



## Feasibility and Safety of Day Case Laparoscopic Cholecystectomy for Symptomatic Gallstones

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### ABSTRACT

**Aim:** To evaluate the feasibility, safety and outcome of day case laparoscopic cholecystectomy in patients with symptomatic gallstones. **Materials and methods:** This prospective cross-sectional study was conducted at Department of Surgery, Northern Medical Tower, in the Northern Border region of Saudi Arabia from Jan 2018 to Dec 2019. Two hundred forty six patients with uncomplicated symptomatic gallstones were selected according to inclusion and exclusion criteria. They were admitted electively on the same day and operated on in the morning hours and discharged by the surgeon 6-8 hours later in the evening. The variables of this study were overnight stay, rate of conversion to open surgery and perioperative complications. **Results:** Out of 246 patients, 221 (90%) were female and 25 (10%) were male with a ratio of 9:1. The age of the patients ranged from 20-50 years with a mean age of 35 years. In this series 209 patients (85%) were discharged successfully after observation of 6-8 hours in the day surgery unit (DSU) whereas 37 patients (15%) stayed overnight. Factors responsible for overnight stay included excessive postoperative nausea and vomiting in 5 cases (2%), drain placement in 27 cases (11%) and three patients (>1%) refused to be discharged. Two patients (<1%) required conversion to open laparoscopic cholecystectomy. Umbilical port site infection was noted in 4 cases (2%). **Conclusion:** Day-case laparoscopic cholecystectomy is safe and feasible with high success rate in carefully selected patients with uncomplicated symptomatic gallstones.

**Keywords:** Day case, Laparoscopic cholecystectomy, Day surgery unit

### INTRODUCTION

Laparoscopic cholecystectomy (LC) is the gold standard of the treatment for gallstones [1]. The first laparoscopic cholecystectomy was performed by Professor Dr. Erich Muhe in Boblingen, Germany, on September 12, 1985. Since then laparoscopic cholecystectomy skills have progressively improved, and now become the gold standard treatment of symptomatic gallstone because of faster recovery, less postoperative pain, earlier return to work, patients enjoy a shorter hospital stay and better cosmetics [2]. Although a number of studies have reported that day case LC is feasible, effective, and safe, the national average for successful day case LC is reported to be only around 16% [3,4]. The safety of Day case Patient satisfaction and cost effectiveness make day case laparoscopic surgery suitable for clinicians, surgeons and managers, but patient safety still remains the main priority [5]. Review of recent literature also showed the safety and effectiveness of day-case Laparoscopic cholecystectomy in selected patients, with high level of patient satisfaction [6-9]. Current available literatures strongly suggest application of standard criteria for selection of patients for day-case Laparoscopic cholecystectomy. Fitness for surgery (ASA class I and II), proximity to the hospital and the availability of a responsible adult, the age (20-50 years) and BMI (<30 kg/m<sup>2</sup>) are considered effective criteria for selecting patients which increases success rate of day case Laparoscopic cholecystectomy. Many authors have suggested in their studies that careful patient selection helps to increase the success rate of day care laparoscopic cholecystectomy [10]. The high rate of unplanned admission in Day-case laparoscopy cholecystectomy signifies the presence of inadequate criteria in selection of patients.

The purpose of present study was to evaluate the feasibility, safety and outcome of day case laparoscopic cholecystectomy in symptomatic gallstones at an independent day surgery unit (DSU).

