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ORIGINAL RESEARCH

Assessment of cholelithiasis development after bariatric surgery

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Abstract

Background: Obesity is one of the leading global health burdens and it is associated with additional complications and diseases. The present study assessed cholelithiasis development after bariatric surgery.

Materials & Methods: 60 patients undergoing Bariatric surgery at Department of Surgical Gastroenterology at MOHAK Bariatrics & Robotics, Sri Aurobindo Medical College and P.G. Institutem>18 years to <60 years age group of either sex and patient who are admitted for bariatric surgery due to morbid obesity. Were included and parameters such as weight, height, body mass index (BMI), educational level, smoking status, low-density lipoprotein (LDL), high-density lipoprotein (HDL), total triglycerides (Trig), total bilirubin (TBili) and comorbidities such as diabetes mellitus (DM), hypertension (HTN), dyslipidemia (DLP) were recorded.

Results: Authors found that a strong correlation between the amount of weight loss following bariatric surgery and the incidence of cholelithiasis. High BMI preoperatively and rapid weight loss over a short period increase the risk of developing cholelithiasis post-operatively.

Conclusion: Authors found that a strong correlation between the amount of weight loss following bariatric surgery and the incidence of cholelithiasis. High BMI preoperatively and rapid weight loss over a short period increase the risk of developing cholelithiasis post-operatively.

Key words: bariatric surgery, cholelithiasis, weight loss

Introduction

Obesity is one of the leading global health burdens and it is associated with additional complications and diseases, highlighting the ever-growing need for effective solutions to obesity. Many morbidly obese individuals undergo bariatric surgery after repeatedly failed trials of diet and physical activity. Bariatric surgery is used to promote weight loss by restricting the amount of food that can be held in the stomach.[1]

Gallbladder disorders are the most common surgical diseases in general surgery. Cholecystitis is considered the most common type of gallbladder disease.[2] The most common cause of cholecystitis is cholelithiasis, which is the development of gallstones. Various factors may contribute to gallstone formation. Aging is considered a risk factor among all ethnic groups. Females are at greater risk of developing cholelithiasis, with a female-to-male ratio of approximately 2.1:1 in the United States and in Europe. However, the risk and type of stones in females vary between ethnicities. Furthermore, females are at greater risk of

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requiring surgical intervention.[3] Obesity is also a risk factor for gallstone formation, which may be secondary to increased cholesterol secretion by the liver. Paradoxically, bariatric patients are prone to gallstone formation, with an alarming overall postoperative risk of 30%–53%. One of the established risk factors for cholelithiasis is rapid weight loss, which is an expected outcome of bariatric surgery.[4] It is of note that even less extreme weight loss, as through dieting, also poses a risk of developing gallstones. Other risk factors include an age of 40 years or older, Caucasian ethnicity, pregnancy, the use of oral contraceptive pills (OCP) or estrogen replacement therapy, diabetes mellitus, and a family history of gallstones.[5] The present study assessed cholelithiasis development after bariatric surgery.

Materials & Methods

The present study comprised of 60 patients undergoing Bariatric surgery at Department of Surgical Gastroenterology at MOHAK Bariatrics & Robotics, Sri AurobindoMedical College and P.G. Institute, Indore between 1STApril 2021 to 30TH September 2022 (18 months).
Inclusion criteria was patient >18 years to <60 years age group of either sex and patient who are admitted for bariatric surgery due to morbid obesity. Exclusion criteria was patients who refused to undergo study and deny for consent and patient who had cholelithiasis before surgery, history of cholecystectomy, and history of previous bariatric surgery.
Demographic data was recorded. Other parameters such as weight, height, body mass index (BMI), educational level, smoking status, low-density lipoprotein (LDL), high-density lipoprotein (HDL), total triglycerides (Trig), total bilirubin (TBili) and comorbidities such as diabetes mellitus (DM), hypertension (HTN), dyslipidemia (DLP) were recorded. Results were statistically analyzed. P value less than 0.05 was considered significant (P< 0.05).

Results

Table I Distribution of patients

Total- 50		
Gender	**Male**	**Female**
Number	28	22

Table I shows that out of 50 patients, males were 28 and females were 22.

