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Study of Feasibility of Simultaneous Laparoscopic Sleeve Gastrectomy and Cholecystectomy in Patients with Asymptomatic Cholelithiasis

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ABSTRACT

Background: Morbidity increases for obese patients when laparoscopic cholecystectomy is performed at the same time as bariatric surgery. **Objective:** The aim of the current study was to evaluate the safety, efficacy, and clinical outcome of simultaneous cholecystectomy (CC) during laparoscopic sleeve gastrectomy (LSG) obese patients with asymptomatic cholelithiasis.

Patients and methods: A case series was carried out on 18 morbidly obese patients in the Department of General Surgery, Hepatopancreatico and Biliary Surgery Unit at Zagazig University Hospital for surgical management. During the period study, all patients with LSG and CC were postoperatively followed-up with for 6 months.

Results: The mean duration of surgery for both LSG and CC was 108.50 (SD 9.364) min (range, 90-125 min). There were 2 (11.1%) females complicated with gall stone spillage, while, there were 2 (11.1%) male and female complicated with gall bladder bed bleeding. All cases completed the procedure laparoscopically without conversion to open, visual analogue scale (VAS) revealed a mean score of 5.28 (SD 1.708). According to patient's satisfaction, there were 10 (55.6%) patients with good satisfaction and 8 (44.4%) patients with excellent satisfaction. Only 5.6% discharged in the 1st day, 33.3% of patients at the 2nd day, 44.4% at the 3rd day and 16.7% patients discharged at the 4th postoperative day.

Conclusion: CC is safe and practical during LSG and is appropriate for all patients with established gall bladder. CC can be done during LSG without increasing morbidity or duration of hospital stay.

Keywords: Laparoscopic sleeve gastrectomy, Concomitant cholecystectomy, Bariatric surgery.

INTRODUCTION

Until the gallstones cause symptoms, no therapy is necessary. Twenty percent of those with asymptomatic gallstones will experience symptoms within 15 years after diagnosis. Further consequences from gallstones include cholecystitis, cholangitis, choledocholithiasis, gallstone pancreatitis, and, in extremely rare cases, cholangiocarcinoma [(1)].

Acute cholecystitis symptoms include pain in the upper right abdominal region, fever, and an increase in white blood cells (leukocytosis). Supportive care and cholecystectomy are both part of the treatment plan. Choledocholithiasis patients should have their common bile duct stones removed as part of their treatment. Involving severe inflammation and infection of the common bile duct, acute ascending cholangitis can be fatal if left untreated [(2)].

Biliary drainage, decompression, intravenous antibiotics, and analgesics are all part of the treatment plan. In the absence of gallstones, biliary dyskinesia can cause biliary colic due to motility issues [(3)].

Gall bladder (GB) disease is strongly linked to both obesity and significant weight loss following bariatric surgery. There is still some uncertainty in the medical community about how and when laparoscopic cholecystectomy (LC) should be performed in conjunction with bariatric surgery (BS) [(4)].

It is debatable whether the best time would be to have a laparoscopic cholecystectomy after bariatric surgery because of the increased risk of GB diseases linked with the dramatic weight loss and the correlation between bariatric surgery and changes in gastrointestinal structure [(5)].

However, there are risks involved when a laparoscopic cholecystectomy is performed at the same time as bariatric surgery. These risks include a higher incidence of conversion to open surgery and bile duct injuries, as well as excess intra-abdominal fat and a potential difference in port placement between the two procedures [(6)].

The aim of the current study was to evaluate the safety, efficacy, and clinical outcome of simultaneous cholecystectomy (CC) during laparoscopic sleeve gastrectomy (LSG) obese patients with asymptomatic cholelithiasis.

PATIENTS AND METHODS

A total of 18 patients with the diagnosis of morbid obesity (BMI >40) were admitted to the Department of General Surgery, Zagazig University Hospitals for surgical management.

Inclusion criteria:

1. Who aged >18 years.
2. Both sexes with BMI >40 or >35 with at least one obesity-related co-morbidity.
3. Ultrasound (US) documented GB stones (simple chronic calcular cholecystitis).

