

Cholecystectomy after endoscopic sphincterotomy in elderly: A dilemma

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Ethics Committee Approval

Ethics Committee approval was taken from the Erzurum Training and Research Hospital ethics committee (approval number: 2021/07-150). All procedures in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments.

Conflict of Interest

No conflict of interest was declared by the authors.

Financial Disclosure

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Abstract

Background/Aim: Although cholecystectomy is recommended by many guidelines after endoscopic retrograde cholangiopancreatography (ERCP) for gallstones, the necessity of cholecystectomy in geriatric patients is a matter of debate. Here we compare the outcomes of new biliary events in cholecystectomized and non-cholecystectomized patients of geriatric age after ERCP for suspected choledocholithiasis.

Methods: Non-cholecystectomized patients who underwent ERCP for choledocholithiasis from 2015 to 2017 were included in this retrospective cohort study. Patients with other biliary pathologies, incomplete clearance of common bile duct stones, and those who could not be reached at follow-up were excluded from the study. Biliary events (cholecystitis, cholangitis, pancreatitis, re-ERCP) were evaluated by considering age groups in patients with and without cholecystectomy in their follow-up after sphincterotomy.

Results: A total of 284 patients were followed for an average of 69.77 (0.2) months. The cumulative incidence of biliary events in cholecystectomized patients was lower (16% vs. 21.5%; $P < 0.001$), and cholecystectomized patients had a longer time to the occurrence of events (mean 74.49 [0.27] months vs. 73.50 [0.33] months; $P = 0.03$). There was no significant difference in the frequency of biliary events between elderly patients with and without cholecystectomy ($P = 0.81$), and the cumulative incidence of biliary events in the in situ group was significantly lower than that in the geriatric group (17.5% vs 32.6%; $P = 0.03$)

Conclusion: Although cholecystectomy significantly reduces subsequent biliary complications in young patients, it does not provide a statistically significant benefit in geriatric patients. We believe that there may be no need for routine prophylactic cholecystectomy after endoscopic sphincterotomy in geriatric patients.

Keywords: Sphincterotomy, Endoscopic, Cholecystectomy, Aged, Geriatrics

Introduction

Gallstone disease is very common. In Europe and America, approximately 20% of the population has stones in the gallbladder [1, 2]. The risk of significant complications (cholecystitis, cholangitis, pancreatitis) for symptomatic cholelithiasis is 0.5% to 3% per year. It is known that 55% or more of developed pancreatitis cases are of biliary origin [3].

After the widespread use of endoscopic retrograde cholangiopancreatography (ERCP) in the 1980s, many publications supported the conservative strategy, leaving the gallbladder in situ [4–7]. In the following period, with the loss of popularity of open surgery and the widespread use of laparoscopic cholecystectomy, the adequacy of the ERCP procedure for biliary tract stones started to be discussed again. Although laparoscopic cholecystectomy is currently recommended by many guidelines [8–10], because of regional differences in the frequency of post-ERCP biliary events [11] and the development of new techniques (e.g., large balloon dilation) that can be applied in the ERCP procedure, there is a need to reevaluate what the most appropriate method should be [12].

The necessity of cholecystectomy after sphincterotomy in patients of advanced age due to the longer life expectancy is another issue that has not been clarified. There are only a few studies that have been conducted in this direction. In a retrospective study, Mafalda et al. [13] compared 131 patients aged 75 years and older with and without cholecystectomy after ERCP. They reported that the group with cholecystectomy had fewer biliary events (cholecystitis, cholangitis, pancreatitis, re-ERCP), and there was no significant difference in mortality due to biliary tract diseases.