Table II Assessment of parameters

Parameters	Variables	Number	P value
Co-morbidities	DM	21	0.16
	Dyslipidemia	17	
	Thyroid disorder	8	
Cholelithiasis	USG W/A (PRE-OP)	14	0.05
	USG W/A (POST-OP)	26	
BMI	Pre- op	46.8	0.02
	At the time of diagnosis	37.07	
TYPE OF SURGERY	LAP SLEEVGASTRECTOMY	21	0.04
	ROB MINI GASTRIC BYPASS	2	
	ROBOT ASSISTED SILS SLEEVE GASTRECTOMY	1	
	ROBOTIC ASSISTED LAP SLEEVE GASTRECTOMY	1	
	ROBOT ASSISTED LAP ONE ANASTOMOSIS GASTRIC BYPASS	1	
	ROB.ASSISTED LAP OAGB	1	
	LAP MINI GASTRIC BYPASS	4	

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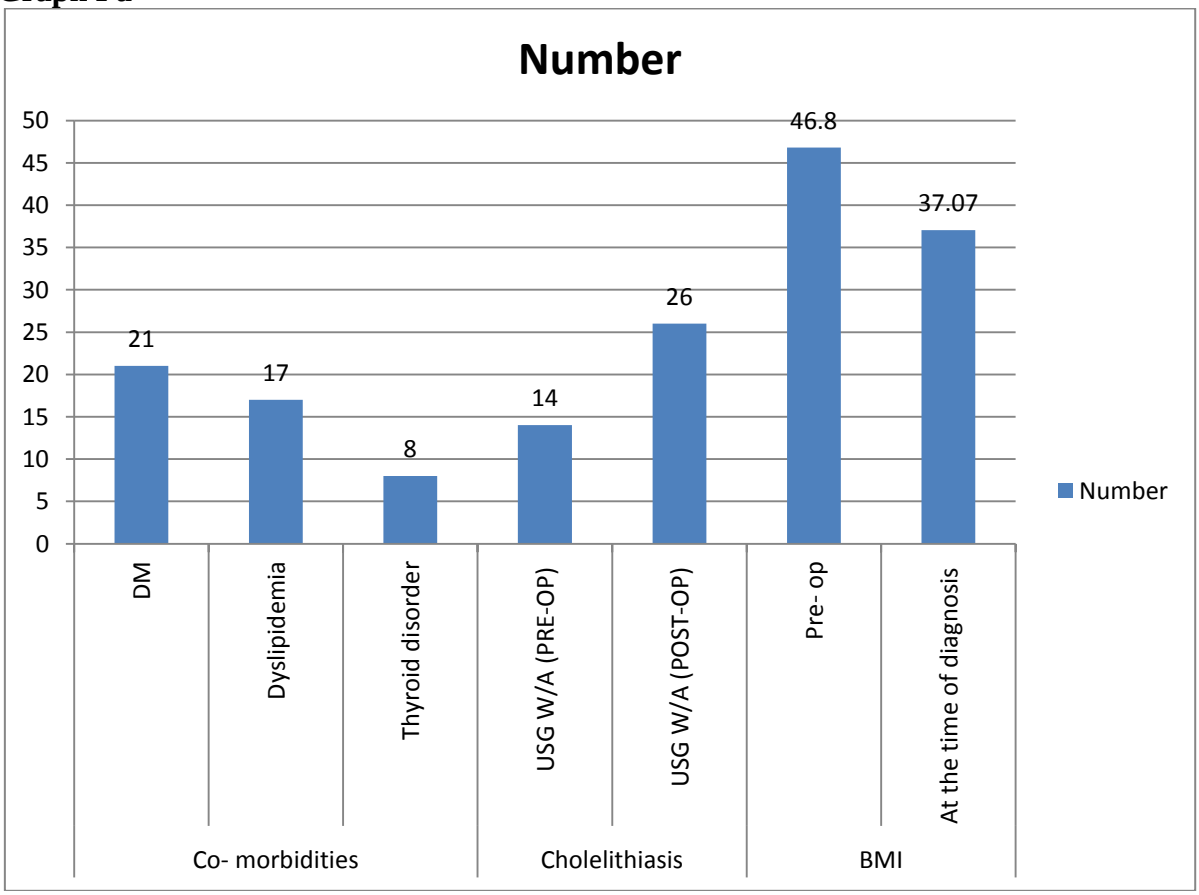
	ENDOSCOPIC SLEEVE GASTRECTOMY	2	
	4K LAP MINI GASTRIC BYPASS	1	
	4K OAGB	1	
	4K LAP.OAGB	1	
	LAP BANDED OAGB	1	
	3D LAP BANDED OAGB	1	
	LAP OAGB	4	
	LAP RYGB	3	
	LAP SILS SLEEVE GASTRECTOMY	5	