## MATERIAL AND METHODS

This prospective Cross-sectional study was conducted in an independent day surgery unit (DSU) for a period of 2 years from Jan 2018 to Dec 2019 at Northern Medical Tower in Northern Borders region of Saudi Arabia. Ethical clearance was obtained from the local committee of Bio Ethics at Northern Border University prior to the study and informed consent taken from the patients. A total of 410 patients with symptomatic gallstones visited the consultant surgeons in outpatient's surgical clinic. Patients were evaluated by detailed history and complete physical examination then clinical data were recorded on pre-designed computer-based proforma. Patients were subjected to laboratory (complete blood count, liver function tests, viral screening) and radiological workup (ultrasound abdomen). All patients were sent to anesthesia clinic for general anesthesia fitness. Inclusion criteria were patients having uncomplicated symptomatic gallstone, age between 20-60 years, absence of clinical and radiological evidence of acute cholecystitis at admission, ASA class I or II, no previous abdominal surgery, availability of competent adult to accompany the patient and body mass index (BMI) <30 kg/m<sup>2</sup>. Exclusion criteria were patients having complicated symptomatic gallstones, ASA class III or IV, history of acute cholecystitis, previous abdominal surgery and co-morbidities. 246 patients were selected who fulfilled the selection criteria for day-case laparoscopic cholecystectomy. Remaining patients were planned for inpatient traditional laparoscopic cholecystectomy. Patients who had given informed consent after explaining the merits and demerits of day-case laparoscopic cholecystectomy were electively admitted in day surgery unit (DSU). Patients were admitted on operative day after midnight fast in day surgery unit which is open from 7.00 am until 9:00 pm and Operation was usually scheduled in the morning session of operating list. All patients received single dose of prophylactic antibiotic (Cefazolin 1 gm.). General anesthesia established using following protocol. For pre-medication tablet Midazolam 7.5 mg was given 1 hour before surgery. All patients were given parenteral anti-emetics (Metoclopramide 10 mg) during the induction of anesthesia, Fentanyl 2 microgram/kg, Propofol 1.5 mg/kg-2.5 mg/kg, and Atracurium 0.5 mg/kg. All operations were performed by a consultant surgeon or surgical specialist with a consultant surgeon as an assistant. The operative field were prepared and draped. Four ports technique was used and 15 mmHg pneumoperitoneum was created through umbilical port using the open (Hassan) approach. After the abdominal survey, patient was placed in the reverse trendelenburg (Fowler's) position with the patient tilted to the left and the surgeon standing on the patients left side. Clipping of cystic duct and artery was performed by 5 mm endoclip (Endoskope®; Karl Storz). Gall bladder was removed through epigastric port using endobag. At the end of operation all port sites were injected with 0.5% Bupivacaine local anesthesia. After cholecystectomy a closed suction drain was placed in cases where there was oozing of blood from liver bed. During postoperative care patients were given antiemetic (Ondansetron 8 mg) and i/v NSAIDS (Ketorolac 30 mg) in the recovery room or daycare surgery unit after assessment of verbal pain score (1-10). Patients with drains shifted to surgical ward in the evening and on the next day after removal of drain they were discharged.

Patients were encouraged to get up 4-6 h after surgery and to take a liquid diet and were discharged from day surgery unit in the evening once they have adequate pain control, normal vital signs, passed urine, resumed oral feeding and ability to ambulate independently. At the time of discharge the patient were prescribed tablets diclofenac sodium 50 mg and cefuroxime 500 mg bid for 3 days. Patients were instructed to report to the emergency department and also given on call residents and surgical ward reception phone number to contact in case of postoperative problem at home. All patients were followed at surgical clinic after one, two, and four weeks. Data were entered in Microsoft excel and statistical analysis done using SPSS-16.

## RESULTS

A total of (n=246) patients with uncomplicated symptomatic gallstones were selected for day case laparoscopic cholecystectomy. Of the 246 patients, 221 patients (90%) were female and 25 patients (10%) were male. The range of age of the patients was 20-50 years (mean age 35 years). Patient's demographic data and presenting symptoms is given in Table 1.

In present study 209 patients (85%) were discharged successfully after 6-8 hours observations in day surgery unit while 37 patients (15%) discharged on next day. Twenty seven patients (11.0%) required sub-hepatic drains due to significant intraoperative bleeding, shifted to the surgical ward and discharged after removing the drains in the next morning. In this series two patients (<1%) required conversion to open laparoscopic cholecystectomy due to obscure anatomy at calot's triangle. Bile/stones spillage occurred in (n=5) patients, in which irrigation was done and spilled stones were removed. Five patients (2%) experienced postoperative nausea and vomiting, received single dose of Ondansetron during postoperative stay, required admission for excessive nausea and vomiting. Three patients (1%)

wished to stay overnight in the hospital and refused to discharge so they were discharged next morning. The reasons for overnight stay of patients are shown in Table 2.

Mean operative time for day case laparoscopic cholecystectomy was only 50 minutes and ranged between 40-60 minutes. Perioperative complications observed are given in Table 3.

**Table 1 Demographic data and presenting symptoms of the patients**

Demographic Data (n=246)	No. (%)
<b>Age</b>	
Range	20-60 years
Mean $\pm$ SD	40 $\pm$ 12.2
<b>Sex</b>	
Female	221
Male	25
<b>ASA</b>	
ASA Class I	148
ASA Class II	98
<b>Presenting Symptoms</b>	
Recurrent Biliary Pain	200
Previous Cholecystitis	36
Previous Biliary Pancreatitis	10

**Table 2 Showing reasons for overnight stay**

Reasons for Failure to Discharge	No. of Patients
Nausea and Vomiting	5 (2%)
Sub Hepatic Drains	27 (11.0%)
Patients Refusal	3 (>1%)
Conversion to Open Surgery	2 (<1%)
Readmission	0
Unplanned Admission	37 (15%)
Mean Operative Time	50 min.
Range	40- 60 min.