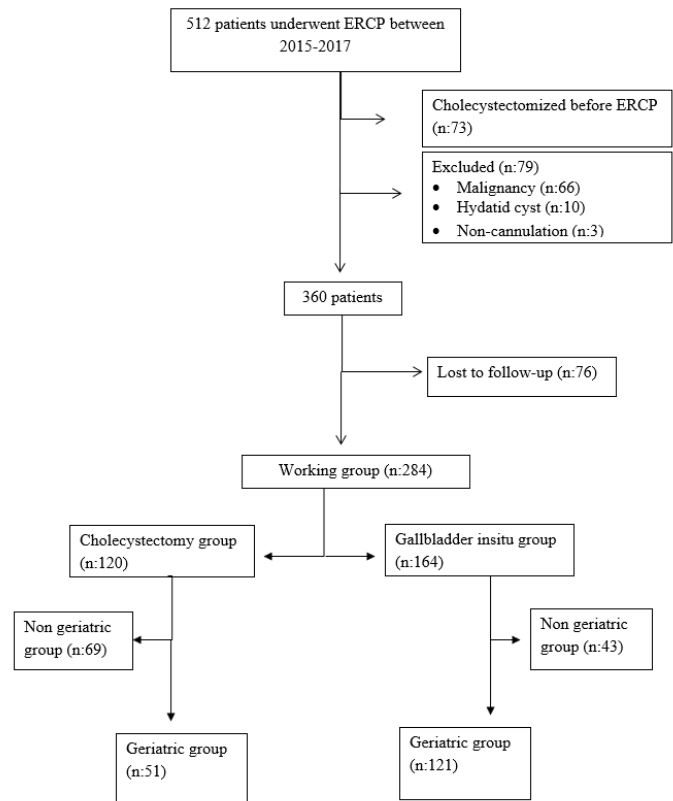
Patients aged 65 and over are referred to as the geriatric population by the World Health Organization (WHO). In this study, we aimed to compare the outcomes of new biliary events in cholecystectomized vs non-cholecystectomized patients of geriatric age after ERCP for suspected choledocholithiasis from 2015 to 2017.

Materials and methods

Study design

Our study was carried out with 512 patients who had MRCP images and underwent ERCP between 2015 and 2017 for choledochal stones. Follow-up data were obtained from examining hospitals, telephone calls, and outpatient records. Patients who underwent cholecystectomy before ERCP, those who had ERCP for reasons other than bile duct stones, those for whose common bile duct (CBD) cannulation failed in the procedure or those whose choledochal stones could not be completely removed, and those who could not be reached at follow-up were excluded from the study (Figure 1). The study was continued with the remaining 284 patients. Prophylactic cholecystectomy after ERCP was recommended for all patients after the procedure. During the follow-up period, those with and without cholecystectomy were evaluated in two groups. The ages of the patients were taken into account in the evaluation of the groups. Those aged 65 and over, as determined by the WHO, formed the geriatric age group.

Figure 1: Flowchart of patients



Ethics approval

The study design comprised a retrospective cohort study, in accordance with the Declaration of Helsinki, has been given a start upon approval of the Erzurum Training and Research Hospital ethics committee (ethics committee approval number: 2021/07-150).

Statistical analysis

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) program version 17.0 (IBM). Data are expressed as the mean (SD) or median with range. Categorical parameters were compared using the χ^2 or Fisher's exact test when appropriate, and continuous variables were compared with Student's *t*-test. Survival and event-free survival were calculated using the Kaplan-Meier method. Categorical predictors of survival were compared using a log-rank test. *P*-values < 0.05 were considered statistically significant.

Results

The study was carried out with 512 patients. A total of 228 patients were excluded from the study because of a previous cholecystectomy (73 patients), nonbiliary causes (79 patients), and not being reachable during follow-up (76 patients). The study group consisted of 284 patients, with 79 (27.8%) males and 205 (72.2%) females. The mean age was 78.66 (8.3) years in patients aged 65 and over, which was considered the geriatric group. In the nongeriatric group, the mean age was 47.61 (11.64) years. The mean follow-up period was 69.77 (0.2) months. Endoscopic sphincterotomy was performed in all patients during the ERCP procedure.