Table II, graph Ia, b shows that co- morbidities were diabetes mellitus in 21, dyslipidemia in 17 and thyroid disorder in 8 patients. USG W/A (PRE-OP) cholelithiasis was seen in 14 and USG W/A (POST-OP) in 26, Pre- op BMI was 46.8 kg/m^2 and at the time of diagnosis was 37.07 kg/m^2. Type of surgery were lap sleevgastrectomy in 21, robotic mini gastric bypass in 2, robotic assisted SILS sleeve gastrectomy in 1, robotic assisted lap sleeve gastrectomy in 1, robot assisted lap one anastomosis gastric bypass in 1, robot assisted lap OAGB in 1, lap mini gastric bypass in 4, endoscopic sleeve gastrectomy in 2, 4k lap mini gastric bypass in 1, 4K OAGB in 1, 4K lap OAGB in 1, banded OAGB in 1, 3D lap banded OAGB in 1, lap OAGB in 4, lap RYGB in 3 and lap sils sleeve gastrectomy in 5 cases. The difference was significant (P< 0.05).

Graph I a



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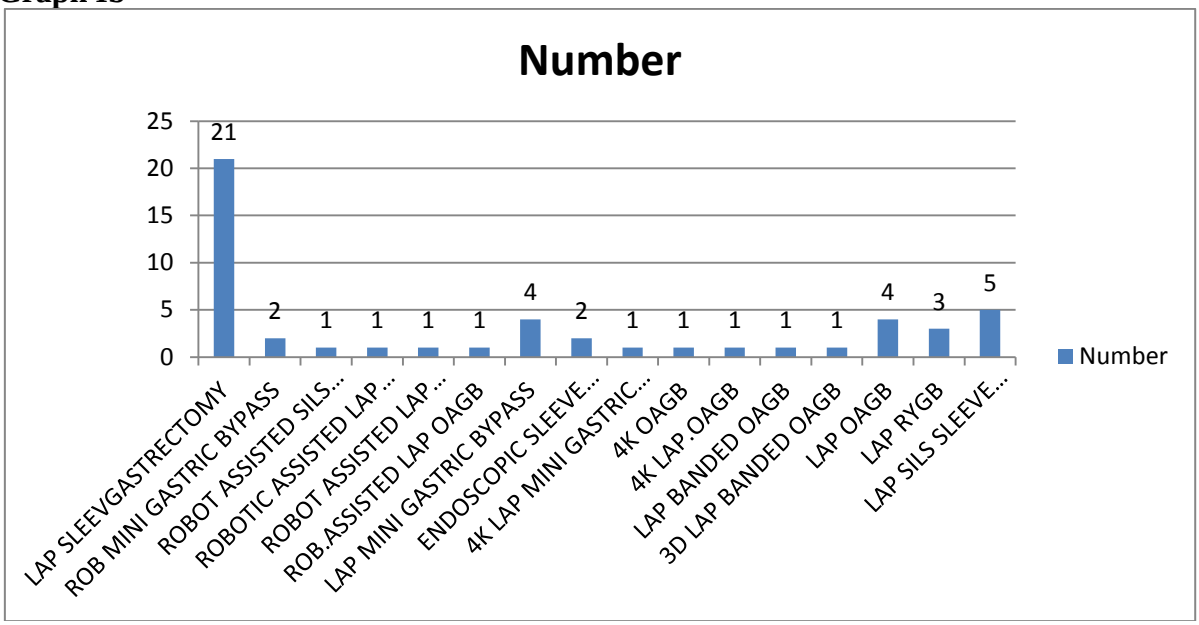
Graph Ib