Exclusion Criteria:

1. Patients aged <18 years.

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2. BMI <40 or <35 with no co-morbidity.
3. Patients who have undergone a bariatric operation in the past,
4. Cases with symptoms suggesting GERD and symptomatic cholelithiasis.

Methodology:

1) Full History taking laying stress on:

- Age and sex, onset of obesity, comorbidities (like cardiovascular diseases, diabetes, etc.), history of jaundice or cholangitis.
- History of any medical disease, history of factors contributing to the development of obesity.
- Drug history.
- Family history of obesity.
- Assessment of dietary habits and pattern

2) Physical examination including: Vital signs, chest and cardiac examination, BMI calculation, waist circumference and assessment of other comorbidities.

3) Laboratory investigations:

A. Routine laboratory investigations: Complete blood picture, blood urea and serum creatinine, fasting blood sugar, and complete urine analysis.
B. Liver function tests: Plasma liver enzymes (Aspartate Transaminases, Alanine Transaminases). Serum alkaline phosphatase and Gamma Glutamyl transpeptidase for selected cases. Serum bilirubin (Total and direct). Serum albumin. Prothrombin time and activity. Viral markers (HIV, HBsAg and HCV IgG 3rd Gen), and serum TSH, Cortisol level and HBA1C.

4) Imaging:

A) Pelvi-abdominal ultrasound (U/S): to confirm presence of gall stones.
B) Magnetic resonant cholangiopancreatography (MRCP): Whenever indicated as in cases of jaundice to exclude them from study.
C) Computerized tomography (CT): in cases with suspected complications:

- **Surgical Technique:**

- All operations were performed under general anesthesia. Conventional laparoscopic cholecystectomy was done before or after sleeve gastrectomy in the same session depending on the surgeons' preference. However, in this study, all patients had sleeve gastrectomy followed by cholecystectomy.
- General anesthesia was given.
- At the time of induction of anesthesia, prophylactic antibiotics were given mostly third generation cephalosporins.
- To avoid DVT during the procedure calf compression on both lower limbs was done.
- On the operating table, patients lie supine with their legs spread apart (the "French position") and the knees bent at a 45-degree angle. Trendelenburg. The laparoscopic equipment was set up to the right of the patient's head. The surgeon was positioned in the middle of the patient's legs, the camera operator to his right, and the assistant to his left.
- Pneumoperitoneum was created using an optical trocar with insufflation maximized to a pressure of 15 mmHg.
- Five trocars were used:
  - For the 30° optical system, a pneumoperitoneum is started through a trocar that is 10-12 mm in diameter and is placed 15-20 cm below the xiphoid process.
  - Left anterior axillary line, 5 mm trocar for grasper.
  - Insert a 12 mm trocar in the mid-clavicular line on the patient's left side to use a stapler.
  - Right mid-clavicular trocar, 5 or 12 mm.
  - For liver retraction, a 5 mm trocar is inserted below the xiphoid process.
  - During cholecystectomy, the epigastric trocher may need to be slightly modified by moving it to the right in order to better grasp the GB.
- Using a Harmonic Scalpel or Ligasure, the gastrocolic ligament was opened next to the stomach after the crow's foot (at a distance of 5-6 centimeters from the pylorus) was located.
- The first step in LSG is to use a harmonic or ligature scalpel to mobilize the stomach's larger curvature, beginning at the pylorus and progressing to the angle of His. Omentum separation and increased curvature of stomach vascular supply up to the cardioesophageal junction. Adhesions in the stomach's back area were cut up. Following this, the anesthesiologist placed a 36-Fr orogastric tube (bougie) into the stomach, aiming it at the pylorus. After cutting along the lesser curvature of the stomach in a direction parallel to the oro-gastric tube until the angle of His was reached, the stomach was entirely dissected.
- The umbilical port was used for the initial stapler shot, while the left 12-mm port was used for the subsequent shots. For each shot, the orogastric tube was slid back and forth out of the way of the stapler's jaws.
- During greater curvature mobilization, the surgeon's left hand was used to raise the anterior gastric wall, which simultaneously raised the left lobe of the liver. Surgeons used either their own left hand or a fixed liver retractor to pull the liver back during stapling.
- Following the completion of the stomach division, the staple line was carefully examined for any bleeding spots, which were subsequently clipped.
- Overrunning 3/0 prolene sutures can be used to reinforce the staple line.
- Leakage testing with diluted methylene blue is an option in some situations.

