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Feasibility and safety of single-incision laparoscopic cholecystectomy in elderly patients: A single institution, retrospective case series

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HIGHLIGHTS

- The operative time and the conversion rate of patients ≥80 years after single-incision laparoscopic cholecystectomy were comparable to those of patients <80 years.
- The incidence of pneumonia was significantly higher in patients ≥80 years than in patients <80 years.
- Single-incision laparoscopic cholecystectomy could be performed in patients ≥80 years with acceptable morbidity and mortality.

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ABSTRACT

Introduction: To evaluate the feasibility and safety of single-incision laparoscopic cholecystectomy (SILC) for uncomplicated gallbladder in elderly patients.

Materials and Methods: A retrospective analysis of 810 patients undergoing SILC from May 2009 to October 2016 at Osaka Police Hospital was performed, and the outcomes of the patients aged < 80 years and the patients ≥ 80 years were compared.

Results: The median operative times of patients <80 years and patients ≥80 years were 100 min and 110 min, respectively ($p = 0.4$). The conversion rates to a different operative procedure (multi-port laparoscopic cholecystectomy or open cholecystectomy) were 3% (22/763) of patients < 80 years and 0% of patients ≥ 80 years ($p = 0.6$). Perioperative complications were seen in 6% (46/763) of patients < 80 years and 17% (8/47) of patients ≥ 80 years ($p < 0.05$). Pneumonia was seen in 0% (0/763) of patients < 80 years and 4% (3/47) of patients ≥ 80 years ($p < 0.05$). There was no mortality in either group. The median postoperative hospital stay was 4 days for patients <80 years and 5 days for patients ≥80 years ($p < 0.05$).

Conclusion: SILC for uncomplicated gallbladder could be performed for patients ≥ 80 years with acceptable morbidity and mortality as compared with the previous reports, though the complication rate of patients ≥ 80 years was higher than that of patients < 80 years.

1. Introduction

Single-incision laparoscopic cholecystectomy (SILC) is an emerging technique that is gaining increased attention due to its superior cosmesis, though there are many difficulties associated with a confined operating space, in-line positioning of the laparoscope, close proximity of the working instruments with limited triangulation, and limited range of motion of the laparoscope and instruments [1–3]. Regarding the patient characteristics that may particularly indicate or preclude the application of laparoscopic cholecystectomy (LC), increased age is sometimes noted in the literature because of the need for an increased conversion rate to open cholecystectomy [4]. Although current literature frequently documents that experienced laparoscopic surgeons can perform LC safely for patients ≥80 years [5–11], there have been no report evaluating the feasibility and safety of performing SILC for elderly patients. Therefore, a large single-center database was retrospectively reviewed to evaluate the feasibility and safety of SILC for elderly patients by comparing patients aged <80 years and patients ≥80 years undergoing SILC.

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2. Methods

2.1. Clinical setting

A retrospective analysis of patients who underwent SILC from May 2009 to October 2016 at Osaka Police Hospital was performed. A total of 810 patients were evaluated. The indications for SILC were uncomplicated gallbladder diseases such as gallstone, benign polyp, and chronic cholecystitis. Acute cholecystitis was excluded in this study. For the outcome analyses, patients were subdivided according to their age (<80 vs. ≥ 80 years).

2.2. Surgical technique

A single-access system enclosing working channels was introduced into the abdominal cavity via an incision of the muscular aponeurosis under visual control. Depending on the operating surgeon's choice and hospital supplies, several types of single-access systems (EZ access and Lap-Protector, Hakko Co., Ltd., Nagano, Japan; x-gate, Sumitomo Bakelite Co., Ltd. Tokyo, Japan; SILS™, Covidien, Dublin, Ireland; OCTO™ port, Surgical Network Systems, Tokyo, Japan; and a surgical-glove technique that involves the use of a small plastic wound retractor inserted transumbilically with an attached surgical glove to prevent CO_2 leakage with its fingers functioning as multiple ports for scopes and instruments) were used in this study. Recently, EZ access on the Lap Protector was typically used for the insertion of trocars. A flexible 5-mm laparoscope, standard straight laparoscopic instruments, and laparoscopic coagulation shears were used during the operations. In cases of difficult exposure, supplemental exposure systems (Mini Loop Retractor II, Covidien; or Endo Relief™, Hirata Precisions Co., Ltd., Chiba, Japan) were used according to the surgeon's preference and the clinical presentation (Figs. 1 and 2) [12].

