Day-case laparoscopic cholecystectomy in obese patients: safety and feasibility

Mohamed M.T. Zaazou[a], Ashraf A. Mohamed[b]

[a]Department of Surgery, Faculty of Medicine, Misr University for Science & Technology, Giza, [b]Department of Surgery, Faculty of Medicine, Minia University, Minia, Egypt

Correspondence to Mohamed M.T. Zaazou, MD, Department of Surgery, Faculty of Medicine, Misr University for Science & Technology, Giza, 565666, Egypt. Mob: 01000774331; Tel and fax: 0228656258; e-mail: mzaazou-mzaazou@gmail.com

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Objectives
To assess the outcomes of day-case laparoscopic cholecystectomy (LC) in different BMI groups with stress on the safety and success of the procedure in patients with high BMI.
Patients and methods
Included patients have their LC in Departments of Surgery at Minia University Hospital and Misr University for Science and Technology Hospital over 2 years (2014 and 2015). Patients with gallbladder cancer or active malignancy were excluded. Comorbidities and American Society of Anesthesiologists (ASA) grading were recorded. According to BMI, patients were divided into six groups: underweight, normal weight, overweight, obese class I, obese class II, and obese class III.
Results
A total of 286 patients were included. ASA grading of patients yielded ASA I (23.4%), ASA II (56.7%), and ASA III (19.9%). Magnetic resonance cholangiopancreatography was performed in 16.4% of patients followed by endoscopic retrograde cholangiopancreatography with clearance of common bile duct. Intraoperative bile leak was observed in 0.7% of patients treated by endoscopic retrograde cholangiopancreatography and stenting. Open conversion happened in 2.8% of patients. Mean hospital stay was 1.13+0.06 days. Rate of overnight stay was increased in some cases owing to conversion to open procedure, drain insertion, wound infection, and intraperitoneal collection. Readmission happened for 1.7% of patients within 30 days of their operation with pain or nausea. Port-site bleeding was recorded in one (0.3%) patient.
Conclusion
Day-case LC is a safe and feasible treatment in patients with high BMI, resulting in cost reduction owing to shortening of hospital stay and reduction in the risk of nosocomial infections and thromboembolism.

Keywords:
BMI, day case, laparoscopic cholecystectomy, obesity

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Introduction

The treatment of choice for symptomatic gallstones is laparoscopic cholecystectomy (LC), which has replaced open cholecystectomy in western Europe and USA [1]. The advantages of LC over open procedure include reduction in postoperative pain, rapid recovery, and better cosmesis [2]. High percentage of patients who require cholecystectomy for symptomatic cholelithiasis have high BMI as obesity is a settled risk factor for gallstones [3]. Similar rates of postoperative complications in obese and nonobese patients have been shown in previous studies with the operative time representing the only consistent difference [4,5]. We tried to assess the outcomes of day case LC in different BMI groups with stress on the safety and success of the procedure in patients with high BMI.

Patients and methods

The study included patients having their LC by a single surgical team in the Department of Surgery at Minia University Hospital Minia University Hospital and Misr University for Science and Technology Hospital over 2 years (2014 and 2015). All patients gave informed consent after diagnosis, advantages, and possible complications of LC were explained to all patients according to their age category, BMI, and medical status. Study protocol was approved by both committees Minia Medical College Ethical Committee and Misr University for Science and Technology Hospital. Patients with gallbladder cancer or active malignancy (e.g. breast, prostate, and colorectal) were excluded. Comorbidities and American Society of Anesthesiologists (ASA) grading were recorded. According to BMI, patients were divided into six groups: underweight (<18.5 kg/

m^2), normal weight (18.5–24.9 kg/m^2), overweight (25–29.9 kg/m^2), obese class I (30–34.9 kg/m^2), obese class II (35–39.9 kg/m^2), and obese class III (>40 kg/m^2). All patients were assessed for venous thromboembolism, and venous thromboembolism prophylaxis was given where appropriate. Anesthesia induction was done using propofol and maintained using sevoflurane. Prophylactic intravenous antibiotics were given with induction of anesthesia. The drug of choice for postoperative analgesia was intravenous paracetamol. Patients were advised on discharge to contact their general medical practitioner or the emergency department if they had any concerns.

Results

A total of 286 patients [84 (29.4%) males and 202 (70.6%) females] booked for day-case procedure were included (Table 1). Their ages ranged from 18 to 73 years old. Their BMI and comorbidities are shown in Tables 2 and 3. There was no significant demographic difference among the six BMI groups. ASA grading of patients yielded 67 patients with ASA I (23.4%), 162 with ASA II (56.7%), and 57 with ASA III (19.9%). Only 56 (19.6%) patients had normal weight, whereas 30 (10.5%) patients had BMI more than 40 kg/m^2. All patients had preoperative ultrasound and liver function tests. Magnetic resonance cholangiopancreatography was performed in 47 (16.4%) patients because of suspicion of common bile duct stone on ultrasound scan, followed by endoscopic retrograde cholangiopancreatography, where sphincterotomy and clearance of common bile duct were performed. LC was indicated for gallstones or acute cholecystitis in 283 (98.9%) patients and for gallbladder polyps in three (1.1%) patients. LC team consisted of two consultants and one specialist. LC was done using standard four-port technique with open access to the abdomen. Long ports were available when needed. Intraoperative bile leak was observed in two (0.7%) patients (BMI: 28 and 44 kg/m^2) treated by endoscopic retrograde cholangiopancreatography and stenting. Open conversion happened in eight (2.8%) patients owing to abnormal anatomy, including Mirizzi syndrome and dense adhesions (Table 4). The mean operative time was 48 min, with increase up to 66 min, with BMI more than 40 kg/m^2. Tubal drain was inserted in six (2.1%) patients (four overweight and two obese class II) and removed within 48 h. The mean hospital stay was 1.13+0.06 days. Rate of overnight stay was increased in some cases owing to conversion to open procedure (n=8, 2.8%), drain insertion (n=6, 2.1%), wound infection (n=5, 1.7%), and intraperitoneal collection (n=1, 0.3%) (treated conservatively). Readmission happened for five (1.7%) patients within 30 days of their operation (three with pain and two with nausea), but immediate readmission within 48 h was not recorded except for port-site bleeding, which was recorded in one (0.3%) patient (Table 5).