Discussion

Cholelithiasis is a well-known complication induced by bariatric surgery mainly during the first year after surgery.[6] Since the rate and extent of weight loss have been found to be major predictors of cholelithiasis formation and consequent cholecystectomy, the incidence is higher among patients receiving RYGB than SG or LAGB.[7] Reported postoperative biliary complication rate requiring cholecystectomy is 0.9~7.5% after laparoscopic sleeve gastrectomy and 6– 50% after laparoscopic gastric bypass.[8] Moreover, because of the anatomical changes after gastric bypass, the biliary tree may be endoscopically inaccessible, and surgery may be needed to have successful clearance of the biliary tree.[9] Therefore, some surgeons recommend performing concomitant cholecystectomy for patients who undergo bariatric surgery.[10]The present study assessed cholelithiasis development after bariatric surgery.

We found that out of 50 patients, males were 28 and females were 22. Sneineh et al[11]evaluated 580 patients with an average follow-up of 12 months. Twenty-one patients were excluded because of missing data. Mean age was 48 ± 19 years (78% females). Twenty-nine patients (5%) underwent laparoscopic cholecystectomy (LC) before the bariatric surgery, and 58 patients (10%) performed concomitant LC with the bariatric procedure due to symptomatic gallstone disease (including stones, sludge, and polyps). There were 203 laparoscopic sleeve gastrectomy (SG) (35%), 175 laparoscopic gastric band (LAGB) (30%), 55 Roux-en-Y gastric bypass (RYGB) (9.5%), and 147 (25%) mini gastric bypass (MGB) procedures during the study period. At the follow-up period, 36 patients (6.2%) developed symptomatic cholelithiasis, while the most common clinical presentation was biliary colic. There was a significant difference between the type of the bariatric procedure and the incidence of symptomatic cholelithiasis after the operation. The incidence of symptomatic gallstone formation in patients who underwent RYGB was 14.5%. This was significantly higher comparing to 4.4% following SG, 4.1% following LAGB, and 7.5% following MGB ($p = 0.04$). Previous bariatric surgery was a risk factor for gallstone formation and cholecystectomy, 13/82 patients (15.8%) compared to 23/492 patients (4.6%) among those without previous bariatric operation.

We found that co- morbidities were diabetes mellitus in 21, dyslipidemia in 17 and thyroid disorders in 8 patients. USG W/A (PRE-OP) cholelithiasis was seen in 14 and USG W/A

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(POST-OP) in 26, Pre- op BMI was 46.8 kg/m^2 and at the time of diagnosis was 37.07 kg/m^2. Type of surgery were lap sleevgastrectomy in 21, robotic mini gastric bypass in 2, robotic assisted SILS sleeve gastrectomy in 1, robotic assisted lap sleeve gastrectomy in 1, robot assisted lap one anastomosis gastric bypass in 1, robot assisted lap OAGB in 1, lap mini gastric bypass in 4, endoscopic sleeve gastrectomy in 2, 4k lap mini gastric bypass in 1, 4K OAGB in 1, 4K lap OAGB in 1, banded OAGB in 1, 3D lap banded OAGB in 1, lap OAGB in 4, lap RYGB in 3 and lap sils sleeve gastrectomy in 5 cases. estimated the incidence rate of cholelithiasis among the cohort. We also examined the associated risk factors of cholelithiasis development. Results: Aldriweesh et al[12]contained 490 patients (38.7% males; 61.43% females) with a mean age of 36.87 ± 11.44 years. Most patients (58.54%) were followed up for 12 months. The incidence of cholelithiasis post-operation was 6.53% (n = 32). The average period of cholelithiasis formation was 12–24 months. The percentage of total weight loss (TWL%) was significantly associated with the development of cholelithiasis post-operatively

Alsaif et al[13] found that gender was not associated with cholelithiasis after bariatric surgeries. However, others have shown that gender is a statistically significant risk factor for cholelithiasis development. Besides gender, age is a known risk factor; one study observed a higher mean age in patients who developed cholelithiasis.

Conclusion

Authors found that a strong correlation between the amount of weight loss following bariatric surgery and the incidence of cholelithiasis. High BMI preoperatively and rapid weight loss over a short period increase the risk of developing cholelithiasis post-operatively.

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