Table 1: Characteristics of patients and details of complications

	Non geriatric group (n = 112)		Geriatric group (n = 172)		P-value
	Cholecystectomized	Gallbladder in situ	Cholecystectomized	Gallbladder in situ	
Gender (male/female) (%)	16 / 53 (14.3% / 47.3%)	11 / 32 (9.8% / 28.5%)	15 / 36 (8.8% / 20.9%)	36 / 85 (20.9% / 49.4%)	0.26
Age (mean (SD))	45.77 (11.62)	50.56 (11.19)	75.02 (7.26)	80.16 (8.35)	<0.001*
Indication for ERCP					
Cholelithiasis	48 (17%)	29 (10.3%)	33 (11.7%)	83 (29.4%)	
Pancreatitis	16 (5.7%)	11 (3.9%)	12 (4.3%)	19 (6.7%)	
Cholangitis	5 (1.8%)	3 (1.1%)	5 (1.8%)	18 (6.4%)	
ERCP findings					
Stone size (mm) (mean (SD))	6.86 (3.72)	6.22 (2.8)	6.41 (3.29)	8.31 (5.31)	0.01*
Number of stone (mean (SD))	1.67 (0.96)	1.71 (1.06)	1.97 (1.49)	1.88 (1.52)	0.59
ERCP complications	9 (3.1%)	11 (3.9%)	11 (3.9%)	11 (3.9%)	0.54
Pancreatitis	2 (0.7%)	2 (0.7%)	1 (0.4%)	3 (1.1%)	
Bleeding	0	2 (0.7%)	1 (0.4%)	1 (0.4%)	
Perforation	1 (0.4%)	0	1 (0.4%)	1 (0.4%)	
Infectious	0	2 (0.7%)	1 (0.4%)	2 (0.7%)	
Hepatobiliary disease during follow-up	25 (8.8%)	7 (12.7%)	29 (10.2%)	12 (21.1%)	0.25
Pancreatitis	5 (9.1%)	7 (12.7%)	5 (8.8%)	12 (21.1%)	
Cholecystitis	0	4 (7.3%)	0	6 (10.9%)	
Re-ERCP	6 (10.9%)	3 (5.5%)	3 (5.5%)	3 (5.5%)	

*P < 0.05 is considered significant for statistical analyses.

One-hundred-nineteen (42.2%) patients underwent cholecystectomy after the ERCP procedure. While the rate of cholecystectomy in the non-geriatric group was 61.6%, cholecystectomy was performed in only 29.4% of the patients in the geriatric group ($P < 0.001$).

Considering all the patients, biliary events (cholecystitis, pancreatitis, or re-ERCP) occurred in 54 (19.1%) patients in post-ERCP follow-ups (Table 1).

The cumulative incidence rate for biliary events in cholecystectomized patients was lower (16% vs. 21.5%; $P < 0.001$), and cholecystectomized patients had a longer time to the occurrence of events (mean 74.49 [0.27] months vs. 73.50 [0.33] months; $P = 0.03$). In those who underwent cholecystectomy, ten (18.5%) patients developed pancreatitis, and nine (16.7%) patients required re-ERCP during follow-up. In those who had their gallbladder left in situ, 19 (35.2%) patients were admitted to the hospital with pancreatitis, ten (18.5%) patients were admitted with cholecystitis, and six (11.1%) patients needed re-ERCP (Figures 2 and 3).

Figure 2: Probability of developing biliary events in patients with and without cholecystectomy during follow-up

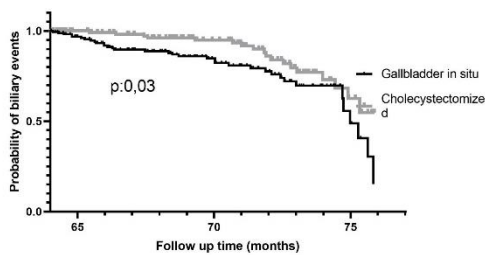
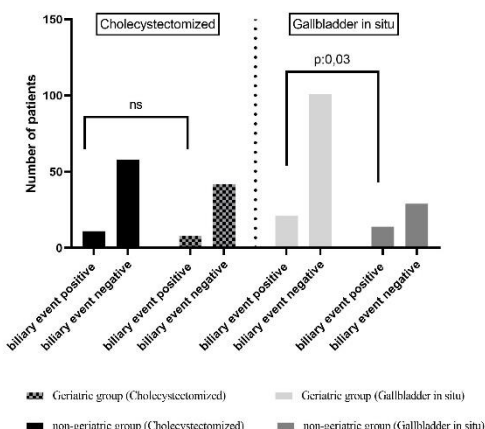


