



## Original research

## Role and outcomes of laparoscopic cholecystectomy in the elderly



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## ABSTRACT

**Introduction:** Laparoscopic cholecystectomy is the standard of treatment for gallstones disease and acute cholecystitis. The prevalence of this disease increases with age and the population is aging in industrialized countries. So, in this study we report our experience in the treatment of gallstone disease in elderly patients, particularly analyzing the outcomes of laparoscopic approach. **Methods:** Between January 2010 and May 2014 we performed a total of 1227 cholecystectomies. In this retrospective study age group was the primary independent variable: 351 patients were 65–79 years of age and 65 were 80 years of age or older. **Results:** Only 65 patients (5.3%) of all population had primary open cholecystectomy, but the rate in young group was 3.7% respect the highest frequency (9.2%) in the elderly group. The conversion rate was higher (1.2%) in the older group but there was no significant difference with younger group. LC in emergency setting was performed in 10.3% of young patients and in 13.8% of elderly group. **Conclusion:** Laparoscopic cholecystectomy is a feasible and safe procedure in elderly patients and might be performed during the same hospitalization like definitive treatment of gallstone disease. The old age and subsequent comorbidity are the fundamental predictor of surgical outcomes. Elective treatment should be recommended when repeated gallstone symptoms have occurred in the elderly patient before the development of acute cholecystitis and related complications.

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## 1. Introduction

Gallstone disease is one of the most common indication for abdominal surgery in the Western countries. The prevalence of this disease increases with age in all populations and in both sexes and the population is aging in industrialized countries [1,2]. We know laparoscopic cholecystectomy (LC) is the standard treatment both in case of symptomatic gallbladder stones that in case of acute cholecystitis, but these results consider the general population [3]. There are several studies in literature that consider the role of cholecystectomy for the elderly. Those patients older than 80 years more often have complicated gallstone disease or acute cholecystitis, higher preoperative morbidity, more acute and open operations and a longer postoperative hospital stay. In this study we report our experience in the treatment of gallstone disease in

elderly patients, particularly analyzing the advantages of laparoscopic approach in elective and urgent setting.

## 2. Methods

In our Department of General and Emergency Surgery at the University Hospital Policlinico “P. Giaccone” of Palermo between January 2010 and May 2014 we performed a total of 1227 cholecystectomies. In this retrospective study age group was the primary independent variable: 351 patients were 65–79 years of age and 65 were 80 years of age or older. The patient characteristics registered were age, gender, body mass index (BMI), presence of comorbidity with American Society of Anesthesiology (ASA) score, duration and kind of operation, conversion to open procedure. The diagnosis of gallstone disease was based on general conditions, physical examination, laboratory blood texts and radiological findings. We considered acute cholecystitis, symptomatic cholelithiasis without complications and complicated disease with jaundice and acute biliary pancreatitis. Preoperative endoscopic retrograde cholangiopancreatography (ERCP) was done in all patients with a diagnosis of common bile duct stones. Then we performed sequential cholecystectomy during the same hospital stay as

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recommended in the last guidelines [3]. LC was performed using the standard French position with 3 or 4-port technique [4] by experienced surgery team with more than 100 LC and more than 100 other laparoscopic operations [5,6]. Differences between groups for variable were determined by  $\chi^2$  exact test and Student *t* test. Statistical significance was considered  $p < 0.05$ .

### 3. Results

During the study period 1227 patients were registered with diagnosis of gallstone disease. We considered three group: 811 patients were until 64 years of age; 351 patients were 65–79 years of age and 65 were 80 years of age or older. The clinical characteristics of the study population are shown in Table 1. We excluded from this study 42 elderly patients underwent to cholecystectomy during surgical operation for other pathologies like colonic resections for cancer or complicated diverticulitis and radical gastrectomy for cancer. In these case we considered cholecystectomy as “secondary” procedure that was not primary responsible of clinical outcomes. We included instead 11 patients with gallbladder stones and associated ventral hernia for previous surgery. In these cases we performed primary open cholecystectomy and ventral hernia repair. Intra-operative cholangiography (IOC) was performed in six patients with acute cholecystitis and negative preoperative radiologic features of common bile duct stones. The intra-operative findings of dilated common bile duct led us to perform IOC, conversion to open surgery and biliary tract toilette. In one case the preoperative CT abdomen scan showed a consensual liver abscess that we treated with laparoscopic drainage [7]. Only 65 patients (5.3%) of all population had primary open cholecystectomy, but the rate in younger group was 3.7% respect the highest frequency (9.2%) in the oldest group. The conversion rate was higher (1.5%) in the over 80 years old group but there was no significant difference with under 65 years old group. LC in emergency setting was performed in 10.3% of young patients and in 43.1% of elderly group. In the group 65–79 years of age nearly 81.6% had an ASA score 3 or 4 compared with 44% of the patients under 64 years of age. The mean operative time was 75 min (range 20–195 min) without differences in both group of age. Only 2 patients respectively 88 and 89 years old and ASA 4 died in Intensive Care Unit (ICU) for respiratory and cardiac complications, but in this case we

performed primary open cholecystectomy because of compromised clinical conditions. In the group 65–79 years of age or older with ASA score 1 or 2 (18.4%) the outcomes generally were better. We had two bile ducts lesions in the younger group that required conversion and reconstructive surgery (0.1–0.2%), but no significant differences were observed between the age groups. Nearly the 92% of the patients in the total cholecystectomy population had a postoperative hospital stay of only 1–2 days and if we considered the subgroup of elderly patients classified as ASA 1 and 2 there were no differences with general population. Elderly patients with ASA score 3 and 4 without clinical complication had a mean postoperative stay of 2.8 days (range 2–6 days).

