Acta Scientific Gastrointestinal Disorders (ISSN: 2582-1091)

Volume 5 Issue 10 October 2022

Research Article

Laparoscopic Sleeve Gastrectomy in Patients with Steatohepatitis-related Cirrhosis

Filho Ozimo Pereira Gama, Melo Edgard Barboza de*, Melo Júlia Farias de, Carvalho Mateus Balbino Barbosa de

Department of Medicine, Federal University of Maranhão, São Luís, MA, Brazil

***Corresponding Author:** Melo Edgard Barboza de, Department of Medicine, Federal University of Maranhão, São Luís, MA, Brazil.

DOI: 10.31080/ASGIS.2022.05.0485

Received: September 12, 2022

Published: September 22, 2022

Abstract

Laparoscopic sleeve gastrectomy (LSG) is a validated procedure for the surgical treatment of morbid obesity. The aim of this study was to evaluate the morbidity related to sleeve gastrectomy (LSG) performed in obese and cirrhotic patients compared to obese and non-cirrhotic patients. The study included all patients with cirrhosis who underwent LSG to treat associated morbid obesity in the period from January 2010 to January 2019 of the CNPQ Research Group linked to the Federal University of Maranhão. It had approximately 200 patients divided into the groups LSG Cirrhosis positive (+) and LSG Cirrhosis negative (-). The present study had as a result that the etiology of cirrhosis was related to non-alcoholic steatohepatitis in 100% of the cases, besides comparisons of the two groups in question. It was concluded which cases can be performed LSG, but also its perioperative risks in the situations of the patient presenting or not cirrhosis related to steatohepatitis..

Keywords: Liver Cirrhosis; Gastrectomy; Non-alcoholic Fatty Liver Disease

Abbreviations

LSG: Laparoscopic Sleeve Gastrectomy; GERD: Gastroesophageal Reflux Disease; BMI: Body Mass Index; AST: Aspartate Aminotransferase; SSI: Surgical Site Infection

Introduction

Obesity has progressively been implicated as one of the greatest public health challenges of our time [1], due to the increasing prevalence rates, including the pediatric public, but also due to its chronic inflammatory character, which predisposes to a higher risk to many diseases, especially in the cardiovascular spectrum [2].

About 2 billion adults and 40 million children are overweight [3], a reality that reflects the contemporary lifestyle, marked by sedentarism [4] and high calorie food from ultra-processed sources [5]. Obesity is a global concern due to the multiple deleterious effects to the individual, reducing his quality of life and predisposing to several comorbidities due to its pro-inflammatory influence, among them: metabolic syndrome [6], including arterial hypertension, diabetes mellitus, hyperlipidemia, fatty liver disease; heart diseases [7] and cancer [8]. Considering the mechanical effects of weight gain in obesity, these individuals are also susceptible to obstructive sleep apnea [9] and gastroesophageal reflux [10], in addition to other pathologies.

In view of this, bariatric surgery is an important therapeutic option for obese patients, especially in occasions that are refractory to conservative treatment. Sleeve gastrectomy is one of the modalities of bariatric surgery and consists in reducing the gastric volume by stapling the stomach body along the greater curvature of the organ. At the end of this procedure, the stomach presents with the appearance of a tube, without, however, modifying the intestinal transit [11]. This surgical modality has proven to be effective and is currently the most performed worldwide [12].

Obesity has also been implicated as a major cause for chronic liver disease that can progress to cirrhosis [13]. In recent decades, obesity has directly affected the liver health of a large population [14], as it is largely responsible for the growing epidemics of non-alcoholic fatty liver disease (NAFLD) [15]. This pathology increases the risk for the development of cirrhosis, in addition to other complications to the organ, such as liver failure and hepatocellular carcinoma [16]. Patients with obesity have an increased risk of primary hepatic malignancies. In addition, high body mass index is a predictor of liver cirrhosis decompensation, which proves the close relationship between obesity and liver injury [13].