Figure 3: Significantly fewer biliary events were observed in the geriatric patient group with gallbladder in situ than non-geriatric gallbladder in situ group



Significantly fewer biliary events were observed in the younger patient group with cholecystectomy than in the young gallbladder in situ group ($P = 0.04$). There was no significant difference in the frequency of biliary events between elderly patients with and without cholecystectomy ($P = 0.81$).

When the groups were compared by age, the cumulative incidence rates of biliary events in cholecystectomized patients were similar between the geriatric and non-geriatric groups (15.9% in the non-geriatric group, 16% in the geriatric group; $P = 0.99$). However, the cumulative incidence rate of biliary events in the in situ group was significantly lower in the geriatric group (17.5% vs 32.6%; $P = 0.03$) (Figures 4 and 5).

Figure 4: Probability of developing biliary events in patient's groups during follow-up

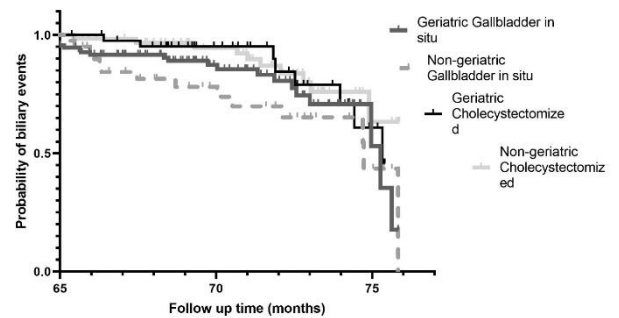
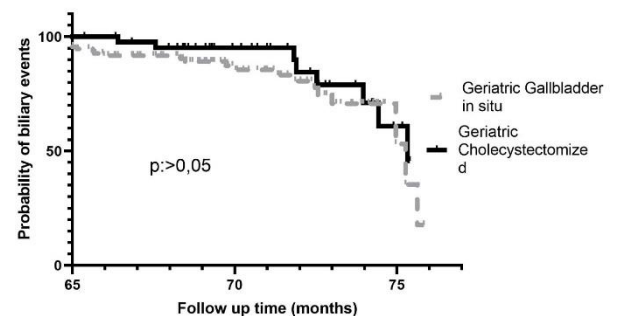


Figure 5: Probability of developing biliary events in geriatric groups



Discussion

In our study, we followed up with patients who underwent ERCP for choledocholithiasis for an average of 69.77 (0.2) months after the procedure and identified three important findings. The first of these is that a significant portion of the patients aged 65 and older, which is considered geriatric age, did not have a cholecystectomy operation after the ERCP procedure. Second, we observed that biliary events decreased significantly

after cholecystectomy in the younger age group, while cholecystectomy did not lead to a significant difference in biliary events in the elderly group. Third, we observed that the geriatric gallbladder in situ group developed fewer biliary events than the young gallbladder in situ group.

The decreased rate of cholecystectomy after ERCP in patients of advanced age may be due to concerns of increased mortality and postoperative complications. This situation was also emphasized in similar studies by Sousa et al. [13] and Lau et al. [14]. Indeed, Russell et al. [15], in their study including 30,145 patients, reported that male sex and age 65 and older were associated with increased serious morbidity and mortality for cholecystectomy patients. However, Lord et al. [16], in a recent meta-analysis including 366,522 patients, stated that cholecystectomy did not cause an increase in mortality even in patients over 80 years of age, but it was associated with prolonged hospitalization time and increased morbidity.

