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Day case laparoscopic cholecystectomy: Safety and feasibility in obese patients

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ABSTRACT

Introduction: Day-case laparoscopic cholecystectomy (DCLC) is not universally adopted and its use is limited to patients selected by non-standardized criteria. Since laparoscopic cholecystectomy is considered technically more difficult in obese patients, a high body mass index (BMI) is often considered an exclusion criterion for DCLC. The aim of this research is to define the feasibility and safety of day case laparoscopic cholecystectomy in obese patients.

Presentation of case: Data from 730 consecutive patients preoperatively considered suitable for DCLC were analysed. BMI was not considered as parameter of selection and patients were divided in two groups (Obese, 294; Non-obese, 436) according to a BMI $\geq$ 30 or $<$ 30 kg/m^2, respectively. Outcomes measured were morbidity, open conversion rates, hospitalization rates, length of hospital stay and readmission.

Overall morbidity and open conversion rates were similar in both groups. No significant differences were observed among the two groups in terms of hospitalization rates (p 0.0533), early complications (p 0.2536), length of hospital stay (p 0.3780) and readmission rates (p 0.4286).

Discussion: Day case laparoscopic cholecystectomy is a widely used surgical technique despite not routinely used in every health system. However, many factors related to the patient and procedure, as well as the expertise of surgical-anesthesiologist team, can influence the feasibility of DCLC. Moreover a well-organized health community system is necessary to protect and follow the patients up. Our readmission and complication rates showed how a day case laparoscopic cholecystectomy, if performed in the right setting, is a safe procedure also for patient with a raised BMI. We enrolled a large population of patients and the statistical analysis demonstrated no significant differences among the obese and non-obese patient regarding the primary and secondary endpoints.

Conclusions: DCLC is a safe and effective procedure in obese patients with morbidity, hospital admission and readmission rates similar to those observed in non-obese patients.

1. Introduction

Obesity is a well-known risk factor for several diseases, including gallbladder disorders, and represents an urgent public health issue in numerous countries [1,2]. The high prevalence of obesity has led to an increasing incidence of benign gallbladder conditions which require laparoscopic cholecystectomy (LC) [3–9]. Obesity and obesity-related comorbidities can unfavorably influence the early outcomes of open surgical procedures [10–13], whereas current scientific literature of this impact is conflicting when laparoscopy is adopted [14–18]. Commonly, LC is considered technically more challenging in obese patients with rates of conversion to open cholecystectomy ranging from 4% to 20.5% [5–11,19–23]. Specific technical difficulties in this group of patients include the placement of trocars, liver retraction and exposure of Calot's triangle [5,8,9,24].

In recent years, utility of day-case LC (DCLC) has been a major target of the healthcare system in the UK [25]. However, DCLC is not universally adopted in all patients listed for LC but limited to cases which are selected accordingly to non-standardized criteria. Body mass index (BMI, Kg/m^2) represents one of the primary parameters considered when selecting patients, despite not having formal, evidence-based guidelines or cut-off values. Large studies evaluating the safety and feasibility of DCLC in normal-weight, obese and super-obese patients have only recently been published [25,28,29].

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Table 1
Criteria for DCLC management.

Preoperative criteria to assess suitability
No clinical history of previous MI, CABG, severe COPD or cirrhosis.
An accompanying adult attending to the patient in the first postoperative 24 h
Travel time to hospital < 30 min
Cholecystectomy without an additional surgical procedure
Non-urgent cholecystectomy
Postoperative criteria for discharge
No drain tube in situ
No postoperative nausea or vomiting
VAS pain score < 3
Independent ambulation or return to baseline mobility
Not in urinary retention
End of the procedure before 18:00

Abbreviations: (MI), Myocardial Infarction; (CABG), Coronary Artery Bypass Graft; (COPD), Chronic Obstructive Pulmonary Disease; (VAS) Visual Analog Scale.

The aim of this study is to compare the outcomes of DCLC between obese and non-obese patients in order to evaluate the safety and feasibility of this procedure in patients with a BMI greater than or equal to 30 kg/m^2.

2. Methods

2.1. Patients & eligibility

Data from 730 consecutive patients who were listed for DCLC at a single institution between November 2012 and October 2015 were retrospectively analysed. Preoperative examination of patients was undertaken by a senior Upper Gastrointestinal surgeon to assess their suitability to DCLC according to criteria listed in Table 1.

BMI of each patient was calculated by trained nursing staff and patients were subsequently classified as non-obese or obese using a BMI cut-off value of 30.

