patients in terms of frequency of emergency surgery and found that the requirement for emergency surgery was more frequent especially in patients aged >80 years (19). A similar situation also affected the decision to convert from laparoscopy to open surgery (19). In our study, the rate of emergency cholecystectomy was 9.31% in young patients and 13.86% in elderly patients ($p=0.021$). Similarly, the rate of conversion to OC in the present study was 0.58% in young patients and 3.83% in elderly patients ($p<0.001$). We believe that early detection of the symptoms of GD and recommending elective surgery will enable patients to experience less morbidity during the postoperative period. No mortality was observed in patients in this study. Morbidities of patients were independent of their comorbidities, and no difference was observed between the young and elderly patient groups.

LC is considered to be the gold standard treatment for patients operated for GD; it has the advantages of less postoperative pain, short recovery period, fast return to normal activity, and good

cosmetic outcomes compared with OC (14). In most studies, this method has been recommended for elderly patients as well as for young patients (18-20). In most cholecystectomy studies, patients operated with closed surgery were reported to have lower mortality rates and shorter hospital stay, but primary OC is preferred more commonly in elderly patients. There as on for this is gallbladder disease being a more severe disease and the low threshold of surgeons for converting to open surgery during laparoscopy in elderly patients (19-21).

Fukami et al. (2014) stated that the most important reason for conversion to open surgery is the presence of a history of previous upper abdominal surgery. The second most common reason was reported to be the occurrence of perioperative cardiopulmonary problems (13). Therefore, they preferred to start the procedure primarily with open surgery in high-risk patients (13). Surgeons in the institution where these retrospective data were obtained were found to primarily prefer open surgery in patients with high cardiopulmonary risk undergoing delayed emergency surgery. In a Danish-based investigation by Majeski et al. (2004), the most common cause of conversion to open surgery was adhesion due to AC, whereas previous abdominal surgery and cardiopulmonary diseases were reported as the minor causes (17). Conversion to open surgery is reported to be between 3.6% and 25% in elderly patients according to various studies (17,18). Majeski et al. (2004) argued that there should be conversion to open surgery when Calot's triangle dissection is difficult and unsafe or when there is an accompanying intra-abdominal disease, and that the patient's age and accompanying medical diseases should not prevent the removal of the gallbladder using laparoscopic techniques (17). In our study, the rate of conversion to open surgery was 4.28% in elderly patients and 0.58% in young patients, and the most common reason for conversion to open surgery was adhesions arising from AC. Adhesions caused by previous abdominal surgery did not affect conversion to open surgery. Furthermore, conversion to open surgery did not occur due to cardiopulmonary causes. It was determined that the adhesions due to previous abdominal surgery did not affect the decision to convert to open surgery and there was no conversion to open surgery because of cardiopulmonary reasons.

In this retrospective study, it was found that surgeons evaluated the patients primarily with magnetic resonance cholangiopancreatography (MRCP) when bile duct stones were detected or suspected based on clinical, laboratory, and ultrasonography (US) findings before LC. It was determined that the surgeons referred our patients to ERCP for bile duct stones detected with this methodology. In the elderly group, 5.3% of the patients were evaluated with the preoperative diagnosis of choledocholithiasis, and 3.83% of these patients needed ERCP after MRCP. This rate was found to be significantly higher compared with the young patient group (2.79% vs. 1.86%, p = 0.045).

In a study investigating choledocholithiasis after LC, Anwar et al. (2004) reported that choledocholithiasis occurred in 2.5% of patients postoperatively, but only 1.84% of these patients with a clinically significant disease required treatment (22). In this study, postoperative choledocholithiasis was detected in 0.46% of patients in the young patients and in 1.17% of patients in the elderly group. In the young group, only two needed ERCP, whereas all elderly patients underwent ERCP. Postoperative ERCP requirement was higher in the elderly group patients (p= 0003). None of these patients had problems during follow-up after ERCP, and they did not require additional surgical procedures. The rate of postoperative ERCP requirement due to choledocholithiasis was 0.47% in all our patient groups.

