



## Original research

## Single incision laparoscopic cholecystectomy in geriatric patients



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## H I G H L I G H T S

- Large Cohort of patients.
- Effectiveness of SILS Feasibility of SILS cholecistectomy in old patients.
- Technically feasibility of SILS cholecistectomy in octogenarians patients.
- Applicability of SILS cholecistectomy on a routine basis.

## A R T I C L E I N F O

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## A B S T R A C T

**Background:** Laparoscopy is a surgical approach recommended for the treatment of gall bladder disease. It is recommended also in geriatric patients. Recently Single Incision Laparoscopic Cholecystectomy (SILC) has been proposed to minimize surgical trauma, recovery and hospitalization time. However, the results and advantages of SILC in the geriatric population have received minimal attention. This case series review is focused on the results of SILC in the geriatric population.

**Methods:** The records of 355 patients who had undergone SILC were reviewed. This report identifies, in the entire cohort, 40 patients aged 65 years or older at the time of surgery who will be the object of this study (geriatric series). Clinical outcomes and results were evaluated. Moreover, post-operative pain of the geriatric cohort was compared to that of the entire series.

**Results:** SILC was successfully completed for 347 out of 355 patients of the entire series, with no mortality reported. In total SILC was converted to standard laparoscopy in 10 patients (2.2%) but never to open procedure. No significant difference was found between the total cohort and the geriatric series in terms of median time of operation (61.20 min vs 68.38 min). Post-operative pain was significantly lower in geriatric patients.

**Conclusion:** SILC is an effective and safe procedure for the treatment of gallbladder disease of elderly, also in terms of post-operative pain and it represents an alternative to the standard laparoscopic approach on a routine basis.

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## 1. Introduction

Laparoscopic cholecystectomy represents the current treatment procedure for symptomatic cholecystitis due to cholelithiasis worldwide [1]. In the last few years, many reports have demonstrated that cholecystectomy by single access laparoscopy (SILC)

may provide several benefits such as reduction of post-operative pain, trocar related complications and early return to work [2,3].

Currently, geriatric patients constitute a relevant fraction of surgical patients, representing more than 40% of all surgeries performed. The definition of age cut-off for the selection of geriatric patients in the bio-medical literature is heterogeneous, ranging on average from 60 to 70 years [4–6], with some reports extending also to 80 years [7]. In this study we have defined patients as geriatric if older than 65.

The reduction of surgical trauma plays a cardinal role in the post-operative care of patients. Minimizing the stress response to

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surgery [8] is particularly important in elderly patients because of the physiological changes of the age that ultimately lead to a decrease in the function of various organ systems [9]. Furthermore, comorbid conditions are frequently concomitant in advanced age [9] so that post-operative complications and/or conversion rate are expected to be higher in the elderly. Therefore, standard laparoscopic cholecystectomy is generally accepted also in the geriatric population [10,11]. This notwithstanding, SILS cholecystectomy in the elderly has received minimal attention so far. For these reasons, in the current report we have evaluated adequacy and feasibility of SILS cholecystectomy via the umbilicus in patients over 65 years and its applicability also in octogenarian patients.

## 2. Methods

### 2.1. Patients

The records of all patients who underwent cholecystectomy by SILS for symptomatic gallbladder disease due to cholelithiasis between October 2009 and January 2013 at two hospitals were reviewed. The entire series included 355 patients among whom 40 patients were aged 65 years or older. Patients' demographic data, intra-operative data, peri-operative complications and surgical pathology were prospectively recorded and retrospectively analysed and are summarised in Table 1.

All patients were considered eligible for surgery if they had symptomatic cholecystitis due to cholelithiasis, or biliary colic and/or symptomatic gallbladder disease after referral for other surgical problems. Exclusion criteria for Patients eligibility for SILS surgery were: presence of liver cirrhosis, peritonitis, clinical or radiological signs of complicated gallbladder disease such as masses, abscesses and/or neoplasms. Furthermore, patients with ultrasonographic evidence of a dilated common duct or presence of common duct stones, serum elevations in alkaline phosphatase, transaminase, or bilirubin underwent pre-operative endoscopic retrograde cholangio-pancreatography (ERCP). BMI  $\geq 35$  Kg/m<sup>2</sup> and/or drug addiction were also exclusion criteria.

