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Feasibility and Safety of Concomitant Laparoscopic Cholecystectomy and Sleeve Gastrectomy: A Retrospective Study

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ABSTRACT

Background: Obesity increases the risk of developing gallstones, and this risk is further heightened by the rapid weight loss caused by bariatric surgery.

Aim: to evaluate the practicality with security of doing laparoscopic cholecystectomy and sleeve gastrectomy.

Patients and methods: Retrospective cohort research performed on forty-four consecutive cases who presented to Gastrointestinal Surgery Centre of Mansoura University during the period from August 2011 to August 2021.

Results: None of the cases underwent conversion to open surgery, there was no intraoperative haemorrhage, there was no detected biliary injury, and blood loss was below a hundred milliliters in 95.5%. The median of hospitalization was two days, the postoperative recovery passed smoothly in most of the study population, 4.5% underwent subsequent exploration, one case had postoperative internal bleeding, and one case had gastric leakage from site of first staple. One case had postoperative subcutaneous collection, there was no port site infection, and no mortality.

Conclusion: We concluded from this study that concomitant laparoscopic cholecystectomy and sleeve gastrectomy might be provided for cases with gallbladder disease as it can yield enhanced cosmetic outcomes and less postoperative discomfort and none of the cases underwent conversion to open surgery.

Keywords: Feasibility, Safety, Laparoscopic cholecystectomy, Sleeve gastrectomy.

INTRODUCTION

Obesity increases the risk of developing gallstones; this risk can be worsened by the rapid weight loss caused by bariatric surgery. The current guidelines don't advise doing concomitant cholecystectomy (CC) for asymptomatic gallstones during the bariatric surgery process [1-3]. Nevertheless, extended monitoring studies have indicated that the occurrence of symptomatic gallstones requiring therapeutic cholecystectomy after bariatric surgery rises to forty percent. Thus, certain surgeons recommend doing cholecystectomy at the same time as bariatric surgery for those who do not show any symptoms [4].

Bariatric surgery increases the risk of cases developing cholelithiasis, which subsequently increases the risk for cholecystectomy, as found by **Altieri *et al.*** [5]. In their research they involved all cases who underwent Roux-en-Y gastric bypass (RYGB), sleeve gastrectomy (SG), and laparoscopic adjustable gastric banding (LAGB) between 2004 and 2010. These cases were monitored for at least of five years to assess the requirement for a subsequent cholecystectomy. The percentage of cases who underwent cholecystectomy after LAGB was 6.5 percent, after RYGB was 9.7%, and after SG was 10.1%.

Anveden *et al.*, research with a follow-up period of 6-24 months, revealed that the occurrence of cholecystectomy in post-bariatric surgery populations ranges from 3.3 percent to 14.7 percent. [5], **Anveden *et al.*** A controlled study examining the occurrence of symptomatic gallstone disease more than 10 years following bariatric surgery found that the 2-year cumulative incidence of symptomatic gallstone disease was 3.7 percent, Furthermore, there was an eighty-five percent rise in risk observed after 2 years of follow-up following bariatric surgery. The cumulative incidence over a period of 10 years was 11.9 percent, which then increased to 19.7 percent after twenty years of follow-up. Bariatric surgery was found to increase the risk of cholecystectomy by forty-one percent Ten years following the intervention [5].

In addition reported a risk increase after bariatric surgery by 85% after 2 years of follow-up. The 10-year cumulative incidence was 11.9%, increasing to 19.7% after 20 years of follow-up with bariatric surgery increasing the risk for cholecystectomy by 41% 10 years after intervention [5].

Gallstone disease is a widespread condition that frequently leads to hospitalization and is a major contributor to healthcare costs. While many individuals with gallstones don't experience any symptoms, twenty percent of cases suffer from abdominal pain and other biliary symptoms. In some cases, surgical removal of the gallbladder is necessary due to recurring symptoms or complications. Enhancing our knowledge of risk factors can aid in identifying cases at risk for gallstones and to prevent gallstones in cases [6,7].

This study aimed to evaluate feasibility and safety of concomitant laparoscopic cholecystectomy and sleeve gastrectomy.

PATIENTS AND METHODS

This was a retrospective cohort research performed on forty-four consecutive cases who presented to

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Gastrointestinal Surgery Center of Mansoura University during the period from August 2011 to August 2021.

Inclusion criteria: Morbid obesity and cholelithiasis eligible for surgery and underwent concomitant laparoscopic cholecystectomy and sleeve gastrectomy.

Exclusion criteria: ASA III and IV patients and patients underwent previous bariatric surgery or previous upper abdominal surgery.