In a study by Sousa et al. [13] in 2018, the frequency of biliary events was reported to be higher in patients aged 75 and older who had their gallbladder left in situ compared to the control group (24%; 7%, respectively). But in their subgroup analysis, these authors stated that this significance disappeared if the patients were over 85 years of age. Similarly, in our study, biliary events were more common in the group in which the gallbladder was left in situ (16% vs 21.5%), and we observed that this significance was lost in patients aged 65 and older. A similar result was reported in Yasui's study [17]. These authors observed that during the 10-year follow-up period, cholecystomized patients under 80 years old had fewer biliary events than patients with their gallbladder in situ (7.5% vs 21.7%). The groups were similar regarding biliary events in advanced age. In conclusion, they emphasized that it may not be necessary to recommend cholecystectomy in elderly patients who underwent endoscopic sphincterotomy due to common bile duct stones (CBDS).

The French study by Boytchev et al. [18] reports similar findings as reported here, but with a lower patient age limit. Boytchev reported that leaving the gallbladder in situ in 169 patients over 65 years of age who were followed up for 56.5 months did not make any difference for biliary events. However, it was unfortunate that 50% of the study's patients died during follow-up due to causes other than biliary diseases. Finally, in the comparative study of 43,338 patients over 60 years old and 45,295 younger patients, which was created using data collected by the Nationwide Inpatient Sample (Healthcare Utilization Project) from 2001 to 2014 and published in 2019, no statistically significant difference in hospital admission due to biliary tract diseases during the 4-year follow-up was detected between the ERCP group and the cholecystectomy group after ERCP [19].

Interestingly, the frequency of post-ERCP biliary events seems to vary regionally [11]. Two important randomized controlled studies addressed this issue. In a Dutch study [20], the frequency of biliary events was reported to be a high rate of 47% (32% morbidity, 81% of patients eventually underwent cholecystectomy, but with a conversion rate of 55%). This rate was reported as 7% in a Chinese study [14]. Lau et al. [14] explained that this difference, in addition to the regional

characteristics, may also be caused by the age factor since the patients participating in the study were 75 years or older, and they emphasized the importance of cholecystectomy in young patients.

Our study observed pancreatitis (10.2%) as the most common biliary event in post-ERCP patients whose gallbladders were left in situ. The causes of biliary events in patients whose gallbladders were left in situ after ERCP also seem to be affected by this regional difference [14]. Cholangitis was the most common biliary event in patients whose gallbladders were left in situ in a Hong Kong-based study, while CBDS was reported to be the most common biliary event in patients whose gallbladders were left in situ in the studies of Schreurs et al. [21] and Yasui et al. [17]. In the study of Yasui et al., CBD stones were observed with a similar frequency between the group with and without cholecystectomy. It has been stated that this may be due to the scarcity of subgroup patients. As an argument supporting leaving the gallbladder in situ in geriatric patients, leaving the gallbladder in situ has no effect on mortality [17, 18, 21], and most biliary events after sphincterotomy are cholangitis or CBDS, which can be treated without the need for cholecystectomy [22]. In addition, some studies emphasized that cholecystectomy performed at advanced ages has increased mortality and biliary tract damage [23, 24].

Some studies have reported that cholecystectomy after ES reduces bile duct complications other than pancreatitis [25]. On the other hand, in a recent meta-analysis, Xu et al. [26] declared that the risk of pancreatitis, in addition to other biliary events, was lower in cholecystomized patients after ES. In our study, we observed that the incidence of pancreatitis and other complications decreased in the group that underwent cholecystectomy, supporting this argument.

Limitations

Our study's strengths include its good follow-up period and the sufficient number of patients. Limitations of our study include its retrospective nature and the inaccessibility of some data during the follow-up period (especially the postoperative hospital stay and complication rate of some patients who had cholecystectomy in an external center).

Conclusion

Here, we evaluated the necessity of routine prophylactic cholecystectomy after endoscopic sphincterotomy in geriatric patients. No superiority of cholecystectomy was found in geriatric patients in preventing biliary complications in a mean follow-up period of 69.77 (0.2) months after endoscopic sphincterotomy. Further studies specifically focused on these issues are needed.

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