Clinical data included sex, age, American Society of Anesthesiologists (ASA) score, clinical history, operative time, estimated blood loss, length of hospital stay, postoperative complications, overnight admission and readmission.

Preoperative assessment in all cases included routine blood test, electrocardiogram (ECG), chest X-ray and abdominal ultrasound scan (USS).

Informed consent was obtained by all patients in accord with the ethical standards of the Governance Committee of our Institution.

2.2. Surgical technique

A single surgical team skilled in hepato-biliary laparoscopic surgery performed all procedures.

All laparoscopies were performed by a conventional 4-port technique. Patients were placed in a supine reverse Trendelenburg position with closed legs and mild left lateral rotation. First operator and assistant were positioned on the left side of the patient. A direct visual laparoscopic-assisted transversus abdominis plane (TAP) block with local anaesthetic **(10 ml of Levobupivacaine 0.5% injected in all ports)** was provided. Using the Hasson technique, an optical trocar (12 mm) was inserted at the umbilical port to establish pneumoperitoneum. After the introduction of a 30-degree 10 mm telescope, the operative trocars were placed under direct vision: 12 mm right-hand operator trocar in epigastrium, 5 mm left-hand operator trocar at the intersection between the subcostal plane and right midclavicular line; 5 mm working trocar at the intersection of the umbilical line and right midclavicular line. Following abdominal exploration, a cholecystectomy was carried out, with previous identification and separated section of cystic duct and cystic artery, according to the “critical view of safety” proposed by Strasberg.[30] At the end of the procedure, all the port sites were again injected with local anaesthetic **(10 ml of Levobupivacaine 0.5%).** A sub-hepatic drain tube was placed in cases with an increased risk of postoperative bleeding or following a complicated procedure.

2.3. Post-operative care

After the surgical procedure, a dedicated nursing staff member looked after the patients for the first 4 h postoperatively. Visual Analogue Scale (VAS) was used to quantify the patients' postoperative pain. All patients were allowed to eat and drink immediately, and they were sent home when satisfying the discharge criteria displayed in Table 1.

At discharge, an information leaflet was given to patients about the expected recovery, recommended diet, analgesic therapy and any possible complications. All patients were advised on whom best to contact regarding any question or clinical issues. Complications were defined as early or delayed when observed before or after discharge, respectively.

Early and delayed complications were considered as indications for hospital admission or readmission respectively. In case of readmission, patients underwent a clinical examination, blood tests and an USS or abdominal computer tomography (CT) scan.

2.4. Medical therapy

Prophylactic preoperative intravenous antibiotics were not routinely administered. A single shot of broad-spectrum antibiotic was administered intra-operatively in case of a BMI > 40, or in cases with bile spillage during gallbladder dissection. **We routinely use a single dose of co-amoxiclav 1.2 gr IV. In patients with penicillin allergy we preferred IV ciprofloxacin and metronidazole.**

General anaesthesia was provided using intravenous propofol and fentanyl for induction and maintenance. Intraoperative anti-emetic therapy was administered in all cases. A single, weight-adjusted dose of dalteparin was administered following the operation. A stardard oral analgesic therapy with opioid and non-steroidal medications was started after the operation and continued for 7 days if necessary.

2.5. Statistical analysis

Statistical analysis was performed using NCCSS 2007 software. The Mann-Whitney test, Student *t*-test, or Fisher exact test was used to compare group data. A p value of < 0.05 was considered statistically significant.

Our work has been reported in line with the STROCSS criteria [32].

3. Results

From November 2012 to October 2015, 730 consecutive patients were listed for DCLC, 436 as ‘non-obese’ and 294 as ‘obese’. Demographic and clinical data are showed in Table 2. The ratio of women to men (overall 2.2:1) was significantly different among the groups (p 0.0341) with the highest proportion of females observed in the non-obese group. The mean age was 55.1 years (range 17–92) with no significant differences among the groups (p 0.1141). The ASA score distribution showed a significantly higher prevalence for class II (63.3%), with significantly higher proportions of ASA II (76.2%) and III (17.7%) in obese patients ($p < .0001$). Cholelithiasis was the most frequent diagnosis, observed in 696 cases (95.3%); 411 of these patients had uncomplicated symptomatic chronic cholecystitis. The remaining 285 patients with cholelithiasis had previously experienced acute cholecystitis (205) or gallstones pancreatitis (80), with a higher incidence in the obese than non-obese patient groups ($p < .001$ and p 0.0181, respectively). No statistical differences were observed in operative time between the groups. Estimated blood loss was significantly higher in obese patients (p 0.0047). The overall rate of conversion to open cholecystectomy was 1.6% (n = 12), with no significant