### 4. Discussion

Biliary tract disorders are one of the most common reason for surgery in older patients and because the mean age of the population continues to rise, the number of elderly patients with symptomatic gallstones is likely to increase [8,9]. More frequently, the elderly patients go to medical observation in urgent and emergent setting for acute cholecystitis or complicates gallstones diseases like acute pancreatitis. Advanced age is associated with significant comorbidity and limited functional reserve, so the patients have high risks of other systemic complications [10]. Two studies respectively by Targarona EM et al. [11] and Boerma D. et al. [12] in the past years show that in case of complicated gallstone disease endoscopic clearance of bile duct and successive LC offered more advantages than conservative treatment only. The real shakespearian problem derives from surgeon's reluctance to operate high-risk elderly patients. A recent study by Nielsen LBJ et al. [13] conclude the age per se plays a role for poorer outcome independently from pre-operative comorbidity and complicated disease. In cited study older age is also associated with higher preoperative comorbidity (ASA). For some reason the frequency of primary open cholecystectomy is higher among the elderly. Nielsen LBJ et al. explain that previous abdominal surgery and perioperative cardiopulmonary complications during laparoscopy could be a reason of their higher conversion rate. On the contrary in our current study the conversion rate for LC doesn't increase significantly with age because we choose to do a strong selection of elderly patients to undergo to laparoscopic approach and because in this study we consider the results of experienced surgeons, instead Nielsen et al. use a national database. Others author as Gurgenidze M et al. [14] refer that mini-invasive cholecystectomy is an attractive alternative of LC in senile patients, but this can not be considered the standard treatment. Other literature data consider LC safe in elderly population with a low morbidity and mortality rate, but show that perioperative outcomes in the elderly are influenced also by the severity of gallbladder disease instead of chronological age [15,16]. In accord with Kuwabara K et al. [17] we observe that an important role is due to timing for surgery. The early laparoscopic cholecystectomy in case of acute cholecystitis and complicated disease is associated with less surgical stress and shorter length of hospital stay. This is visible also in our study where the only 2 elderly patients who died presented symptoms of acute gallbladder disease in the last two week with general clinical compromission. So we can define these patients affected by severe acute cholecystitis.

### 5. Conclusion

The recent literature demonstrates that LC is a feasible and safe procedure in elderly patients and, whenever possible, LC should be performed during the same hospitalization like definitive treatment of gallstone disease. The old age and subsequent comorbidity

**Table 1**  
Characteristic of patients underwent to cholecystectomy with division in three groups on the bases of age. BMI, body mass index; ASA, American Society for Anesthesiology score.

|                                | Age < 64<br>(n = 811) | Age 65–79<br>(n = 351) | Age > 80<br>(n = 65) | p value |
|--------------------------------|-----------------------|------------------------|----------------------|---------|
|                                | n (%)                 | n (%)                  | n (%)                |         |
| <b>Sex</b>                     |                       |                        |                      | NS      |
| Male                           | 298 (36.8%)           | 131 (37.2%)            | 25 (38.3%)           |         |
| Female                         | 513 (63.2%)           | 220 (62.8%)            | 40 (61.7%)           |         |
| <b>BMI</b>                     |                       |                        |                      | NS      |
| <18.5                          | 10 (1.2%)             | 3 (0.8%)               | 1 (1.6%)             |         |
| 18.5–24.9                      | 197 (24.3%)           | 95 (27.2%)             | 13 (20.3%)           |         |
| 25–29.9                        | 264 (32.5%)           | 123 (35.1%)            | 24 (36.4%)           |         |
| 30–34.9                        | 229 (28.3%)           | 108 (30.7%)            | 20 (31.1%)           |         |
| >35                            | 111 (13.7%)           | 22 (6.2)               | 7 (10.6%)            |         |
| ASA 1–2                        | 579 (71.4%)           | 65 (18.4%)             | 6 (9.2%)             | <0.05   |
| ASA 3–4                        | 232 (28.6%)           | 286 (81.6%)            | 59 (90.8%)           | <0.05   |
| Urgent cholecystectomy         | 83 (10.3%)            | 119 (33.9%)            | 28 (43.1%)           | <0.05   |
| Elective cholecystectomy       | 728 (89.7%)           | 232 (66.1%)            | 37 (56.9%)           | <0.05   |
| <b>Operation</b>               |                       |                        |                      |         |
| Primary open                   | 30 (3.7%)             | 29 (8.2%)              | 6 (9.2%)             | <0.05   |
| Laparoscopic cholecystectomy   | 775 (95.6%)           | 318 (90.6%)            | 58 (89.2%)           |         |
| Laparoscopic converted to open | 6 (0.7%)              | 4 (1.2%)               | 1 (1.5%)             | NS      |

are the fundamental predictor of surgical outcomes. Patients with complicated gallstone or acute cholecystitis seem have worse postoperative outcome, but the data are limited and the results in literature are contrasting. Elective LC could be recommended when repeated gallstone symptoms have occurred in the elderly patient and dedicated surgical team experienced in gallbladder and biliary tract disease should treat these pathologies.

### Ethical approval

None required.

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Agrusa Antonino and other co-authors have no study sponsor.

### Author contribution

**Agrusa Antonino:** study design and writing.

**Romano Giorgio:** study design and writing.

**Frazzetta Giuseppe:** data collections and data analysis.

**Chianetta Daniela:** data collections and data analysis.

**Sorce Vincenzo:** data collections and data analysis.

**Di Buono Giuseppe:** data collections, data analysis and writing.

**Gulotta Gaspare:** study design.

### Conflicts of interest

Agrusa Antonino and other co-authors have no conflict of interest.

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