In this study, the mean operation time was longer in the elderly group. When the patient groups were compared, it was observed that the high number of episodes and high number of patients

undergoing emergency surgery, conversion to open surgery or starting with open surgery in the elderly group were factors affecting the operation time in the elderly patient group. It was observed that the factors affecting the operation time were similar to those reported in the literature (6,8,17). Additionally, the surgeons' tendency to use laparoscopic surgery instead of open surgery with advances in and increasing experience on laparoscopic technology is among the factors reported in several studies (8,18,20). In addition, one of the reasons for prolonged duration of surgery was the need for performing additional procedures in the same session. Notably, 5.29% of patients in the elderly group and 2.44% in the young group underwent additional surgery (p=0.005).

Although it has been described in the literature that cholecystectomy without drainage is ideal, the use of closed drainage systems has traditionally been reported to allow early detection of possible injuries and leaks; however, there are no objective criteria on drain use (23,24). In a retrospective study of 250 patients who underwent elective LC, Gürer et al. (2013) reported that drainage was used in 20.4% of the patients, and when the patients were compared in terms of intra-abdominal fluid loculation in their postoperative follow-ups, it was found that drainage was not necessary (24). Kim et al. (2014) retrospectively evaluated 457 patients who underwent LC for acute inflammatory gallbladder disease and reported that drainage was used only when there was concern for bile leakage and the use of drainage did not affect morbidity and mortality (25). In the meta-analysis of Picchio et al. (2019), it was emphasized that insertion of drainage for suspected biliary leakage after laparoscopic cholecystectomies due to AC was unnecessary, but the authors indicated that it would be appropriate to prove this with high-quality randomized controlled studies (26). The complication rates after laparoscopic cholecystectomy in elderly patients were reported to be between 5% and 15% and mortality was reported to be between 0% and 1% (27,28). In this retrospective study, the complication rate was 1.16% in the young patient group and 1.76% in the elderly patient group, and there was no significant difference between the groups. In this institution, from which retrospective data were obtained, closed drainage systems are used for early postoperative detection of bile leakage not detected perioperatively after difficult cholecystectomies performed in the presence of severe infection, and for draining hemorrhage and inflammatory fluid accumulation. In the present study, drain usage was found to be higher in the elderly patient group because of the reasons mentioned (p = 0.001).

In this study, the length of hospital stay was found to be significantly longer in elderly patients who underwent emergency surgery, those who underwent open surgery, those who developed complications, those who underwent additional surgical procedures, and who had high ASA scores. The frequency of AC episodes was significantly higher in elderly patients but did not affect the length of hospital stay. The threshold of surgeons for conversion to open surgery has increased with technological improvements in laparoscopy devices and increase in surgical experience. Therefore, there is an increasing tendency to complete the surgery laparoscopically.

There are certain limitations of this study. Because of the retrospective nature of this study, the complications were evaluated based only on the complications encountered. This created a limitation in the comparison of the elderly and the young patient groups for the other complications reported in the literature. Another limitation was the referral of patients with high ASA scores (ASA 4–5) and patients in need of interventional radiology to another center. The absence of this patient group also had an effect on the low complication rates and no mortality in our sample. Additionally, because of missing data during the retrospective evaluation, certain classifications based on the Tokyo Guidelines could not be included in the

study. This situation both limited the formation of objective criteria for evaluating the severity of the disease and also led to a limitation in the classification of the surgical technique selected by the surgeons during surgery. In addition, the socioeconomic status of the patient group presenting to the hospital was middle to high because it is a foundation hospital. Therefore, the findings may not be generalizable to the Turkish society.

CONCLUSION

The rate of complications associated with cholecystectomy is similar between young and elderly patients provided that appropriate surgical preparation is performed. We determined that a high number and high severity of cholecystitis episodes and a history of previous surgery in elderly patients increased the rate of conversion to open surgery. Patients who undergo emergency surgery, open surgery, and additional surgery and have high ASA scores have a longer length of hospital stay. Our preferred method is open surgery in the presence of delayed emergency surgery and high comorbidity in the elderly patient group. Because of the aforementioned factors, the duration of hospital stays and return to daily activities is significantly longer in elderly patients than in younger patients. Within the bounds of these possibilities, surgical treatment for GD can be performed safely in elderly patients with low morbidity and mortality rates.

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