

Review Article

Bariatric Surgery and Gallstone Problems

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Abstract

The incidence of obesity has been increasing day after day, worldwide. Hence bariatric surgery has recently become one of the most common treatment modality in maintaining long-term weight reduction and improving obesity-related conditions. Gallstones and bariatric surgery is an important issue because both obesity and bariatric surgery resulting with rapid weight loss are risk factors for the formation of gallstones. It can cause acute cholecystitis and acute pancreatitis. There are some contradictions about diagnosis, treatment and preventing of gallstones in obese patients who undergo bariatric surgery. In our article, we have discussed usage of routine ultrasonography in perioperative period, timing of cholecystectomy and preventing cholelithiasis after bariatric surgery in company with literature.

INTRODUCTION

The worldwide prevalence of obesity has been increasing day after day. Obesity is related with many chronic diseases such as hypertension, type 2 diabetes, dyslipidemia, cardiovascular diseases, sleep apnea etc. Other modalities for weight reduction (diet, exercise etc.) usually result in regaining weight differently from bariatric surgery. Obesity related morbidities both shorten life time and cost expensive. Bariatric surgery has recently become one of the most common treatment modality in maintaining long-term weight reduction and improving obesity-related conditions. Hence bariatric surgery is a cost-effective treatment modality [1-3].

Gallstone diseases are closely related to obesity and this topic is very important due to increase risk of acute cholecystitis and acute pancreatitis. Acute pancreatitis is very serious situation which can be fatal. Kumarevel et al., reported a 50-fold higher risk of acute pancreatitis after bariatric surgery [4]. The incidence of cholelithiasis ranges from 2% to 15%. Obesity, female gender, age more than 40 years, and white ethnicity increase the incidence of cholelithiasis. Other risk factors are rapid weight gain or weight loss (as seen after bariatric surgery), pregnancy, use of oral contraceptives, estrogen replacement therapy, diabetes, and family history [5,6]. While the risk of gallstone formation increases 8-fold in patients with BMI >40 kg/m² [7], it also increases 5-fold in patients who underwent bariatric surgery compared with normal population [8]. Bariatric surgery causes rapid weight loss and multiple physiologic factors actively affect the occurrence of gallstones. Hyper saturation of bile with cholesterol, raised mucin production and hypomotility of gallbladder contribute to gallstone formation [9,10]. Division of hepatic branch of the vagus nerve causes gallstone formation as well [10].

INCIDENCE OF CHOLELITHIASIS IN BARIATRIC SURGERY PATIENTS

Theoretically, cholelithiasis expected to be less common after laparoscopic sleeve gastrectomy (LSG) or laparoscopic gastric banding (LGB) than laparoscopic Roux-en-Y gastric bypass (LRYGB), because the nutrients continue to follow the normal gastrointestinal tractus [11,12]. Nevertheless, Li et al., reported no difference in gallstone formation between LSG and LRYGB [11]. Likewise, the highest frequency of cholelithiasis was reported as 71% in patients who underwent LRYGB [13]. Controversially, only 3-16 % of these patients turn into symptomatic cases [14-16].

Melmer et al., observed 109 patients who underwent bariatric surgery (gastric banding, gastric bypass, or sleeve gastrectomy) over 10 years and gallstone formation after surgery was detected as 17.4% and it was detected more frequent in gastric bypass and sleeve groups (42.9%) than gastric banding group (16.3%). This result was correlated with the amount of weight loss. They also reported that need for cholecystectomy was higher in bypass and sleeve group [17]. Similarly, in a retrospective analyze of 937 patients who underwent bariatric surgery, symptomatic cholelithiasis rates were similar in LRYGB and LSG and much higher than gastric banding. There was no detected gallstone formation in the gastric banding group 24 months after surgery because of slow and less weight loss [18]. In another retrospective analyze of 1397 bariatric surgery patients (32-month mean follow-up), the incidence of post-bariatric surgery development of cholelithiasis was 10.53 % (8.42 % for LSG, 13.4% for LRYGB, and 12.7 % for mini gastric bypass) and the highest incidence of symptomatic cholelithiasis requiring surgery was detected in LRYGB group (4.54%) [15]. The incidence of choledocholithiasis

after bariatric surgery was also reported from 0.7% to 2.09% [15,16]. The question of "which bariatric procedure increases the cholelithiasis and/or choledocholithiasis risk more?" was analyzed in literature and Coupaye et al., reported that main component leading to gallstone formation was rapid weight loss especially in the first 6 months rather than operation type [17]. On the other hand, Manatsathit et al., reported that gallstone formation was not associated with amount of weight loss both during the early or late postoperative period [18].

Thus, there are many contradictory findings about the incidence and what should be done for gallstone disease during and after bariatric surgery. There are following three questions about the bariatric surgery and gallstones.

1. Should we practice routinely ultrasound (US) in perioperative period?
2. If we diagnosed cholelithiasis preoperatively what will we do? Cholecystectomy or not?
3. Should we use any drug preventing gallstone formation after surgery?

USE OF PERIOPERATIVE US

Li et al., reported weight loss more than 25% of original weight was main and only postoperative factor that can help selecting patients for postoperative ultrasound surveillance. They also defined the overall rate of symptomatic gallstone formation was 7.8% and mean time for its development was 10.2 months. Therefore they advised the timing of routine US as first 24 months in patients who have weight loss more than 25% of original weight [12]. Almazeedi et al., routinely performed abdominal ultrasound before LSG in their study including 747 patients. The gallstone incidence was found as 11.1% and this data did not correlated with degree of obesity. They reported that preoperative US did not alter the course of operation and they suggested that US should be applied to only symptomatic patients [19].