Table 1 Laparoscopic cholecystectomy performed during 2014 and 2015

	2014 [*n* (%)]	2015 [*n* (%)]	Total [*n* (%)]
Elective day cases	147 (51.4)	132 (46.1)	279 (97.6)
Emergency day cases	4 (1.4)	3 (1.1)	7 (2.4)
Total	151 (52.8)	135 (47.2)	286

Table 2 Recorded BMI

	Weight	*n* (%)
Underweight	< 18.5	4 (1.4)
Normal weight	18.5–24.9	56 (19.6)
Overweight	25–29.9	86 (30.1)
Obese class I	30–34.9	81 (28.3)
Obese class II	35–39.9	29 (10.1)
Obese class III	≥40	30 (10.5)

Table 3 Recorded comorbidities

	Overweight [*n* (%)]	Obese class I [*n* (%)]	Obese class II [*n* (%)]	Obese class III [*n* (%)]
Endocrinological (diabetes and thyroid)	9 (3.1)	10 (3.5)	5 (1.7)	4 (1.4)
Cardiac (HTN, AF, and CABG)	17 (5.9)	22 (7.7)	10 (3.5)	19 (6.6)
Respiratory (asthma)	9 (3.1)	7 (2.4)	3 (1.1)	7 (2.4)
Chronic renal disease	1 (0.3)	4 (1.4)	0	2 (0.7)
Liver cirrhosis	1 (0.3)	1 (0.3)	0	0

AF, atrial fibrillation; CABG, coronary artery bypass graft; HTN, hypertension.

Table 4 Indications for conversion to open technique

	Overweight [*n* (%)]	Obese class I [*n* (%)]	Obese class III [*n* (%)]
Abnormal anatomy	1 (0.3)		
Mirizzi syndrome		1 (0.3)	1 (0.3)
Adhesions	1 (0.3)	2 (0.7)	2 (0.7)
Total 8	2 (0.7)	3 (1.1)	3 (1.1)

Discussion

Open abdominal surgery in obese individuals is associated with high rate of postoperative wound

Table 5 Complications

	Overweight [*n* (%)]	Obese class I [*n* (%)]	Obese class II [*n* (%)]	Obese class III [*n* (%)]
Port-site bleeding		1 (0.3)		
Wound infection	1 (0.3)		1 (0.3)	3 (1.1)
Intraperitoneal collection		1 (0.3)		
Intraoperative bile leak	1 (0.3)			1 (0.3)

infection, respiratory tract infection, atelectasis, and thromboembolism, in addition to technical difficulties such as difficult access and retraction of the abdominal wall and viscera. LC is considered the gold standard for treatment of symptomatic cholelithiasis for more than two decades [6]. Our study has shown that LC is safe in obese and morbidly obese patients, with no significant increase in the rate of overnight stay (P=0.215). This is supported by Tandon *et al*. [7] who found that there is no significant difference between the BMI groups regarding overnight stay extension, rates of intra-abdominal collection, or readmission. Tandon *et al*. [7] also documented an increase in the mean operative time with increasing BMI, which was attributed to difficulties during port insertion and wound closure. In our study, the difference between the mean operative times for all groups and that for obese class III group was 18 min. Careful dissection allows identification of relevant structures and their safe dissection despite large amount of fat in the triangle of Calot in obese patients. The conversion rate reported in obese patients ranges from 1.1 to 11.4%, but there is no significant difference from the rate in the nonobese [7]. Conversion rate of 4.5 and 1.8% in obese patients and in nonobese patients, respectively, was found in a study by Champault *et al*. [8]. Farkas *et al*. [9] showed that there is no increased risk of conversion to open surgery or perioperative complications in obese patients when compared with normal weight patients. In our study, the conversion rate was 2.8% (overweight two, obese class I three, and obese class III three). Our conversion rate compares favorably with previous studies documenting conversion rate of 5–10% [10]. Bile leak was detected in two (0.7%) patients in our study, which is comparable to the previous study by Sutcliffe *et al*. [11]. In our study, readmission rate was 1.7% and attributed to nonspecific abdominal pain and nausea. This readmission rate compares favorably with previous studies recording a 30-day readmission rate of 2–6% [12,13]. Recent reports of LC in obese and nonobese patients did not show any significant difference regarding complication rate or hospital stay. However, open abdominal surgery may be associated with a higher incidence of wound infection and pulmonary complications.

Conclusion

In conclusion, day-case LC is a safe and feasible treatment in patients with a high BMI, resulting in cost reduction owing to shortening of hospital stay and reduction in the risk of nosocomial infections and thromboembolism. Just a small increase in the operative time has no significant effect on the outcome of LC in patients with high BMI.

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Conflicts of interest

There are no conflicts of interest.

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