

## Original Research Article

# Quality of life and surgical outcomes of laparoscopic cholecystectomy in patients over the age of 80: a retrospective study

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## ABSTRACT

**Background:** As the United Kingdom's population ages an increasing number of patients undergoing elective cholecystectomy are over the age of eighty. The current literature base focuses on a younger patient cohort and fails to consider quality of life benefit from the intervention. Assessing quality of life benefit as well as operative morbidity and post-operative complications together is important in the assessment of whether patients of this age should be managed surgically or conservatively.

**Methods:** A retrospective study was conducted on all patients above the age of eighty undergoing elective cholecystectomy between January 2017 to January 2019 at a tertiary care centre in London. Intra-operative morbidity and post-operative complications were obtained from inpatient notes and quality of life was measured using the gastrointestinal quality of life questionnaire (GIQLI) pre and post operatively.

**Results:** 120 patients over the age of eighty underwent laparoscopic cholecystectomy in the three-year timeframe. 11% experienced post-operative complications. A statistically significant improvement in GIQLI score was noted post-operatively across all domains including social function, gastrointestinal symptoms, physical function and emotional function.

**Conclusions:** Post-operative complication rates were higher amongst this cohort compared to series studying a younger cohort of patients. However, quality of life significantly benefited from the intervention for patients over the age of 80. Hence, amongst carefully selected patients, laparoscopic cholecystectomy remains a viable treatment option and can greatly benefit the individual.

**Keywords:** Emergency general surgery, Gastrointestinal quality of life questionnaire, Laparoscopic cholecystectomy

## INTRODUCTION

Gallstones in the United Kingdom have a prevalence of 12% in men and 24% in women, accounting for a third of emergency surgery referrals and admissions.<sup>1,2</sup> Census predictions indicate that from 1995 to 2020 the percentage of the population who are 75 years or older will increase from 5.6% to 6.8% and 85 years or older will increase from 1.4% to 2%.<sup>3</sup> As a result, an

increasingly substantial number of patients undergoing laparoscopic cholecystectomy are over the age of 80.<sup>3</sup>

It is well recognised that the ageing process comes with physiological and psychological changes that have a significant impact on post-operative complications, recovery and as a result the quality of life benefit achieved from a surgical intervention. Numerous series have demonstrated that this elderly population have a greater number of comorbidities and a higher ASA

grade.<sup>4-6</sup> Elderly patients have also been found to present with more severe forms of gallbladder disease, such as acute cholecystitis, common bile duct stones, cholangitis and gallbladder carcinoma.<sup>7,8</sup> However, post surgically the follow up for patients post laparoscopic cholecystectomy is largely the same in patients of all ages. The majority of the literature base focuses on younger patients and either excludes the elderly in their selection criteria or fails to assess quality of life outcomes for this specific subgroup of patients. Overall, the literature base has proven the benefits of laparoscopic cholecystectomy however it remains unknown how patients over the age of 80 handle the recovery period post operatively and what quality of life benefits they achieve through the intervention.

The Gastrointestinal Quality of Life Index (GIQLI) is a gastrointestinal surgery specific tool designed to evaluate a patient's quality of life pre and post operatively.<sup>9</sup> The tool was first validated for laparoscopic cholecystectomy in 1993 and has since been validated for numerous other gastrointestinal surgeries.<sup>9</sup> GIQLI is one of the most widely used methods of objectively assessing quality of life benefit in gastrointestinal surgery. Having first been developed in English and German it has since been validated in numerous other languages including Chinese, Spanish and Swedish.<sup>4,11,12</sup> The GIQLI explores the patient's self-evaluation of the 2-week period before the questionnaire is filled out.<sup>9</sup> It includes 36 items covering four domains: gastrointestinal symptoms (19 questions), physical function (7 questions), social function (4 questions), emotional function (5 questions), and one item about subjective treatment assessment. Every item is scored from 0 (least desirable option) to 4 (most desirable option).