According to the actual clinic practice guidelines for the Perioperative Nutritional, Metabolic, and Nonsurgical Support of the Bariatric Surgery Patient (2013 update, American Association of Clinical Endocrinologists, The Obesity Society, and American Society for Metabolic & Bariatric Surgery), hepatobiliary ultrasound is not recommended as a routine screen for liver disease but this knowledge has grade-C evidence level. If the patient complains symptomatic biliary disease and his/her blood analysis reveal elevated liver function tests (2-3 times the upper limit of normal) abdominal US is indicated (evidence level: grade D) In postoperative period, if the patient has right upper quadrant pain, ultrasound should be performed for evaluation of cholecystitis (evidence level: grade D) [20].

CONCOMITANT CHOLECYSTECTOMY OR NOT?

When we look at the history of bariatric surgery, concomitant cholecystectomy during open bariatric surgery was a common practice at the beginning. The rate of concomitant cholecystectomy has decreased with the development of laparoscopic surgery and most surgeons abstained from concomitant cholecystectomy [21,22].

Some authors mentioned that gallstone formation was more frequent after gastric bypass [11-13,15,17]. Wudel et al., also reported this rate as high as 71%. Because of these high rates, concomitant cholecystectomy was suggested in patients who performed LRYGB [13]. Tucker et al., also suggested concomitant cholecystectomy at LRYGB for only ultrasonography-confirmed gallbladder pathology at preoperative or intraoperative period and they also reported this surgery is feasible and safe [23]. Especially after bypass surgery, it could be hard to perform cholecystectomy or other procedures like ERCP, due to altered gastrointestinal tract. Today, there is no consensus on the management of the gallbladder at the time of bariatric surgery. Some authors avoid concomitant cholecystectomy due to probability of postoperative complications and long hospitalization [7]. Controversially, some also reported decreasing rate of postoperative complications and hospitalization time after concomitant cholecystectomy in patients with bypass surgery [24].

The effects of age, gender and preoperative BMI on postoperative gallstone formation analyzed in literature and no relationship was found [25,26]. Chang et al., also reported that excess weight loss (EWL)% was not a predictive factor for postoperative complications. They also identified that elder age was an independent predictive factor on the biliary complications [27]. D'Hondt et al., reported that EWL during first 3 months post-LRYGB more than 50% as the sole significant independent predictor of delayed symptomatic cholelithiasis and they did not recommend concomitant cholecystectomy [28].

Three bariatric procedures (LRYGB, LSG, LGB) evaluated in terms of cholecystectomy rates in a prospective study and 109 (7.8%) patients of 1398 patients underwent cholecystectomy with a median follow-up 49 months. The highest cholecystectomy rate was found in LRYGB group (10.6%) and the frequency was highest within the first 6 months (3.7%). They also emphasized that EWL >25% within the first 3 months was strongest predictor of cholecystectomy after bariatric surgery [29]. Worni et al., analyzed retrospectively 70,287 adults undergoing LRYGB bypass patients' data and due to increased postoperative complications, reinterventions, mortality, and longer hospital stay, they did not suggest concomitant cholecystectomy [30].

Consequently, according to the actual clinic practice guidelines, prophylactic cholecystectomy may be considered with RYGB to prevent gallbladder complications (Evidence level: Grade B) [20].

DRUGS USE IN PREVENTION OF GALLSTONES

Ursodeoxycholic acid (UDCA) is generally used to dissolve gallstones in patients who don't want surgery. It is indicated also in patients at high risk for cholecystectomy. UDCA is a bile acid and normally it is produced by the body that is stored in the gallbladder. It decreases the production of cholesterol and increases dissolving cholesterol in bile. Thus, it prevents gallstone formation [31].

In literature, UDCA use has been supported after bariatric surgery, especially after gastric bypass, for preventing gallstone formation [32,33]. On the other hand, some authors did not recommend using due to high cost [34] and several side effects such as diarrhea, skin rash, and aggravation of previous liver

diseases [35].

Abdallah et al., investigated that the influence of the UDCA in the prevention of cholelithiasis after LSG and they reported that UDCA reduced the incidence of the cholelithiasis after LSG. They also realized that dyslipidemia and rapid EWL caused to the tendency of gallstone formation 3 months after LSG [35]. Miller et al., reported that daily oral administration of UCDA for 6 months was associated with a decreased rate of gallstone formation after restrictive bariatric procedures as well [36]. The UDCA dosage and duration of use was suggested as 300 mg twice a day for the first 6 months after bariatric surgery [7].

CONCLUSION

Bariatric surgery has been proved as most effective treatment of obesity and related comorbidities. The rapid weight loss after bariatric surgery is the most important predisposing cause for gallstones formation. These can cause serious problems such as acute cholecystitis, choledocholithiasis and pancreatitis. Clinicians should be cautious in terms of cholelithiasis in patients with complaints of abdominal pain during the post-operative follow-up period. In such a case, the abdominal ultrasound should definitely confirm. In our own practice, we don't perform routine US preoperatively and postoperatively if the patient has no abdominal complaints. If there is a problem with gallbladder in patient's history, we recommend concomitant cholecystectomy in this case. We determine the duration of postoperative UDCA use according to the preoperative BMI of the patient. UDCA is recommended as 300 mg twice a day for 3 months in patients with BMI less than 40 kg/m², for 4 months in patients with BMI between 40- 50 kg/m², and for 6 months in patients with BMI greater than 50 kg/m².

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