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Is concomitant cholecystectomy with laparoscopic sleeve gastrectomy safe?

STOMACH/BILIARY

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Original Article

ABSTRACT

Background/Aims: To study the effect of selective concomitant cholecystectomy (SCC) on laparoscopic sleeve gastrectomy (LSG).

Materials and Methods: A retrospective case-control study of 16 morbidly obese patients treated with concomitant LSG as the primary bariatric surgery and SCC for proven gallbladder (GB) pathology (Group A) between November 2010 and February 2013 was performed. Randomly selected 32 patients who underwent laparoscopic sleeve gastrectomy was the control group (Group B).

Results: A total of 48 patients with a mean age of 35.5±10.7 years were included. Demographic data of groups were similar except that there were more female patients in the Group A (p=0.036). Mean body mass index (kg/m2) was 51.1±5.6 and 50.9±5.4 in Groups A and B, respectively (p=0.894). The mean operative time for patients with and without cholecystectomy was 157.2±40 and 95.72±6.2 min, respectively (p=0.001). Cholecystectomy resulted in an additional mean operative time of 49.1±27.9 min without any specific complication. There was no statistical difference with regard to overall morbidity (p=0.316) and the length of hospital stay (p=0.528) between groups.

Conclusion: Although an increase in operative time may be an important issue, SCC can be performed on all patients with proven GB pathology during LSG without an increase in morbidity or length of hospital stay.

Keywords: Morbid obesity, bariatric surgery, laparoscopic sleeve gastrectomy, gallstones, cholecystectomy

INTRODUCTION

There is an enormous rise in the number of the bariatric procedures performed each year. However, increased formation of gallstones either caused by obesity itself, rapid weight loss after the surgery, or type of the bariatric surgery is an important therapeutic challenge (1). Although some bariatric procedures like Roux-en-Y gastric bypass are supposed to cause more gallstone formation by the mechanisms of poor gallbladder (GB) emptying and disturbed enterohepatic circulation of biliary salts, rapid weight loss after bariatric surgery is shown to be the most important risk factor for development of gallstones (2-4). Increased cholesterol saturation in the bile and biliary mucin concentration in GB are important pathophysiological features of the enhanced gallstone formation associated with rapid weight loss (5).

Although it has been proposed that up to one-third of patients develop cholelithiasis after bariatric surgery, the requirement for subsequent cholecystectomy in these patients has been reported in ranges between 3-28% (1,3,4,6). Therefore, the timing of cholecystectomy in these patients remains a subject of concern. There are several approaches with regard to the management of GB during bariatric surgery, including "selective concomitant cholecystectomy" (SCC) only after pre- or intra-operatively detected GB pathologies like cholelithiasis or polyps by ultrasound, "prophylactic cholecystectomy" (PCC) for all patients, and conventional cholecystectomy when both gallstones and symptoms develop after the bariatric surgery (5).

Because of increased operative time and requirement for additional port placement, cholecystectomy dur-

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ing laparoscopic bariatric surgery is a technically demanding procedure (3,7,8). Although PCC has been suggested as a safe and feasible approach for the management of GB, a trend for the selective approach only in cases of proven GB pathology has been favored (1,3,9,10). However, intra- and post-operative outcomes of SCC with laparoscopic sleeve gastrectomy (LSG) have not been studied before.

In this paper, we report our experience of SCC and LSG in morbid obese patients with proven GB pathology regarding the intra-operative and short-term post-operative outcomes.

MATERIALS AND METHODS

A retrospective review of a prospectively maintained database of all morbidly obese patients treated with LSG as primary bariatric surgery between November 2010 and February 2013 was performed. Patients with a body mass index (BMI) in excess of 40 kg/m^2, or >35 kg/m^2 with at least one severe comorbidity, were offered LSG after failure of conservative treatment and complete evaluation by a multidisciplinary team. In addition to other pre-operative tests, routine abdominal ultrasound was performed for all patients to detect GB pathology, if present. Patients with previous cholecystectomy (n=21) were excluded from the study. Of 225 patients who underwent LSG, 16 (7.1%) had GB pathology identified during pre-operative work-up. There were 171 female (76%) and 54 male (24%) patients in the overall study group. In case the ultrasound proved GB pathology including cholelithiasis or GB polyps larger than 1 cm regardless of presence or absence of the symptoms, SCC was planned at the time of the bariatric surgery as a general policy. In all 16 cases, it was possible to perform SCC prior to LSG.

The study group (Group A) included 16 LSG patients with SCC, and a control group (Group B) was comprised of 32 randomly selected LSG patients from the patient list based on BMI. For one LSG with SCC patient, two patients within the same BMI interval range were selected randomly using a computer-generated number system. The database included pre-operative patients' demographic and anthropometric features, co-morbidities, operative findings, and follow-up information. The study was approved by the Institutional Review Board. An informed consent was taken from the patients.