METHODS

All patients were subjected to:

Preoperative assessment

Patients were evaluated through a comprehensive history, including symptoms, medical conditions, and BMI ***(Body mas index)*** Clinical examinations included abdominal and general examinations, blood pressure measurements, electrocardiograms, and preoperative laboratory investigations. Diabetic tests included random and fasting blood sugar, complete blood pictures, liver and kidney function tests, thyroid function tests, and cortisol levels. Routine preoperative abdominal ultrasounds were performed to assess liver, gallbladder, and other abdominal abnormalities, while routine upper endoscopy was performed to assess esophageal, gastric, duodenal abnormalities or GERD.

preoperative preparation

All patients were prepared preoperatively by maintaining high protein low carbohydrates and fat diet for three to four weeks prior to surgery, cessation of smoking, encouraging mild or moderate exercise, tight glycemic control for diabetic patients and maintaining regular medications for any medical comorbidities.

Anasthetic evaluation

All patients underwent perioperative evaluation for anaesthesia through full laboratory investigations, ECG, echocardiography, chest X rays, pulmonary function test, and sleep study. Either cardiological consultation, chest consultation or any other consultation was done if indicated. Patients with ASA Score I, II only were involved in the research.

Surgical procedures

Sleeve gastrectomy

Patients underwent laparoscopic sleeve gastrectomy, with the case's position reversed using a reversed Trendelenburg's with a 45° angle. The abdomen was insufflated using a Verres needle, and five ports were inserted, including a camera, liver retractor, and working ports. The stomach's greater curve was devascularized by dividing the greater omentum, passing through the lower esophagus and pylorus. A 35 F bougie tube was inserted and passed through the pylorus, with the first staple placed parallel to the pylorus through a 15 mm trocar at the right upper quadrant. The remaining staples were placed along the greater curve and fundus, and the staples were colored blue, green, or gold depending on gastric wall thickness. Nearly 5 to 7 staples were enough for all patients. Clips were positioned across the staple line to facilitate hemostasis. Removing sleeve of the stomach was extracted throughout the upper quadrant ports on either the right or left side. Gastropexy or omentoplasty was performed, and drains were placed from the left upper quadrant port.

Concomitant cholecystectomy

Patients underwent cholecystectomy in the same set and position of sleeve gastrectomy, using the same ports. Extraport was needed in the right subcostal region for gallbladder fundus traction in two cases. The gallbladder fundus was pulled towards the right axilla throughout the right upper quadrant port, the gallbladder neck was pulled to the side by the left upper quadrant port. The dissection of Callot's triangle was performed to precisely locate and separate the cystic duct and cystic artery, which were then secured with clips and split. The cystic duct was milked towards the gallbladder to ensure no cystic stones were present. The gallbladder was dissected from its bed towards the fundus, and gallbladder extraction was made through the 12 mm left upper quadrant port.

Postoperative care

Patients with comorbidities like diabetes, hypertension, hypothyroidism or OSAS were stated to the ICU for observation of vital signs for one day, while those without comorbidities were admitted to the ward. All patients received proton pump inhibitors, prophylactic antibiotics, and nutritional support postoperatively. Oral fluid intake was started at the first postoperative day in cases without complications. Patients with low drain output were submitted to drain removal. Other treatment was given as needed, including prokinetic agents for abdominal discomfort and distention. Hospital stays, postoperative course, and complications were recorded. Patients were asked to return for follow-up at 8-10 days postoperatively, with the least follow-up duration being 6 months.

Ethical Consideration:

The study received approval from the institutional review board from the Department of General Surgery, Faculty of Medicine, Mansoura University and the IRB code was MS.22.03.1908. This study was performed in compliance with the Declaration of Helsinki, the code of ethics of the World Medical Association. All patients in this study were informed about complications, morbidity and mortality of the procedure and we had their informed consent before procedure, they were also informed about

their participating in this retrospective study on their free will.

Statistical analysis

Data distribution was tested for normality using the Kolmogrov-Smirnov test and Shapiro-Wilk test, categorical variables were expressed as group percentages and were compared for independent samples using Chi-square test, continuous data were presented as medians and were compared for independent samples using T test or Mann-Whitney test according to the data distribution, the strength of association between variables was further assessed by Spearman correlation coefficient, the statistical significance level was set at <0.05, statistical analyses were performed using SPSS version 17 (Chicago, IL).

RESULTS

Table 1 indicates that average age of the population in the research was 36.48±10.62, 93.2% were females. Average body mass index was 50.10±9.91.