Liver cirrhosis arises as a possible future complication, being the final pathological outcome of several chronic liver diseases in addition to fatty disease [17]. Its development occurs after a long period of inflammation that results in the replacement of healthy liver parenchyma by fibrous tissue. The disease evolves from an asymptomatic phase (compensated disease), to a phase with symptoms (decompensated cirrhosis), of which often results in hospitalization, impaired quality of life, and high mortality [18].

Thus, cirrhosis has become a major public health problem and a significant cause of morbidity and mortality [19]. It is the 13th most common cause of mortality worldwide [20], causing more than one million deaths each year [21].

Therefore, this study aimed to evaluate the correlation and impacts of bariatric surgery in obese patients previously cirrhotic Child A due to hepatic steatosis.

Materials and Methods

CNPQ Research Group study linked to the Federal University of Maranhão and approved by the ethics committee (22264313.0.0000.506). The inclusion criteria of patients for the research were: previous diagnosis of liver cirrhosis due to fatty disease by ultrasonographic and laboratory evaluation and postoperative pathological confirmation and obesity with surgical indication by the parameters of the Brazilian Society of Bariatric and Metabolic Surgery, undergoing laparoscopic vertical gastrectomy between January 2010 and January 2019. Exclusion criteria included: previous cholecystectomy, history of alcoholism (intake greater than 140 g/week), confirmed serology for hepatitis types B or C, other metabolic liver diseases, use of hepatotoxic medications. The total number of patients selected was ten (LSG Cirrhosis+ Group), which were matched in terms of preoperative data (age, sex, body mass index, and comorbidities) on a 1:2 non-cirrhotic patient basis (LSG Cirrhosis- Group) from a cohort of approximately 200 bariatric patients. The primary outcome assessed was the overall morbidity and mortality rate, and the secondary outcomes were operation time, gastric fistula, bleeding rates, and weight loss over a 24-month period. The software used for the statistical analysis was STATA and the interpretation of the results was done by calculating the p-value in order to determine the relevance or not of the data collected by the research.

Results and Discussion

The group of patients with cirrhosis, group 1, had a mean age of 42.8 ± 8.8 (22-63) years, compared to the mean of 44.7 ± 9.5 (24-61) of non-cirrhotic patients, group 2 ($p = 0.98$). As for the initial BMI, group 1 corresponded to the mean of 42 ± 7 (35-57), and group 2 of 41 ± 9 (37-55), with $p = 0.96$. Regarding gender, 9 of the 10 patients in the first group were women, for a proportion of 17 of the 20 patients in the non-cirrhotic group ($p = 0.054$ in the intergroup analysis).

Regarding the clinical profile of the patients, the presence of associated comorbidities in the preoperative period and their evolution in the postoperative period of 18 months were evaluated. Group 1 had two patients with Gastroesophageal Reflux Disease (GERD) and, postoperatively, five ($p = 0.03$). In group 2, there was no previous GERD, affecting two patients in the postoperative period ($p = 0.2$). Regarding the presence of hiatal hernia, in group 1, there was one patient with the alteration and none in the postoperative period; in group 2, one patient in the pre-op and none in the post ($p = 0.34$). On blood pressure levels, in group 1 there were eight patients with Systemic Arterial Hypertension and none in the post-op; in group 2, fifteen in the pre-op and one in the post-op ($p = 0.16$). Regarding the metabolic aspect, in group 1, there were three diabetic patients and two dyslipidemic patients in the pre-op and none in the post; whereas in group 2, there were six diabetics and five dyslipidemics in the pre-op for one diabetic ($p = 0.5$) and no dyslipidemic ($p = 0.16$) in the post.

In the evaluation of arthropathies, in group 1, there were nine patients affected for one in the post-op; in group 2, eleven patients in the pre-to-one post ($p = 0.16$). Regarding sleep disorders, in group 1, there were nine with Obstructive Sleep Apnea Syndrome for three in the post-op; in group 2, three in the pre-op to one in the post-op ($p = 0.26$).