Hence, given the increasing number of patients over the age of 80 undergoing elective cholecystectomy and given this patient's subgroups underrepresentation amongst the literature base, the aim of this study is to assess the intraoperative morbidity, perioperative outcomes and the quality of life benefits achieved in patients over 80 undergoing elective cholecystectomy.

## METHODS

This retrospective study was conducted in a central major teaching hospital in London. The electronic records of all patients over the age of 80 who underwent laparoscopic cholecystectomy from January 2017 to January 2019 period were retrospectively analysed.

Patients over the age of 80 undergoing laparoscopic cholecystectomy were included provided they met the inclusion criteria and that the GIQLI questionnaire was available pre-operatively and 30 days post operatively.

### *Inclusion criteria*

Patients undergoing laparoscopic cholecystectomy over the age of 80; the indication for the surgery must be for

symptomatic gall stone disease; the laparoscopic cholecystectomy must be elective, these were the criteria to include the subjects in the study.

### *Exclusion criteria*

Patients undergoing laparoscopic cholecystectomy as part of another procedure; patients with multiple admission episodes or presentations to the emergency department and patients with a history of gallstone pancreatitis were excluded from the study.

### *Data collection*

The data was collected at an Emergency General Surgery department in a central London teaching hospital. The inpatient electronic records of all patients who underwent an elective cholecystectomy were manually screened covering two years from January 2017 to January 2019.

Data collected included age, gender, body mass index (BMI), American Society of Anaesthesiology (ASA) score, duration of surgery, conversion to open procedure, post-operative complications, readmission or death within 30 days, length of stay and quality of life using the Gastrointestinal Quality of Life Index (GIQLI) collected preoperatively and 30 days post operatively. Complications were graded using the Clavien-Dindo Classification.

### *Data processing and analysis*

Differences between groups for variables were determined by a  $\chi^2$  exact test and Student t test. Statistical significance was considered  $p < 0.05$ .

Data analysis was performed using Graphpad Prism 7.0 software. Paired t-test was used to compare pre-operative and post-operative total GIQLI scores, as well as subgroup analysis, with a p-value of  $< 0.05$  accepted as statistically significant.

## RESULTS

### *Study participants*

Of the electronic patient records screened who had a laparoscopic cholecystectomy, 120 were identified as over the age of 80. Two of the patients had an intra-operative conversion from laparoscopic to open cholecystectomy. The mean age of the identified patients was 82 with a range of 80-86 years of age. Of the included patients 73 (61%) were male and 47 (39%) were female.

All patients fell under an ASA2 (96%) or ASA3 category (4%). Co-morbidities outlined in table 2 from most to least common include: hypertension (33%), diabetes (29%), anticoagulant therapy (17%), respiratory disease (13%), chronic kidney disease (8%) and myocardial

infarction (2%). The mean duration of symptom onset to date of surgery was 180 days.

**Table 1: Patient demographics, ASA status and comorbidities.**

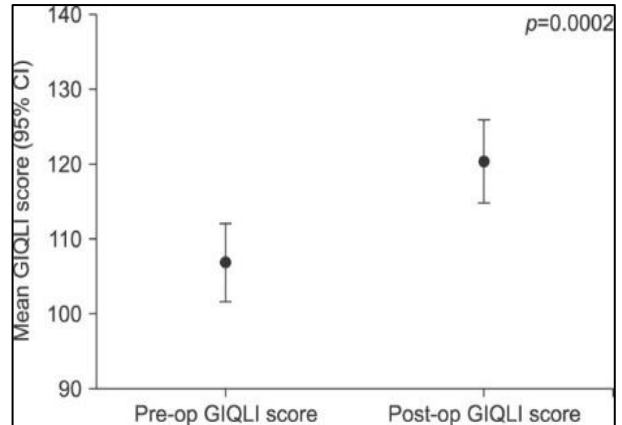
Patient demographics		Total number 120
Gender (male: female)	73:47	
Age ( years, mean)	80-86 (82)	
ASA grade	I	0
	II	115 (96%)
	III	5 (4%)
	IV	0
Comorbidities		
Hypertension	40 (33%)	
Diabetes	35 (29%)	
Anticoagulant therapy	20 (17%)	
COPD/Asthma	15 (13%)	
CKD	10 (8%)	
MI	2 (2%)	