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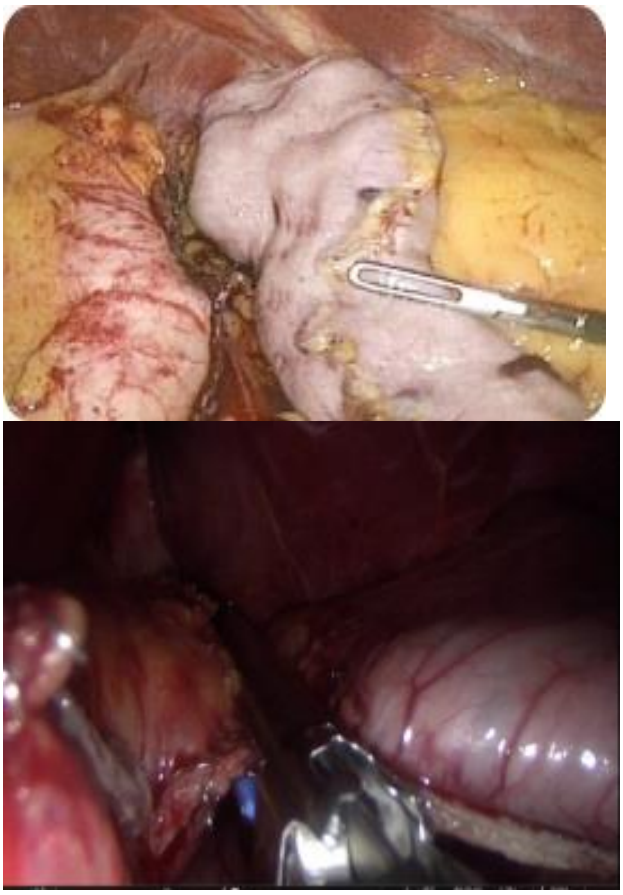

Figure (1): Complete separation of sleeve.

- **Cholecystectomy** similarly accomplished via the same ports.

- The GB fundus was grasped by the assistant's grasper, which was inserted through the left port (the surgeon's right hand), and retracted upward, while the Hartman pouch was retracted laterally using a toothed grasper, which was introduced through the right port (the surgeon's left hand). The cystic duct and artery were located by dissecting the anterior and posterior leaflets of the Calot triangle using a harmonic scalpel or mireland.

- A critical view of safety will be attempted in every patient.

