

The prevalence of gallstone disease after sleeve gastrectomy and Roux en Y gastric bypass

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Abstract:

Background: Obesity (body mass index >30) is increasing worldwide with an estimated 1.7 billion people currently affected by the disease, Gallstone represent the third most common disease observed among obese patients. Moreover about 30% of the patients who are candidates for bariatric surgery either have undergone a prior cholecystectomy or are found to present gallstones at time of surgery, On the other hand, newly formed gallstones may be diagnosed in 27% to 43% of patients who have undergone bariatric surgery within a very short period of time.

Objective: To determine the prevalence of gallstone disease requiring cholecystectomy after laparoscopic sleeve gastrectomy and roux en Y gastric bypass during a one year follow up and to determine the need for prophylactic cholecystectomy in these patients.

Patients and methods: prospective study among patients with morbid obesity treated with laparoscopic sleeve gastrectomy and Roux- en- Y Gastric Bypass between 1st of February 2013 till 31st of July 2015 at Saint Raphael hospital and Al-Hayat private hospital, patients with negative abdominal ultrasound preoperatively, patient with at least one year follow up after surgery were included in this study, The patients were divided into two groups for comparison. Group A patients who had laparoscopic sleeve gastrectomy, and group B included the patients who underwent laparoscopic Roux en Y gastric bypass. The primary outcome measure was the formation of symptomatic gallstones or sludge with or without complications.

Results: 284 patients in group A(sleeve) and 45 patients in group B(Bypass) were included in the analysis, the mean age of was 34.5 years for group A, and 191(67.3%) of the patients were women, whereas it was 41.5 years for group B and 33 (73.3%) of the patients were women, Symptomatic cholelithiasis subsequently requiring cholecystectomy occurred in 29 (10.2%) of 284 laparoscopic sleeve gastrectomy patients, and 5(11.1%) of 45 Roux en Y gastric bypass patients , symptomatic gallstone developed in a median of 7 months in group A, while the median time to developed symptomatic gallstone in group B was 8 months. No significant difference in symptomatic gallstone disease was found between the patients who underwent laparoscopic gastric bypass and those who had sleeve gastrectomy

Conclusions: Cholelithiasis was common in our patients before weight reduction surgery. The rate for symptomatic gallstones after surgery was not so high.. Routine prophylactic cholecystectomy should not be recommended for these patients.

Keywords: sleeve gastrectomy, Roux-en-Y gastric bypass, and cholelithiasis.

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Introduction:

Obesity [body mass index (BMI), >30] is increasing worldwide with an estimated 1.7 billion people currently affected by the disease. In the USA, the prevalence of obesity has reached 30% and in Europe 20% of the population. In the USA, morbid obesity has become an epidemic condition, with co-morbid associations of metabolic abnormalities, and is accompanied by a reduction in life expectancy (1). Bariatric surgery decreases body weight and improves co-morbidities, conservative treatment, i.e non surgical treatment, provides poor results (2). Surgery is the most recommended effective

treatment of morbid obesity according to NIH consensus conference (3). Laparoscopic sleeve gastrectomy(LSG) is a treatment for obesity that involves removal of the funds and most of the antrum of the stomach, thereby creating a gastric tube or sleeve that restricted oral intake(4) . This procedure initially introduced as a part of duodenal switch operation, but now become a popular stand-alone procedure for weight loss surgery(5) Gallstone represent the third most common disease observed among obese patients. Moreover about 30% of the patients who are candidates for bariatric surgery either have undergone a prior cholecystectomy or are found to present gallstones at time of surgery(6). On the other hand, newly formed gallstones may be diagnosed in 27% to 43% of patients who have undergone bariatric surgery within a very short period

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of time(7), it was found that the risk of developing gallstones can be as high as 52.8% in patients undergoing Roux-en-Y gastric bypass who are followed up for 1 year afterwards(8) Patients with a rapid weight loss, following bariatric surgery, experience increased cholesterol saturation in the bile and also present increased concentrations of mucin in the gallbladder which is the most important pro-nucleating factors (9)

Patients and methods:

This is a prospective study among 437 patients with morbid obesity treated with laparoscopic sleeve gastrectomy (LSG) and laparoscopic Roux- en- Y Gastric Bypass (LRYGB) between 1st of February 2013 till 31st of July 2015 at Saint Raphael hospital and Al-Hayat Private hospital, data collection began before the operation and continued forward until the latest visit after the operation. Patients with negative abdominal ultrasound preoperatively, patient with at least one year follow up after surgery were included in this study, exclusion criteria included: patients with gallstone disease preoperatively, history of cholecystectomy, presence of gallbladder polyp on preoperative ultrasound, patients who were lost to follow up after surgery and patients with a previous weight reduction procedure such as intra gastric ballon or gastric band, 108 patients were excluded from the study and 329 patients were included in the analysis. All patients were counseled concerning the options of LRYGB and LSG and the respective risks of surgery were explained, a written informed consent was taken from all patient preoperatively. Preoperative abdominal ultrasound was performed for all patients to rule out gallstones, sludge or gallbladder polyp. Those with positive findings on ultrasound were counseled for concomitant laparoscopic cholecystectomy. Patients were followed up regularly, every 2-3 months; those with symptoms suggestive of cholelithiasis or its complications had further imaging with abdominal ultrasound or magnetic resonance imaging of the abdomen. The patients were divided into two groups for comparison. Group A patients who had (LSG), and group B included the patients who underwent (LRYGB). The primary outcome measure was the formation of symptomatic gallstones or sludge with or without complications. Positive findings according to the ultrasound, or MRI reports were recorded. Symptoms were considered attributable to gallstones or sludge if not clinically explainable by other causes. Patients who had complications such as acute cholecystitis, deranged liver function, acute cholangitis, or biliary pancreatitis at first presentation also were considered as symptomatic in the analysis. Statistical analysis: Data were collected using Excel for Windows, and analysis was performed with the Scientific Package of the Social Sciences version 22 (SPSS). The chi- square test or Fisher’s exact test was used for nominal variables as appropriate. The t-test was used to compare continuous variables. A p value less than 0.05 was considered significant.

Results:

Between 1st of February 2013 till 31st of July 2015, 372 (LSG) and 65 (LRYGB) were performed. After exclusion from the study, 284 group A patients and 45 group B patients were included in the analysis (table 1). reoperative gallstone disease was found in 32(8.6%) of patients in group A and 8(12.3%) of patients in group B, all patients with gallstone disease that diagnosed preoperatively underwent concomitant cholecystectomy. Three (0.8%) patients in group A had a previous gastric band and 6 (1.6%) had a previous intragastric ballon placement, while in group B, 3(4.6%) patients had a previous intragastric ballon and all these patients were excluded from the study

Table 1 patient exclusion and incidence of gallstone diseases before surgery

	Group A (sleeve)	Group B (Bypass)
Total number of patients	372	65
Excluded n(%)		
Gallstone on preoperative U/S	32(8.6%)	8(12.3%)
Gallbladder polyp on U/S	1 (0.27%)	-
Previous cholecystectomy	22(5.9%)	5(7.6%)
Previous weight reduction procedures	9(2.4%)	3(4.6%)
Lost to follow up	24(6.4%)	4(6.1%)
Number of patients included in the study	284	45

The baseline characteristics of the patients in both groups are shown in (table 2) the mean age of was 34.5 (18-51 years) for group A, 191(67.3%) of the patients were women and 93 (32.7%) of the patients were men , whereas it was 41.5(27-56 years) for group B and, 33 (73.3%) of the patients were women and 12(26.7%) of the patient were men, the Preoperative mean BMI was 50.5±7.7 (range from 35.7-65.3) in group A patients, and 53.9±7.9 (range from 42.2-65.5) in group B patients. The median follow up period was 14 month (range 12-16 months) for sleeve group and 18 months (range, 12-24 months) in gastric bypass group.

Table 2 baseline characteristics of group A(sleeve) and group B(bypass) patients

Characteristics	Group A	Group B
Mean age: years (range)	34.5(18-51)	41.5(27-56)
Gender		
Male: n (%)	93 (32.7%)	12 (26.7%)
Female : n(%)	191 (67.3%)	33 (73.3%)
Preoperative BMI(kg/m2)	50.5±7.7	53.9±7.9
Median follow up (months)	14	18

*BMI= body mass index

Symptomatic cholelithiasis subsequently requiring cholecystectomy occurred in 29 (10.2%) of 284 (LSG)

patients, and 5(11.1%) of 45 (LRYGB) patients and this difference was statistically not significant (p. Value >0.05), no incidental gallstone disease was found in both groups , symptomatic gallstone developed in a median of 7 months (4-12 months) in group A, while the median time to developed symptomatic gallstone in group B was 8 months (2-18 months) and this difference was statistically not significant(p.value >0.05). Mean BMI at the time of cholecystectomy was 30.8± 7.9kg in group A (range from 19.8- 48.7kg/m²) and 36.8±5.4 kg/m² (range 27.3-43.7 kg/m²) in group B (p. Value 0.07) table 3.