**Table 2: Intraoperative details.**

Operation duration mean (Range)	106 minutes (32-280)
Laparoscopic procedure	118 (98%)
Laparoscopic converted to open	2 (2%)
Surgical drain	24 (20%)
Mean LOS (range)	2.5 (1-4)
30-day mortality	0
30 -day readmission	9 (7.5%)
Complications	
Wound infection	4( 3.3%)
Chest infection	3 (2.5%)
CBD stone	2 (1.6%)
Bile leak	1 (0.8%)
Intraabdominal collection	2 (1.6%)
AF	1( 0.8%)

**Table 3: Pre and post-operative GIQLI scores.**

GIQLI scores	Preoperative (Mean±SD, 95% CI)	Postoperative (Mean±SD, 95% CI)	P value
<b>Total score</b>	107±16.9, (101.6-111.8)	120.3±17.5, (114.4-126.2)	<0.001
<b>Gastro-intestinal symptoms range (0-76)</b>	59.1±7.2 (56.6-62.1)	66.3±8.1 (62.3-66.7)	<0.001
<b>Physical Condition range (0-28)</b>	18.4±4.9 (17.5-21.0)	21.6±6.1 (19.9-25.2)	0.001
<b>Emotional Status range (0-20)</b>	13.4±3.2 (11.2-14.3)	15.9±3.4 (15.2-17.1)	<0.001
<b>Social Function range ( 0-20)</b>	14.3±3.1 (13.1-15.7)	17.1±2.9 (15.0-18.2)	<0.001



**Figure 1: Comparison of pre-operative and post-operative total GIQLI score.**

**Radiological and laboratory investigations**

All patients included had an abdominal ultrasound positive for gallstones and commenting on wall thickness, common bile duct (CBD) diameter and number of stones. An MRCP was organised for three patients with deranged liver function tests (2.5%) and for ten patients with abnormal CBD diameter (8.5%). Of the thirteen patients that underwent MRCP, two identified CBD stones and required ERCP preoperatively.

**Operative details**

Of the 120 patient records screened, two elective laparoscopic cholecystectomies were converted to open surgery. Both of these patients were male and required open surgery due to difficulties in safely delineating the anatomy via a laparoscopic approach.

Mean operative duration was 106 minutes (range: 32-280). A surgical drain was left in situ in 20 % of cases and subsequently removed in all cases prior to discharge (Table 2).

**Post-operative complications**

Thirteen patients (11%) experienced post-operative complications. Four patients had an umbilical port site infection all were managed with antibiotics and discharged within 6 days of their operation. Three had chest infections, all successfully managed with antibiotics and discharged within 4 days. Two patients had retained CBD stones, both of which re-presented within 30 days of surgery with pain and jaundice and were successfully managed with ERCPs. Two patients developed intra-abdominal collections, both of which had a CT abdomen to confirm diagnosis and were managed conservatively on antibiotics. One patient had a bile leak which required a laparoscopy followed by a wash out and one patient had atrial fibrillation who was managed by the medical team and discharged on day 3 (Table 2).

### **GIQLI questionnaire and QoL assessment**

The questionnaire was completed by all 120 patients preoperatively and 115 patients post operatively. Five patients were not contactable in the post-operative period. Mean pre-operative total GIQLI score was  $107 \pm 16.9$  (95% CI, 101.6–111.8), while post-operative total GIQLI score was  $120.3 \pm 17.5$  (95% CI, 114.4–126.2,  $p < 0.001$ ).