Table 1: Demographic characteristics of the study population

	N=44	%
Age (years)		
Mean ± SD (Min-Max)	36.48±10.62 (18-60)	
Sex		
Male	3	6.8
Female	41	93.2
Weight (kg)		
Mean ± SD (Min-Max)	133.07±24.75 (100-195)	
Height (cm)		
Mean ± SD (Min-Max)	163.02±7.18 (148-180)	
Body mass index (kg/m^2)		
Mean ± SD (Min-Max)	50.10±9.91 (37-71)	

Table 2 shows that 54.5% had previous abdominal operations. Operative time in 59.1% of cases was >60 min to 120 min. Operative time for cholecystectomy alone in 50% was less than or equal to 15 min.

Table 2: Operative data of the study population

	N=44	%
Previous abdominal operations		
No	20	45.5
Yes	24	54.5
Operative time		
≤60 minutes	2	4.5
>60 to 120 minutes	26	59.1
>120 to 180 minutes	13	29.5
>180 to 240 minutes	2	4.5
>240 to 300 minutes	1	2.3
Cholecystectomy time		
≤15 minutes	22	50.0
>15 to 20 minutes	16	36.4
>20 to 45 minutes	6	13.6

Table 3 shows that none of the cases have undergone open surgery, there was no intraoperative haemorrhage, there was no detected biliary injury, and blood loss was under hundred milliliters in 95.5%.

Table 3: Intraoperative data of the study population

	N=44	%
Intraoperative internal bleeding	0	0.0
Bile duct injury	0	0.0
Conversion to open surgery	0	0.0
Blood loss during operation		
100 ml or less than 100 ml	43	97.7
More than 100 ml and less than 500 ml	1	2.3
Number of extraports		
0	42	95.5
1	2	4.5

Table 4 shows markedly distended gallbladder in 9.1% of cases, easy grasping of gall bladder marked in 93.2%, and easy extraction of gall bladder in all patients. 2.3% had bleeding from GB bed and 2.3% had bleeding from ports.

Table 4: Procedure details

	N=44	%
Cutting cystic duct	0	0.0
Cutting cystic artery	0	0.0
Markedly distended gallbladder		
Not marked	40	90.9
Marked	4	9.1
Grasping of gall bladder		
Easy	41	93.2
Difficult	3	6.8
Extraction of gall bladder		
Easy	44	100.0
Bleeding from GB bed		
No	43	97.7
Yes	1	2.3
Bleeding from ports		
No	43	97.7
Yes	1	2.3

(GB: Gall bladder)

Table 5 shows that the median duration of hospitalization was two days, postoperative course passed smoothly in most of the study population, and 4.5% underwent subsequent exploration.

Table 5: Postoperative data of the study population

	N=44	%
Postoperative hospital stay (days)		
Median (min-max)	2.0 (1.0-12.0)	
Need for subsequent exploration:		
Patient had no subsequent explorat	42	95.5
Patient had subsequent exploration	2	4.5

Table 6 shows that one case had postoperative internal bleeding and one case had gastric leakage from site of first staple. Postoperative subcutaneous collection was detected in one case. There was no port site infection and no mortality.

Table 6: Postoperative complication of the study population

	N=44	%
Postoperative internal bleeding		
No	43	97.7
Surgically controlled postoperative internal bleeding	1	2.3
Postoperative gastric leakage		
Patient had no postoperative gastric leakage	43	97.7
Patient had postoperative gastric leakage	1	2.3
Postoperative bile leakage	0	0.0
Postoperative obstructive jaundice	0	0.0
Postoperative intraabdominal collection	0	0.0
Postoperative subcutaneous collection		
No	43	97.7
Yes	1	2.3
Port site infection	0	0.0
Death	0	0.0

DISCUSSION

In our study, average age of studied cases was 36.48±10.62 years, ranged 18 - 60 years, 93.2% were females. In a study by **Habeeb *et al***. 92.5% of cases were from 18 to 45 years, 81% were females [8]. In a study by **Barakat *et al*.** mean age was 42.44±10.32, 87.1% were females [9]. In a study by **Lale *et al***. mean age was 38.6±9.3, 89.1% were females [10]. In a study by **Dincer and Dogan** average age of cases was 40.58 ±10.36, 63.9% were females [8]. In a study by **Wood *et al***. mean age was 45.2, 85% were females [12]. In a study by **Dakour-Aridi *et al***. mean age was 45.2±11.1, 81% were females [13]. In a study **by Coşkun *et al***. mean age was 39.6±10.2, 93.7% were females [14].