Prophylactic antibiotic cefazolin sodium (Sefazol; Mustafa Nevzat, İstanbul, Turkey) was given intravenously at the induction of anesthesia. Low molecular weight heparin was started in the evening before surgery until the end of the second post-operative week, and elastic stockings during the hospitalization were used for prophylaxis against thromboembolism. SCC was performed using trocars and other instruments used during LSG. However, one additional 5-mm trocar was placed in the right upper quadrant in all patients. Retrograde cholecystectomy was performed by using electrocautery. After completion of SCC, all patients underwent a standard LSG with five or six trocars under Institutional Review Board approval. At the end of the procedure, fibrin sealant (Tisseel VH; Baxter, Westlake Village, USA) was applied to the staple line under direct vision, and one Jackson-Pratt drain from the GB site to the Angle of His abutting the remnant stomach was placed at both operative fields. All patients without any complication were discharged generally at the third post-operative day. Outcome measures were overall operation times calculated as minutes from the first incision to the last skin closure, the time for LSG and SCC, length of hospital stay calculated as days, and specific morbidity related to SCC included bleeding, bile leakage, and common bile duct injury, and for LSG during the post-operative first month.

Statistical analyses were performed using SPSS 17 software (SPSS Inc., Chicago, IL, USA). Continuous variables were expressed as mean±standard deviation. The Student's t-test was used for comparison of continuous variables. Categorical variables were expressed as frequencies and evaluated by the chi-square test and Fisher's exact test. The differences were considered statistically significant if the p value was equal to or less than 0.05.

RESULTS

A total of 48 patients with a mean age of 35.5±10.7 years were included. There were 16 and 32 patients in the Groups A and B, respectively. Demographic data and operative information of these patients were given in Table 1. There was no difference between the two groups regarding age, body weight, and pre-operative BMI (p>0.05 for all). However, there were significantly more female patients in the Group A (p=0.036). The mean operative time in patients with and without SCC was 157.2 and 95.7 min, respectively (p=0.001). Cholecystectomy in the Group A resulted in an additional mean operative time of 49.1±27.9 min (range 15-110 min). There was no conversion to open surgery for either group.

Table 1. Demographic and operative data

	Group A (n=16)	Group B (n=32)	p
Age (years)$^{\mu}$	39.6±10.2	33.4±10.6	0.06
Female/male (n/n)	15/1	20/12	0.036*
Body weight (kg)$^{\mu}$	134.9±12.5	143.6±24.1	0.105
BMI (kg/m^2)$^{\mu}$	51.1±5.6	50.9±5.4	0.894
Overall operation time (min)$^{\mu}$	157.2±40.0	95.7±26.2	0.001*
Time for LSG (min)$^{\mu}$	108.1±33.3	95.7±26.2	0.165
Time for SCC (min)$^{\mu}$	49.1±27.9	NA	NA
Length of hospital stay (day)$^{\mu}$	3.56±0.9	3.41±0.8	0.528
Morbidity (n/%)	3/18.75	2/6.25	0.316

$^{\mu}$mean±standard deviation

*statistical significance

NA: not applicable; LSG: laparoscopic sleeve gastrectomy; SCC: selective concomitant cholecystectomy; BMI: body mass index

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Cholecystectomy was associated with no specific complication in Group A. There was no statistical difference with regard to overall morbidity between the groups (p=0.316). In the Group A, wound infection and requirement of post-operative blood transfusion was seen in one and two patients, respectively. There was one wound infection and one post-operative blood transfusion in the Group B patients. Wound infections were treated with oral antibiotics, and blood transfusions (with a mean of 2.3 units) were required in these patients due to prolonged bloody discharge from the drains. For both groups, there was no mortality. There was also no difference in the length of hospital stay between the groups (p=0.528). Histopathological analysis of GB revealed chronic cholecystitis and adenomyomatosis in 14 and two patients, respectively.

DISCUSSION

The prevalence of cholelithiasis in morbidly obese patients varies between 19% and 45% (11). Besides cholelithiasis, acalculous cholecystitis, and cholesterolosis have also been detected more commonly in obese patients (7). It has been reported that abnormal histopathological findings in routinely removed gallbladders were found in up to 85% of morbidly obese patients (5,7,11). In addition to obesity as a well-known factor for development of cholelithiasis, rapid weight loss and altered GB function after bariatric surgery is associated with an even greater risk (2,3,9,11). Within the first two years after bariatric surgery, up to 50% of the patients develop gallstones or biliary sludge, although most of them are asymptomatic (11,12). Therefore, cholecystectomy is often required in obese people, but timing still remains controversial (13,14).