For the 115 patients who completed pre and post-operative questionnaires, statistically significant improvements were observed in all the domains over the four GIQLI categories including gastrointestinal symptoms, physical condition, emotional status and social function (Table 3, Figure 1).

### **DISCUSSION**

The aim of this retrospective study was to investigate the quality of life and complication rates in patients undergoing elective cholecystectomy over the age of 80.

#### ***Intra-operative morbidity***

The rate of intraoperative morbidity identified in this series was similar to that identified in series including patients of a younger cohort. This may be due to the fact that all of the surgeries were performed by specialist upper Gastrointestinal/ Emergency General Surgeons with a high flow of elective cholecystectomies through the department.<sup>13</sup> This may have the effect of reducing complications due to experience and recency of managing laparoscopic cholecystectomies.<sup>13</sup> Furthermore, low intra operative morbidity amongst this patient subgroup may reflect careful selection of patients over the age of eighty for intervention. This is reflected in the ASA grading with 96% of patients an ASA grade 2 and only 4% an ASA grade 3. Amongst this age group, further emphasis is made on pre-operative screening and preparation as well as patient selection. Hence, this may be why the complication rates amongst patients deemed to be amenable for surgery amongst this cohort are comparable to complication rates amongst a younger cohort of patients.

#### ***Post-operative complications***

The post-operative complication rates were consistent with other series for patients of this age group, indicating that elderly patients with higher ASA grades correlated with greater risk of post-operative complications.<sup>14,15</sup> Interestingly, the majority of the patients included amongst this age group were male despite gallstone prevalence being two to four times higher in females than in males.<sup>1,15</sup> This is thought to be due to oestrogen increasing biliary cholesterol secretion.<sup>16</sup> However, this difference between genders decreases gradually after the sixth or seventh decade, which may have importance in the rate of perioperative complications in older patients.<sup>16</sup>

Several studies have shown that males have higher conversion rates from laparoscopic to open cholecystectomy and a greater risk of complications.<sup>17</sup> Males tend to be operated on later and to present with more severe gallstone disease than females.<sup>17,18</sup> It has been suggested that males are more likely to delay seeking medical assistance and therefore present with a more severe disease. Thus, the reduction of the female/male ratio in the elderly may have contributed to increase the risk of post-operative laparoscopic cholecystectomy complications in this age group.

#### ***Quality of life***

The patients included in this study statistically benefited across all GIQLI domains in the post-operative period. This indicates that in carefully selected patients over the age of eighty the benefit surgery provides to quality of life may be worth the increased risk of post-operative complications. The subjective nature of a quality of life scoring system may be influenced by a number of factors that can be hard to control. For example, elderly patients undergoing elective cholecystectomy at the department were seen by anaesthetics for a pre-operative assessment and the peri-operative medical team for pre-operative optimization as well as the operating surgeon or a member of their team. Post operatively they were followed up within 30 days to fill in GIQLI. The actual process of seeing the patients on multiple occasions may have a positive impact on the patient's subjective quality of life, especially across the social function and emotional status domains. Since GIQOL was only measured at 30 days post operation it may be worth repeating at a later date to see if the subjective improvement diminished over time or if it is retained. Statistically significant improvements of physical condition and gastrointestinal symptoms indicate however that these patients significantly benefited from this operation in terms of the symptoms and physical limitations that gallstone disease was inflicting.

### **CONCLUSION**

Intra-operative morbidity for patients over the age of eighty undergoing a laparoscopic cholecystectomy was of a similar rate to previous series studying patients of a younger cohort. Post-operative complication rates were higher amongst this cohort compared to series studying a younger cohort of patients. However, quality of life significantly benefited from the intervention for patients over the age of 80. The benefit of quality of life was seen over all domains including social function, physical condition, gastrointestinal symptoms and emotional status. Hence, amongst carefully selected patients, laparoscopic cholecystectomy remains a viable treatment option for patients over the age of eighty and can greatly benefit the individual despite an increased risk of post-operative complications.

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