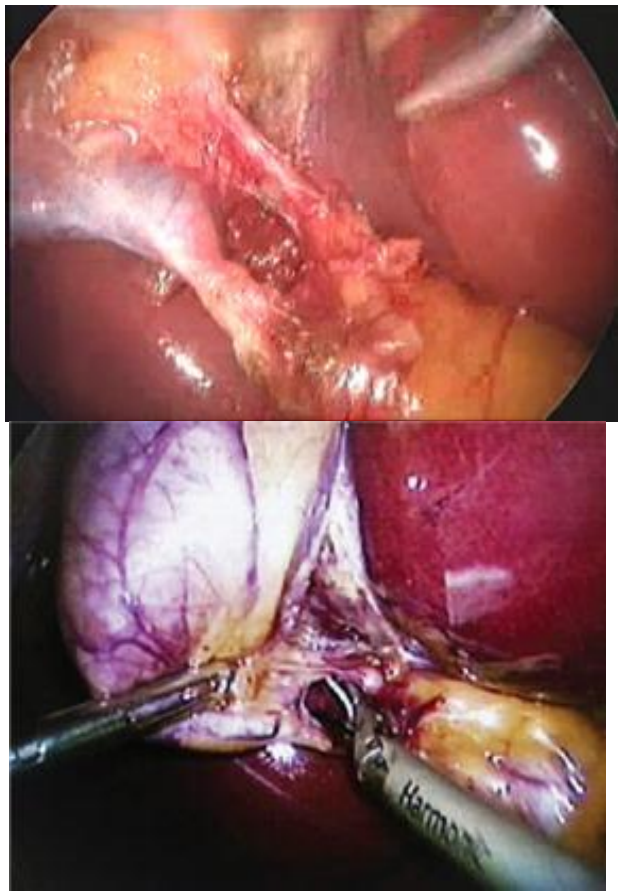

Figure (2): Identification of calot's triangle (critical view of safety).

- The artery was severed or divided, and the duct was cut in half using scissors.
- Harmonic shear or the hook was used to entirely dissect GB.

Figure (3): Removal of gall bladder from liver bed.

- At last, after muscle splitting, gastric and GB specimens were extracted with the use of Kocher forceps through any 12 mm port.

Figure (4): Specimen extraction.

Intraoperative assessment:

1. Operative time (the time elapsing from the start of cholecystectomy until the completion of GB dissection from the liver bed).
2. The need for conversion to open surgery
3. Intraoperative technical difficulties such as number and suboptimal port placement, engulfed GB by the large liver making it difficult to dissect laparoscopically.
4. Need for extra trocer insertion.
5. Intraoperative complications such as bleeding, common bile duct injury, visceral injury, spillage of bile, etc.

Follow up of the cases: Patients were followed at the end of the first, fourth, and sixth postoperative event that affected the clinical course, such as complications of laparoscopic cholecystectomy (bile duct lesions, haemorrhage, and abdominal collection), pneumonia, extra operations, and readmissions.

Follow up included clinical observation of abdominal pain, the color of sclera, asking about the color of urine and stool, serum bilirubin (total and direct) and alkaline phosphatase if needed, US abdomen if clinically suspicion of biliary injury or leakage or collections, white blood cell count, quality of life, general self-esteem, physical activity and satisfaction concerning work.

Ethical Consideration:

This study was ethically approved by the Institutional Review Board of the Faculty of Medicine, Zagazig University. Written informed consent was obtained from all participants. This study was executed according to the code of ethics of the World Medical Association (Declaration of Helsinki) for studies on humans.

Statistical Analysis

The collected data were introduced and statistically analyzed by utilizing the Statistical Package for Social Sciences (SPSS) version 20 for windows. Qualitative data were defined as numbers and percentages. Quantitative data were described as mean, standard deviation (SD), and range.

RESULTS

Table 1 summarizes the demographic data and clinical characteristics of the studied group.

Table (1): Demographic and clinical characterization data of the studied 18 patients.

Variable	**N=18**	
Age (years)		
Mean ± SD	32.78 ± 6.629	
Range	21-47	
Variable	No	%
Gender		
Male	5	27.8
Female	13	72.2
Variable	**N=18**	
BMI		
Mean ± SD	44.67 ± 4.472	
Range	37-53	
Variable	**N=18**	**Percent**
Co-morbidity		
No	14	77.8
Diabetes	1	5.6
Hypertension	1	5.6
Diabetes and hypertension	2	11.1
Gall bladder stones	**N=18**	**Percent**
Multiple	9	50
Single	9	50

Distribution of studied sample according to duration of surgery ranged from 90 to 125 minutes **(Table 2).**

Table (2): Distribution of studied sample according to duration of surgery.

Variable	N=18
Duration of surgery (minutes)	
Mean ± SD	108.5 ± 9.364
Range	90-125

There were 2 (11.1%) complicated with gall stone spillage both were females. Another 2 (11.1%) complicated with GB bed bleeding on a male and the other was a female (**Table 3**).

Table (3): Distribution of studied sample according to intra-operative cholecystectomy complications.