It has been thought that the probability of gallstone formation was directly related to the surgical method used for morbid obesity (13). Theoretically, cholelithiasis should be more common after gastric bypass than after a purely restrictive procedure due to reduced cholecystokinin secretion, causing longer retention of bile in GB (10,13). In the literature, higher rates up to 28.9% for symptomatic gallstone formation among patients after gastric bypass have been reported (3,4,6,15,16). Sakcak et al. (13) detected a 5.8% incidence of symptomatic secondary gallstone formation after gastric banding. After biliopancreatic diversion with duodenal switch, the rate for development of gallstones was reported as 12% (17). No significant difference in the development of symptomatic gallstone formation between Roux-en-Y gastric bypass and LSG was noted (8.7% versus 3.8%, p=0.296), although there was a large difference in the sample size of each group (496 versus 52) (10). The same researchers also did not observe a significant difference for symptomatic biliary lithiasis development after surgery between gastric bypass and restrictive procedures including both LSG and gastric banding (2). Therefore, development of gallstone formation is related with all types of bariatric surgery, in variable rates. However, management of GB pathology during LSG as a restrictive bariatric procedure has attracted attention in recent years, and has not been addressed in the literature (10).

Some researchers have recommended PCC for all patients during the same session as bariatric surgery, arguing that the risks might outweigh the benefit (4,11,14). However, this approach has become less popular due to increased operative time, longer duration of hospitalization, and increased risk of potential complications (1,5). Warschkow et al. (9) also reported some arguments against the PCC approach. The rate of subsequent cholecystectomy after Roux-en-Y gastric bypass in a meta-analysis of 6048 patients was 6.8%, and the main cause for the subsequent cholecystectomy was uncomplicated disease rather than the complicated biliary diseases including choledocholithiasis and biliary pancreatitis. Additionally, surgical morbidity and conversion during subsequent cholecystectomy was very low. Therefore, it is suggested to avoid the PCC approach during bariatric surgery in patients without cholelithiasis, and exclusively be performed in patients with proven GB pathology on pre-operative imaging, or in patients with symptomatic biliary disease. Therefore, the SCC approach is generally recommended only for symptomatic patients with proven GB pathology (1, 3, 7-9). It was also reported that it was possible to reduce the subsequent cholecystectomy rate by performing the SCC approach in asymptomatic patients with proven GB pathology (9). In the present study, considering all favoring and opposing data, cholecystectomy has been performed only in cases with pre-operatively proven GB pathology, irrespective of whether there are symptoms or not.

Extended operation time and longer length of hospital stay have been reported in the SCC approach with bariatric surgery by previous studies (17). Mean length of hospital stay for both groups was the same in our study in accordance with others (4,7,18,19). The present study confirms that concomitant cholecystectomy with bariatric surgery does not prolong the length of hospital stay (4,11). Longer operation time is inevitable, but the amount of additional time in comparison to the standard laparoscopic cholecystectomy is more important. Location of the trocars at different points from the standard laparoscopic cholecystectomy, excess abdominal fatty tissue, and enlarged liver were thought to be the important factors causing operative difficulty during SCC (10). The additional time period for cholecystectomy during bariatric surgery has been reported in ranges from 18 to 48 min (7,13,14,17,20). In the present study, carrying out SCC in the same session with LSG extended the surgery duration a mean of 49.1±27.9 min (median and range 45 and 15-110 min, respectively), which could be regarded as acceptable ranges. Other surgical outcomes including intra-operative blood loss, peri-operative fluid, and analgesic requirements were shown to be unaffected by adding cholecystectomy to bariatric surgery (7). Tarantino et al. (4) recommended adding one more trocar in all patients at the right upper quadrant and performing cholecystectomy at the beginning of the operation when the level of patience was still high and the surgeon was not exhausted by the highly demanding surgery.Therefore, it is suggested to perform cholecystectomy first and apply at least one more trocar placement during cholecystectomy with LSG.

Although Worni et al. (1) reported a significantly higher mortality rate for laparoscopic bypass with SCC compared to gastric bypass alone in 70287 patients (0.2% versus 0.1%, p = 0.012), it should be accepted that albeit the mortality of this procedure in absolute terms is low. More importantly, SCC also increased the overall peri-operative complication rate by 1.1% (6.2% versus 5.1%). Although there were more post-operative complications in the Group A (SCC-LSG), it did not reach significance most probably due to small sample size for both groups (p=0.316), and none of them was associated with cholecystectomy.

On the basis of our findings, this approach can be applied to all LSG patients with proven GB pathology. Concomitant cholecystectomy adds not more than 1 hour to the operation time without an increase in morbidity or length of hospital stay. However, it should be kept in mind that cholecystectomy in an obese patient can be a technically demanding procedure, which requires surgical expertise even with extra trocar placement.

Ethics Committee Approval: Ethics committee approval was received for this study from Institutional Review Board.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

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