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The evaluation of gallstone formation in patients undergoing Roux-en-Y gastric bypass due to morbid obesity

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ABSTRACT

Objective: This study aimed to evaluate gallstone formation, prophylactic and selective cholecystectomy and the effectiveness of ursodeoxycholic acid treatment following laparoscopic Roux-en -Y gastric bypass (LRYGB) in morbid obese patients.

Material and Methods: Files of 60 patients who underwent LRYGB between October 2006 and March 2011 were retrospectively reviewed. Patients were evaluated for formation of gallstones.

Results: Fifty-three (88.3%) patients were female and seven (11.7%) were male. Eight of the 60 patients (13.3%) had previously undergone cholecystectomy. Six patients (11.5%) underwent cholecystectomy in addition to LRYGB due to preoperatively detected gallstones by ultrasonography. The remaining 46 patients were followed up for a mean duration of 28.57 months (5-56 months). In 10 (21.7%) of these patients, gallstones were detected and five patients with symptomatic gallstones underwent cholecystectomy. Patients who did and did not develop gallstones after LRYGB did not show a significant difference regarding age, gender and the new body mass index (BMI). Three patients were started on ursodeoxycholic acid and the treatment was continued for six months. Gallstones were not detected in these patients.

Conclusion: In light of these data, since only a very small portion of patients develops symptomatic gallstones after LRYGB, we recommend cholecystectomy in patients with symptomatic gallstones or the use of ursodeoxycholic acid rather than a prophylactic approach. Prospective randomized controlled studies in larger series are required to support these results.

Key Words: Obesity, laparoscopic gastric bypass, gallstones

INTRODUCTION

Obesity is a serious disease that has significant morbidity and mortality, and complex genetic and environmental etiologies (1). It can lead to hypertension, hyperlipidemia, cardiomyopathy, diabetes, hypoventilation disorders, increased risk of malignancy, cholelithiasis, degenerative arthritis, infertility and psychosocial disorders (2).

Following bariatric surgery, especially Roux-en-Y gastric bypass (RYGB), the frequency of gallstone formation increases as compared to the normal population due to rapid weight loss (3, 4). Hepatic supersaturation of bile with cholesterol, gallbladder stasis, and increased concentration of mucin within bile are possible causes (5).

Management of gallstone disease in these patients is still controversial and several therapeutic modalities are being used. These are performing cholecystectomy simultaneously with gastric bypass regardless of the presence of gallstones (prophylactic approach) (6-8), performing simultaneous cholecystectomy in all patients with gallstones (elective or selective approach) (9, 10), performing simultaneous cholecystectomy in patients with symptomatic gallstones, and methods in which prophylactic ursodeoxycholic acid (UDCA) therapy was initiated or not until development of symptoms (conventional approach) (5, 11).

We aimed to evaluate gallstone formation, prophylactic and selective cholecystectomy, and the effectiveness of ursodeoxycholic acid treatment following laparoscopic Roux-en-Y gastric bypass (LRYGB) in morbid obese patients.

MATERIAL AND METHODS

A retrospective chart review of 60 patients who underwent LRYGB between October 2006 and March 2011 was performed.

All patients received perioperative 2 gr. intravenous cefazolin for two days, and low molecular weight heparin was administered for ten days. Before induction of anesthesia, intermittent compression units were applied to both lower extremities.

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The patients were called for outpatient follow-up at the end of 1 month and every 3 months for the first 2 years, and every 6 months in subsequent years. Changes in weight, blood count, calcium, iron binding, ferritin, vitamin B12 levels were examined and the necessary treatment changes were made.

Cholecystectomy was performed simultaneously during LRYGB in patients who were detected to have gallstones preoperatively. All remaining patients underwent abdominal ultrasonography during routine controls for presence of gallstones. Laparoscopic cholecystectomy was performed in patients with symptomatic gallstones. The remaining patients were followed up. Our approach to obesity and gallstones are summarized in Figure 1. An ethics committee approval was obtained from Tepecik Training and Research Hospital Ethics Committee, in 2011.

Statistical Analysis

Statistical Package for Social Sciences (SPSS, Chicago, IL, USA) 15.0 software was used for evaluation. p value of <0.05 was considered as significant.

RESULTS

The majority of patients (n=53) were female, with a mean age of 41.17±11.09 years, and mean body mass index (BMI) of 47.79±6.98 kg/m^2.

Eight of the 60 patients (13.3%) had a history of previous cholecystectomy. All of these patients were women. In 6 out of the remaining 52 patients (11.5%), who were also all women, gallstones was detected in the preoperative ultrasonography and they underwent cholecystectomy during LRYGB. The mean follow-up period of the remaining 46 patients was 28.57 months (5-56 months). During follow-up controls, all patients received an abdominal ultrasonography for the presence of gallstones. Gallstones were detected in 10 of these patients (21.7%) and only one of these patients was male.

The mean age of patients without gallstones on control ultrasonographies was 39.0±10.8 years, while that of patients with stones was 39.4±7.1 years and there was no statistically significant difference between them (p=0.912). The BMI of patients who had gallstones was found as 31.61 kg/m^2 at the time of diagnosis, and the BMI of patients without gallstones was 30.61 kg/m^2. There was no statistically significant difference between these two groups (p=0.595).

Ursodeoxycholic acid (UDCA) was applied in the last three patients after LRYGB, and was continued up to 6 months. Gallstones were not detected in these patients.

Six patients were diagnosed with cholelithiasis during evaluation of various complaints outside their routine controls. Five of them underwent laparoscopic cholecystectomy due to symptomatic gallstones. In four more patients within the remaining 40 group of patients, gallstones were detected by abdominal ultrasonography during a routine control. These patients were followed up because they were not symptomatic.