All forty geriatric patients were symptomatic from gallbladder disease and/or cholecystitis. The classical symptoms referred from patients were epigastric pain, a positive Murphy's sign, fatty food and/or leafy greens intolerance, nausea and emesis, right upper quadrant pain radiating to the back, biliary colic, fever and dyspepsia. Routine pre-operative examinations (blood chemical

tests, cardiologic examination, chest X-ray, abdominal ultrasound) were carried out for every patient.

All patients were given the option to undergo either traditional laparoscopic procedure or single incision surgery upon signature of the informed consent. All procedures were performed by A.R. and F.U.Z. Elderly patients were generally healthy. The majority of them were female (78.5%) and their median age was 69.57 (range, 65–81); 8 patients (40% of geriatric series) were octogenarians. The median BMI was 26.28 kg/m<sup>2</sup>, (range 22–31). Eleven patients had previously undergone abdominal operations. Thirty-one patients out of 40 had comorbid diseases (82.5%), being diabetes mellitus, cardiac disease, hypertension, and peripheral vascular diseases the most common. According to the ASA (American Society of Anaesthesiologists) classification, 27 patients were classified as either class I or II, 11 patients were classified as class III and 2 patients were classified as class IV. No geriatric patient had symptoms of pre-operative dementia.

The presence or absence of pain in the first 24 post-operative hours and its severity were evaluated by a numeric rating scale (NPRS). NPRS-values of the geriatric patients were compared with those of the entire series. All patients were treated with Paracetamol for post-operative pain with a dose regimen of 1 g three-times/day.

$\chi^2$  test and Fisher's exact test were used to compare frequencies, and the Mann–Whitney *U* test for analysis of quantitative data. Statistical analysis was performed using IBM SPSS ver. 19.0 (IBM Co., Armonk, NY, USA). A probability of 0.05 or less was considered statistically significant.

### 2.2. Surgical technique

Patients were positioned in reverse Trendelenburg position (at approximately 20° for the entire series and 10° for geriatric patients), left tilted approximately 20°, with legs apart.

After disinfection a 2.0 cm curved incision was made around the upper edge of the umbilicus. After the opening of the white line the SILSTM port system with three port cannulas (for 5–12 mm instruments) (Single-Incision Laparoscopic Surgery Port PT 12/Autosuture, Covidien, Dublin Ireland) was inserted into the incision.

Pneumoperitoneum up to 12 mmHg was established through the pole of SILSTM, and a 50-cm-long, 30°, 5-mm laparoscope (Storz, Tuttlingen, Germany) was inserted.

**Table 1**  
Preoperative Clinical Characteristics of all patients undergoing SILC.

	Value of entire series Patients 355	Value of geriatric series Patients 40
Median Age (yr)	57.5 (range 26–81)	69.5 (range 65–81)
Gender		
Male	77 (21.7%)	9 (%)
Female	278 (78.3%)	31
Median Body Mass Index (Kg/m <sup>2</sup> )	28.4 (range 23–34)	26.28 (range 22–31)
Previous OP history		
Yes	168 (47.4%)	11 (27%; of geriatric series 3% of entire series)
No	187	
Pathologic Diagnosis		
Acute Cholecystitis	114 (32.1%)	11 (27.5% of geriatric series 3.09% of entire series)
Chronic Cholecystitis	223 (62.8%)	28 (70% of geriatric series 7.88% of entire series)
Gall Bladder Polyp	13 (3.66%)	0
Gall Bladder Empyema	5 (1.40%)	1 (2.5% of geriatric series 0.28% of entire series)
ASA Score <sup>a</sup>		
1	79 (22.2%)	6 (16% of geriatric series 1.69% of entire series)
2	210 (59.1%)	21 (52.5% of geriatric series 5.9% of entire series)
3	63 (17.7%)	11 (27.5% of geriatric series 3.09% of entire series)
4	3 (0.84%)	2 (5% of geriatric series 1.4% of entire series)

<sup>a</sup> ASA American Society of Anesthesiologists score.

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