In the current research, average BMI was 50.10±9.91 kg/m^2, ranging from 37 to 71 kg/m^2. In **Habeeb *et al***., average BMI was 42.7±2.95 [5]. In **Barakat *et al***. average BMI was 46.2±9.95 [9]. In **Lale *et al***. average BMI was 45.5±5.9 [10]. In **Dincer and Dogan** average BMI was 42.9 [8]. In **Wood *et al***. average BMI was 44.9 [12]. In **Dakour-Aridi *et al***.[13] average BMI was 46.5±7.6.

In our study, operative time in 59.1% of cases was >60 to 120 minutes, in 29.5% was >120-180 minutes, in 4.5% was ≤60 minutes, in 4.5% was >180 to 240 minutes and in 2.3% was >240 to 300 minutes. **Habeeb *et al***. found that average operative time was 141.15±2.48 [8]. In **Barakat *et al***. average operative time was 76.82±17.22 [9]. **Lale *et al***. found that average operative time was 82.7±19.6 [10]. **Dincer and Dogan** found that average operative time was 65.7±8.5 [11]. **Wood *et al***. found that average operative time was 103.7[12]. **Dakour-Aridi *et al***. found that the average operative time was 128.2±53.9 [13]. **Coşkun *et al*.** found that average operative time for both LSG and cholecystectomy was 157.2±40.0, operative time for CC alone was 49.1±27.9 [14]. In our study operative time for CC alone was distributed as following; 50% of cases were less than or equal to 15 minutes, 36.4% were more than 15 to 20 minutes and 13.6% were more than 20 to 45 minutes.

In our study, the median duration of hospitalization after surgery was two days. **Habeeb *et al***. reported 2.21±0.51 mean postoperative hospital stays [8]. **Barakat *et al***. reported 1.76±0.05 mean postoperative hospital stays [9]. **Lale *et al***. reported 5.35±1.6 mean postoperative hospital stays [10]. **Dincer and Dogan** reported 4 mean postoperative hospital stay [11].

In the current research, no intraoperative bleeding was found, no bile duct injury, and no cases underwent open surgery. **Habeeb *et al***. reported intraoperative bleeding in one (one percent) case, uncontrolled bile leakage in one (1%) case, and conversion to open surgery in 3 (3%) cases [8]. **Dincer and Dogan** reported intraoperative bleeding in 1 (3.7%) case [11].

In our study, there were extensive tissue adhesions in 1 (2.3%) case. **Habeeb *et al***. also reported extensive tissue adhesions in 1 (1%) case [8]. In our study there was bleeding from GB bed in 1 (2.3%) case. **Barakat *et al***. reported that the gallbladder ruptured while being dissected from the liver bed in 2 (2.8%) cases [9].

In our study, 2 (4.5%) cases were reoperated, 1 for internal bleeding and the other for gastric leakage. **Habeeb *et al***. reported reoperation in 3 (3%) cases, 1 for internal bleeding, 1 for bile leakage and 1 for gastric leakage [8]. **Barakat *et al***. [9] and **Lale *et al***. reported no reoperation [10]. **Wood *et al***. reported reoperation in 33 (1.6%) cases [12].

In our study, 1 (2.3%) case had postoperative internal bleeding, 1 (2.3%) case had gastric leakage, no cases had postoperative bile leakage, no cases had obstructive jaundice, no cases had intraabdominal collections, 1 (2.3%) case had subcutaneous collection, and no cases had surgical site infections. **Habeeb *et al***. reported one (one percent) case of postoperative internal bleeding, 1 (1%) case of gastric leakage, one (one percent) case of postoperative bile leakage, 3 (3%) cases of surgical site infection [8]. **Barakat *et al***. reported 1 (1.4%) case of postoperative internal bleeding, 1 (1.4%) case of intraabdominal collections and 6 (8.5%) cases of surgical site infections [9]. **Lale *et al***. reported 1 (2.7%) case of postoperative internal bleeding, 3 (8.1%) cases of surgical site infection[10]. **Wood *et al***. reported 10 (.5%) cases of intraabdominal collections and 10 (.5%) cases of surgical site infections [12].

Raziel *et al*. reported 4 (2.22 %) cases of postoperative internal bleeding, 2 (1.11 %) cases of gastric leakage and 2 (1.11 %) cases of postoperative bile leakage[15].

CONCLUSION

Based on our study, we have determined that doing laparoscopic cholecystectomy and sleeve gastrectomy together is a viable option for cases with gallbladder illness. This approach offers improved cosmetic outcomes along with fewer postoperative pain.

DECLARATIONS

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- **Conflicts of interest:** No conflicts of interest.
- **Competing interests:** None

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