**Table 3 Perioperative complications**

Name of Complications	No. (%)
Port Site Bleeding	0 (0%)
Bile/Stone Spillage	5 (2%)
Cystic Artery Bleeding	2 (1%)
Sub Hepatic Collection	0 (0%)
Other Vascular Injury	0 (0%)
CBD Injury	0 (0%)
Bowel Injury	0 (0%)
Umbilical Port Site Infection	2 (1%)
Port Site Hernia	0 (0%)

## DISCUSSION

The first Laparoscopic cholecystectomy performed as a day-case without overnight admission was reported in 1990 [11]. At present many studies have documented the safety and feasibility of day case laparoscopic cholecystectomy [12]. Day-care laparoscopic cholecystectomy can save costs and has been shown to be a safe and effective treatment for symptomatic gallstones [13]. Laparoscopic cholecystectomy as a day case reduces cost for the health care provider and patients because of the short stay in the day surgery unit without occupying inpatient beds. It also shortens the surgical waiting times [14]. Routine Laparoscopic cholecystectomy performed on a day-case basis without specific patient selection has resulted in higher failure and admission rate [15]. In our study with strict patient's selection criteria in Day care surgery for symptomatic gallstones resulted in success in 93% of patients. In present study 221 patients (90%) were female and 25 (10%) patients were male, female to male ratio was 9:1 but in study by Hamad, et al. [16] 426 patients (87.5%) were female and 61 (12.5%) patients were male with 7:1. In this study 209 patients (85%) were successfully discharged on the same day of admission from day surgery unit but in some studies it was higher i.e by Bal, et al. [17] and Hamad, et al. [16] 92% and 95% respectively. Studies by Selim, et al. [18] and Chok, et al. [19] showed success rate 90%, 95% and re-admission rate 10% and 8% respectively. In this study Two patients (<1%) required conversion to open laparoscopic cholecystectomy due to obscure anatomy at calot's triangle and no readmission but in series by Hamad, et al. [16] and Ali, et al. [20], 4 patients (0.82%), 2 patients (4%) required open conversion and 2 patients (0.4%), 1 patients (2%) needed readmission respectively. In our study the unplanned admission rate of 15% compares favorably with the result of other study by Ali, et al. [20] which was 8%. The present study showed excessive nausea and vomiting in 5 cases (2%) and sub hepatic drains placed in 27 cases (11.0%) but in study by Bal, et al. [17] severe nausea and vomiting in 9 patients (3%) and sub hepatic drains in 4 cases. The sub hepatic drain insertion causing localised pain (due to the presence of the tube) and poor patient mobility resulted in longer hospital stay [21]. Length of operation has been shown to be the most important factor for unplanned admission after day case laparoscopic cholecystectomy [22]. In our study the mean operative time for day case Laparoscopic cholecystectomy was 50 minutes. Similar results were observed in other series by Ali, et al. [20], 59 mints and Khan, et al. [23], 43 mints. Previous studies have reported longer operating durations more than 90 minutes when trainees were involved [24].

In our study we did irrigation with Bupivacaine (0.5%) at Peri-hepatic region, gallbladder fossa and local administration of Bupivacaine at port sites may had attributed to minimal postoperative analgesic requirement and hence none of our patient admitted for postoperative pain. Umbilical port site infection was seen in 2 (1%) patients. In this series there was no port site hernia on follow up but in study by Zubair, et al. [25] there was a single case of port site hernia. This study confirmed that careful patient selection, standardized anesthetic protocols, advanced surgical technique and appropriate perioperative care in an independent day surgery unit (DSU) are necessary requirement for the successful outcome of day case laparoscopic cholecystectomy.

## CONCLUSION

Day case laparoscopic cholecystectomy is a feasible and safe option with successful outcome in carefully selected patients with uncomplicated symptomatic gallstones. Optimal control of postoperative pain, nausea or vomiting is essential to enhancing the outcome of day case Laparoscopic cholecystectomy in an independent day surgery unit (DSU).

## DECLARATIONS

### Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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