The gallstones were detected during the first 12 months in one patient, during the second 12 months in 8 patients and after 24 months in one patient. Gallstone detection during the second postoperative year was statistically significant (p<0.001).

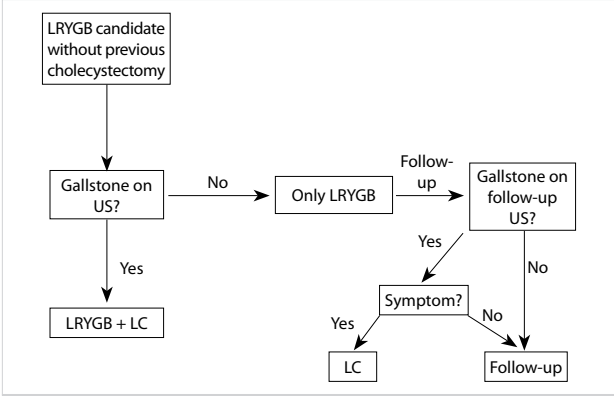

Figure 1. Flow-chart in obesity and gallstones

LC: laparoscopic cholecystectomy; LRYGB: laparoscopic Roux-en-Y gastric by-pass; US: ultrasonography

DISCUSSION

Obesity is becoming increasingly common in our country as in the rest of the world. In addition to increased frequency of various other diseases, obese patients have increased frequency of gallstones compared to the normal population (21-33%). The increase in the secretion of cholesterol by the liver and the reduced contractility of the gallbladder due to the increased cholesterol concentration without a proportional increase in phospholipids and bile salts play an important role in the formation of gallstones (12-14).

The surgical treatment of obesity not only provides weight loss but also significant improvement in co-morbid diseases (15). However, after surgery, especially after RYGB, gallstone formation also increases due to diet and rapid weight loss. This appears to be especially due to hepatic supersaturation of bile with cholesterol, gallbladder stasis, and increased concentration of mucin within bile (5).

The incidence of gallstones in morbidly obese patients varies between 21-33% and about 50% of them undergo cholecystectomy prior to bariatric surgery (6, 7, 16-19). In our patient group, gallstones were present in 14 of 60 patients (23.3%), and eight of them (57.1%) had undergone cholecystectomy previously.

No significant difference was found between patients who developed gallstones versus who did not after LRYGB, in terms of age, gender or new BMI. Although it is stated that the demographic characteristics do not effect gallstone formation (3), there are studies indicating that there is a significant increase in gallstone formation in women after RYGB as compared to men (20).

According to the literature, the risk of gallstones and/or the risk of symptomatic gallstone disease after bariatric surgery vary. In a population-based study conducted in Sweden, it was found that the risk of gallstone disease and cholecystitis after bariatric surgery is 5.5 times higher than the general population (4). Iglezias Brando de Oliviera et al. (3) have reported the incidence of gallstones after RYGB as 52.8%. Patel et al. (21) stated the rate of symptomatic gallstone disease requir-

ing surgery after LRYGB as 6%. In our study, the incidence of gallstone disease after LRYGB was 21.7%, and the incidence of symptomatic gallstone disease was 10.9%. Out of 5 symptomatic patients, one developed acute pancreatitis, and two experienced acute cholecystitis. In the other two cases, there were biliary colic symptoms. All symptomatic patients underwent laparoscopic cholecystectomy.

The risk of developing gallstones during weight loss after bariatric surgery is increased. The risk is at the maximum level during rapid weight loss and around 24 months, and decreases to a minimum once the weight has stabilized (22). Our results were also consistent with the literature, gallstones were mainly identified within the first 24 months.

Ursodeoxycholic acid is a bile acid that reduces cholesterol saturation of bile by reducing cholesterol secretion. It also acts by decreasing the biliary nidus forming factors by reduction of glycoprotein secretion and dissolution of gallstones (11). A meta-analysis concluded that the daily administration of 500 mg UDCA is an effective method of preventing gallstone formation after bariatric surgery (11). A meta-analysis focusing on the side effects of UDCA treatment after bariatric surgery has not been published so far. However, it is stated that mild to moderate side effects are observed in most of the patients who use UDCA (22-24). UDCA was applied in the last three patients after LRYGB in our study and none developed gallstones. There were no side effects. However, it is not possible to make a conclusion due to the limited number of patients and the short follow-up period of these last patients.

Management of gallstone disease in these patients is still controversial and several therapeutic modalities are being used. These are performing cholecystectomy simultaneously with gastric bypass regardless of the presence of gallstones (prophylactic approach) (6-8), performing simultaneous cholecystectomy in all patients with gallstones (elective or selective approach) (9, 10), performing simultaneous cholecystectomy in patients with symptomatic gallstones, and methods in which prophylactic UDCA therapy was initiated or not until development of symptoms (conventional approach) (5, 11). The selective approach was preferred in our study.

The limitations of our study are the retrospective design of the study, the insufficient number of patients treated with UDCA, the short follow-up period, the limited number of total patients and lack of its being a randomized controlled study.

CONCLUSION

Since only a very small portion of patients develop symptomatic gallstones after gastric bypass, we recommend a selective and conventional approach together with ursodeoxycholic acid treatment rather than a prophylactic approach. Prospective randomized controlled studies in larger series are required to support these results.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Tepecik Training and Research Hospital.

Informed Consent: There is not the patient's consent because of this study was restrospective, any personal information and document were shared.

Peer-review: Externally peer-reviewed.

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