Intra-operative cholecystectomy complications	Number	Percent
Gall stone spillage		
Yes	2	11.1
No	16	88.9
Gall bladder bed bleeding		
Yes	2	11.1
No	16	88.9

All cases in this study complete the procedure laparoscopically without conversion (**Table 4**).

Table (4): Distribution of studied sample according to conversion to open surgery.

Variable	Number	Percent
Conversion to open	0	0
Variable	Number	Percent
Method of extraction of specimen through trocar site	18	100

The distribution of studied sample according to post-operative pain using visual analogue scale ranged from 2 to 9 (**Table 5**).

Table (5): Distribution of studied sample according to post-operative pain using visual analogue scale and post-operative oral feeding.

Post-operative pain using Visual analogue scale	N=18	
Range		2-9
Mean ± SD		5.28±1.708
Post-operative Oral feeding	**Number**	**Percent**
Date of Start of oral Feeding		
ame day of the operation	5	27.8
1st post-operative day	13	72.2
Total	18	100

The distribution of studied sample according to oral feeding after surgery show that 5 (27.8%) were at the same day of the operation. The distribution of studied sample according to post-operative local complications showing that there was not any post-operative local complications (**Table 6**).

Table (6): Distribution of studied sample according to post-operative local complications.

Post-operative local complications	Number	Percent
Post-operative bleeding	0	0
Post-operative fever	0	0
Post-operative wound complications	0	0
Post-operative any visceral injury	0	0
Post-operative paralytic ileus	0	0
Post-operative pelvic collection	0	0
Total	18	100
Post-operative general complications	**Number**	**Percent**
Post-operative blood transfusion	0	0
Post-operative venous thrombosis	0	0
Post-operative at 30 days mortality	0	0
Total	18	100

Table 7 summarizes the distribution of studied sample according to date of hospital discharge.

Table (7): Distribution of studied sample according to date of hospital discharge.

Date of Hospital Discharge	Number	Percent
1st post-operative day	1	5.6
2nd post-operative day	6	33.3
3rd post-operative day	8	44.4
4th post-operative day	3	16.7
Total	18	100

Table 7 summarizes the distribution of studied sample according to patients' satisfaction.

Table (8): Distribution of studied sample, according to patients' satisfaction.

Patients' Satisfaction	Number	Percent
Good	10	55.6
Excellent	8	44.4
Total	18	100

DISCUSSION

If you have asymptomatic gallstones and are having bariatric surgery, you will not be advised to have a concomitant cholecystectomy (CC) [7].

The best ways to manage GB during bariatric surgery are still up for discussion. Therefore, it is still up for discussion when to perform a cholecystectomy on these patients. There are a number of strategies for managing GB during bariatric surgery, such as selective concurrent cholecystectomy only in the presence of pre- or intraoperatively identified GB pathologies. Some doctors favor cholecystectomy as a preventative measure for all obese patients. When symptoms and gallstones appear after bariatric surgery, some people favor traditional cholecystectomy. Concomitant cholecystectomy detractors assert that it is linked to lengthier operating times, extended hospital stays, and higher complication rates. The majority of writers, however, only advocate for selective cholecystectomy following preoperative confirmation of gallstones [8]. Long term studies, however, suggest that the prevalence of symptomatic gallstones after bariatric surgery, requiring therapeutic cholecystectomy, rises to 40% [9]. So, some doctors recommend cholecystectomy for asymptomatic patients undergoing bariatric surgery [10].

Regarding the demographic data of the studied group, the majority of cases (13/15, 72.2%) were females, the study population, however, consisted of a significantly higher proportion of women than men. The mean age was 32.78 years (range: 21 – 47 years), and a mean preoperative BMI was 44.67 kg/m^2 (range: 37- 53 kg/m^2. These findings were agreement with the study done in Iraq by **Alabbasi *et al.* (11)** who documented that, the sample mean age was 40.5 years, BMI 45.5, and proportion of female participants was 62%.