Table 3 comparison of patients who developed symptomatic gallstones

	Group A (sleeve)	Group B(LRYGB)
Number of patients	29(10.2%)	5(11.1%)
Female	24(82.7%)	4(80%)
Male	5(17.3%)	1(20%)
BMI at the time of Bariatric surgery (kg/m ²)	45.4±6.5	47.2±3.6
BMI at the time of cholecystectomy (kg/m ²)	30.8±7.9	32.8±5.4
Interval time (months)	8.0± 3.6	14.1±8.8

All patients who developed symptomatic gallstones underwent laparoscopic cholecystectomy. One female patient from group B underwent laparoscopic choledochoduodenostomy along with the cholecystectomy and common bile duct exploration, because of ascending cholangitis without complication. No patient developed complications requiring re-admission or reoperation after cholecystectomy. No mortality occurred in our patients after cholecystectomy.

Discussion:

Laparoscopic cholecystectomy in the morbidly obese may be associated with increased operative difficulty and morbidity compared with nonobese patients(10). However, the role of prophylactic cholecystectomy at the time of bariatric surgery remains controversial. The fact that pathological evidence of gallbladder diseases has been found in more than 75% of routinely resected specimens supports those who advocate prophylactic cholecystectomy (11). On the other hand, the fact that only 7 to 16% of patients will develop symptomatic gallstones (12,13), and that less than 10% of patients with negative ultrasound exams require subsequent cholecystectomy (14) dose not support performing a prophylactic cholecystectomy. Of our LRYGB group, 11.1% developed symptomatic cholelithiasis and underwent laparoscopic cholecystectomy, this result is the same in many studies done by Nagem et al (15)and Li et al(16) which reported a rate ranged from 6.7 to 11.8%, theoretically, cholelithiasis is less common after laparoscopic sleeve gastrectomy, because the procedure dose not alter the

gastrointestinal pathway(16,17). In our LSG patients, 10.1% developed symptomatic gallstones, and this rate was not statistically significant(p. Value >0.05) from that of LRYGB patients, Li et al (16) also reported no significant difference in the rate for symptomatic and complicated cholelithiasis between LRYGB and LSG group of patients. Although rapid weight loss after bariatric surgery is a risk factor for forming gallstones, we should not neglect that a high number of patients already had gallstone disease or previous cholecystectomy before Bariatric procedure possibly because of obesity factor. In our study we found 14.77% of sleeve patients and 19.9% of LRYGB patients, already had their gallbladder removed or had gallstone disease before the operation. This result is similar to that of other studies (16,18) . Portenier et al(14) argued that the incidence of delayed cholecystectomy for symptoms or complications of gallstone formation was much lower than the ≥30% reported to develop gallstones and suggested an expectant approach of the asymptomatic cholelithiasis in LRYGB patients. We agree on the point that the percentage of patients developing gallstones is not as high as it was perceived to be. However, routine preoperative ultrasound screening for gallstones and/or prophylactic cholecystectomy may still be beneficial in LRYGB patients, because access to the biliary tract after LRYGB is challenging (18). In addition, positive gallstones in workups may interfere with diagnosing other reasons when the symptoms are not specific. These study findings had two important implications. First, because symptomatic cholelithiasis showed no statistical significant compared with gastric bypass; routine prophylactic cholecystectomy is not indicated for these patients. Second, from an etiologic point of view, the traditional belief that hormonal changes and left vagal hepatic branch denervation after gastric bypass result in gallstone formation may no longer hold true because patients who had food going through the usual gastrointestinal transit without duodenal exclusion did not have a lower risk for symptomatic gallstone formation(19,20). The speed and the degree of weight loss after surgery may be solely related to symptomatic cholelithiasis rather than the choice of the procedure itself (20).

Conclusion:

Cholelithiasis was common in our patients before weight reduction surgery. The rate for symptomatic gallstones after surgery was not so high. No significant difference in symptomatic gallstone disease was found between the patients who underwent laparoscopic gastric bypass and those who had sleeve gastrectomy. Routine prophylactic cholecystectomy should not be recommended for these patients.

Authors' Contributions:

Dr. Ramiz Sami Mukhtar: operated most patients (main surgeon), patients follow up, literature review

Dr. Adil kamel Saloom: operated some patients, patient follow up, literature review

Dr. Mohammed Qasim AbdulJabbar: data collection, study design, manuscripts writing.

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