2.3. Data collection

Data on the patients' age, sex, body mass index (BMI), American Society of Anesthesiologists (ASA) score, history of previous abdominal surgery, operative time, bleeding volume, supplementary exposure system, conversion rate, perioperative complications, and postoperative hospital stay were obtained from the medical records.

2.4. Statistical analysis

Student's t-test and Fisher's exact probability test were used for the analyses of parametric and non-parametric data, as appropriate. Differences at $p < 0.05$ were considered significant. All statistical analyses were performed with EZR (Saitama Medical Center, Jichi Medical University, Saitama, Japan), which is a graphical user interface for R (The Foundation for Statistical Computing); more precisely, it is a modified version of R commander designed to add statistical functions frequently used in biostatistics [13].

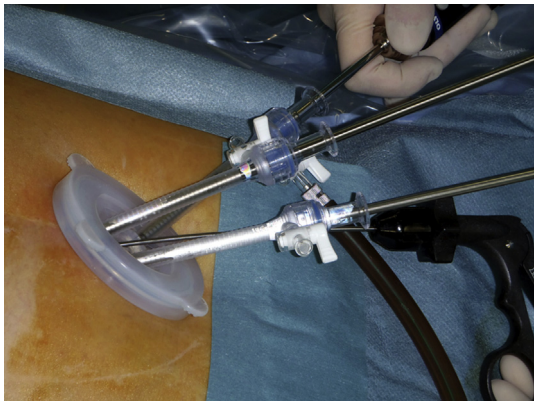

Fig. 1. The Endo Relief and the three ports secured to the EZ Access for SILC.

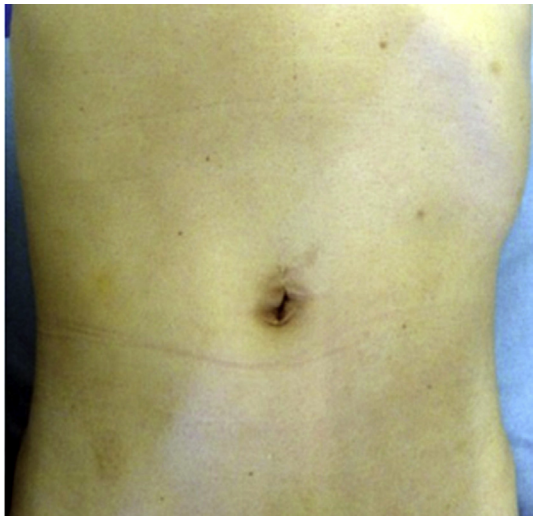

Fig. 2. The postoperative scar after SILC.

3. Results

Table 1 summarizes the patients' characteristics. Between May 2009 and October 2016, 810 patients underwent SILC at Osaka Police Hospital. These comprised 763 patients aged <80 years (94%) and 47 patients aged ≥ 80 years (6%). As expected, the mean age differed significantly between the patient groups. Mean BMI of the patients aged ≥80 years was significantly lower than that of the patients aged <80 years. There was a greater proportion of patients with an ASA score ≥3 among patients ≥80years (23%, 11/47) than among those aged < 80years (8%, 61/763), but the remaining baseline characteristics (sex and history of previous abdominal surgery) were comparable.

Table 2 shows the perioperative data. The median operative times of patients <80 years and patients ≥80 years, excluding the patients converted to either multiport or open surgery, were 100 min (range 35–301 min) and 110 min (range 42–219 min), respectively ($p = 0.4$). The median bleeding volumes in patients <80 years and patients ≥80 years, excluding the converted patients, were 0 ml (range 0–1400 ml) and 0 ml (range 0–550 ml), respectively ($p = 0.9$). The conversion rates to a different operative procedure (multi-port laparoscopic cholecystectomy or open cholecystectomy) were 3% (22/763) of patients < 80 years and 0% of patients ≥ 80 years ($p = 0.6$). Twenty-two cases of patients <80 years were converted: sixteen to multi-port surgery and six to open surgery. The reasons for conversion in the patients <80 years were (with some overlap): adhesion of the gallbladder in 11 cases; bleeding in 3 cases; Mirizzi syndrome in two cases; obesity in one case; disorientation of the cystic duct in one case; and a long distance from the umbilical wound to the gallbladder in one case. Perioperative complications were seen in 6% (46/763) of patients < 80 years and 17% (8/47) of patients ≥ 80 years ($p < 0.05$). Pneumonia was seen in 0% (0/763) of patients < 80 years and 4% (2/47) of patients ≥ 80 years ($p < 0.05$). There was no mortality in either group. The median postoperative hospital stay was 4 days