Regarding comorbidities distribution, our study observed most of patients had no pre-existing comorbidities associated with obesity. The majority of 14 (77.8%) patients had no comorbidities, one (5.6%) patient had diabetes, Resolution of hypertension was seen in one (5.6%) patient and 2 (11.1%) patients had both diabetes and hypertension. These results go on with the study of **Abu Salem *et al.* [12]** and **Barakat *et al.* [13]**.

Regarding the number of GB stones presented among the studied group, the current study shows that 9 (50%) patients had multiple, and 9 (50%) patients had single stone.

The study of **Barakat *et al.* [13]** conducted 454 morbidly obese patients enrolled in the study from 2016 to 2020, They chose at random Study group patients (70) underwent LSG as their primary bariatric treatment plus CC for confirmed gallbladder pathology; these patients were compared to 384 participants (control group) who underwent LSG alone (control group). In addition, 70 patients were diagnosed with GB disease (65 GB stones, 3 GB sludge, and 2 GB polyps less than 1 cm) prior to LSG and underwent CC.

All procedures were done laparoscopically through the same four and/or six ports. The current study revealed that the mean duration of surgery for both LSG and CC was 108.50 (SD 9.364) min (range 90-125 min). **Coşkun *et al.* [14]** studied 48 patients with mean operative time of cholecystectomy 49.1 (SD 27.9) min (range 15-110 min) and 108.1 (SD 33.3) min for sleeve gastrectomy.

Regarding the intraoperative cholecystectomy complications, the current study showed that there were 2 (11.1%) females complicated with gall stone spillage, while, there were 2 (11.1%) male and female complicated with GB bed bleeding. On the other hand, according to intraoperative blood loss and need for blood transfusion, the mean blood loss was 95.00 (SD 58.133) ml, ranged between 20-250 ml among all cases, and no cases need blood transfusion. These findings were agreed with **Sabry and Alkarmouty [15]**.

Regarding the conversion to open, in our study, all cases complete the procedure laparoscopically without conversion to open. Regarding the method of extraction of specimen, through trocar site in our cases, there was no need for extra wound to extract the specimen. These findings were agreed with **Sabry and Alkarmouty [15]**.

Regarding postoperative pain, our patients were assessed of 24-h postoperative pain between the patients in our study group using a visual analogue scale (VAS) revealed a mean score of 5.28 (SD 1.708) and ranged from 2 to 9.

In **Barakat *et al.* [13]** study no statistically significant difference in 24-hour postoperative pain between the study and control groups was found when assessed by VAS, with mean scores of 3.65 (SD 1.42) and 3.42 (SD 1.32), respectively (P=0.186).

Regarding oral feeding after surgery, the majority of 5 (27.8%) patients were at the same day of the operation, 13 (72.2%) patients were at 1st postoperative day. Protocol of oral feeding was in 100% of cases. When surgery was conducted in the afternoon, patients could resume oral eating that evening after SG, or the day after [16].

Regarding the date of hospital discharge, the current study revealed that there was one (5.6%) patient discharged in the 1st day, 6 (33.3%) patients discharged at the 2nd day, 8 (44.4%) patients discharged at the 3rd day and 3 (16.7%) patients discharged at the 4th postoperative day. These findings were in accordance with **Alabbasi *et al.* [11]**.

In the absence of any unusual symptoms following hospitalized mealtimes, discharge was approved the day following surgery (no nausea or vomiting after oral intake). If not, the length of stay in the hospital would have increased by at least one day [16].

According to patient satisfaction, there were 10 (55.6%) patients with good satisfaction and 8 (44.4%)

patients with excellent satisfaction. This coincides with **Behrens *et al.* [17]** as overall satisfaction was rated as excellent by 68% of patients, good by 29% and poor by 3% of patients.

CONCLUSION

Concomitant cholecystectomy (CC) is safe and practical during LSG and is appropriate for all patients with established GB disease. CC can be done during LSG without increasing morbidity or duration of hospital stay, despite the fact that this may be a significant issue.

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Competing interests: Nil.

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