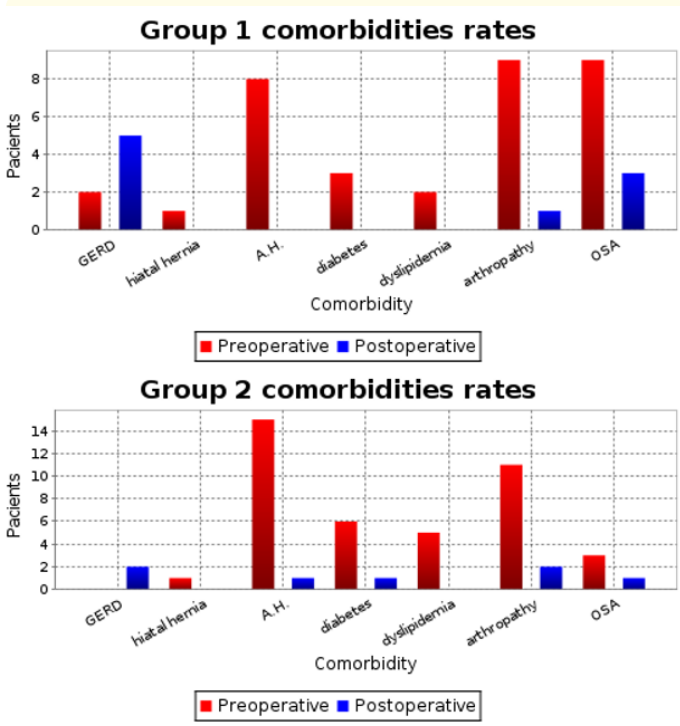

Figure 1

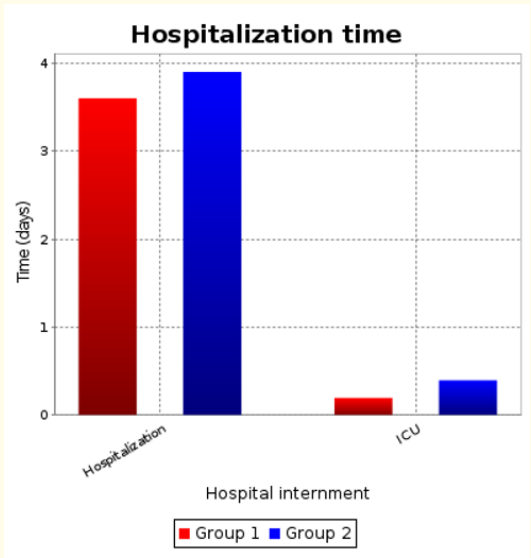

Figure 2

Regarding the duration of the surgery, patients with cirrhosis had an average time, in minutes, of 87 ± 65.59. The procedure in non-cirrhotic, on the other hand, lasted 72 ± 78.44 (p = 0.79). Regarding the hospitalization process, group 1 remained hospitalized for 3.6 ± 1.57 days. The second group, 3.9 ± 2.18 days (p = 0.97). For those who needed intensive treatment, the cirrhotic group remained 0.2 ± 0.63 days in the ICU, while non-cirrhotic patients, 0.4 ± 0.96 days (p = 0.27).

Three factors were considered to evaluate early surgical complications (up to 30 days), no cases of atelectasis, nausea and vomiting, deep vein thrombosis and embolism were observed. The presence of fistulas was observed in 1 of the 10 cirrhotic patients (10%) and in none of the 20 non-cirrhotic patients (0%). The absolute value of hemorrhages was the same in both groups, with a total of 1 picture of hemorrhage in patients with the disease and 1 picture in non-carriers, corresponding to a percentage of 10% and 5%, respectively. In the evaluation of Surgical Site Infection, group 1 presented only 1 case (10%), while group 2 had a percentage of SSI equal to 15%, corresponding to 3 patients. In all three factors for the evaluation of early post-surgical complications, only SSI presented an exact Fisher test with $p<0.05$, thus being the only statistically relevant variable.

In so that postoperative weight loss could be evaluated, body mass index (BMI) was calculated before and after the procedure, having been followed up after 6, 12 and 24 months of surgery. The initial BMI in group 1 was 42 ± 7 (35-57), while that of group 2 was 41 ± 9 (37-55). After 6 months of the procedure, the cirrhotic patients presented an index of 35 ± 5.3, and the non-cirrhotic patients, 36 ± 9.1. After 12 months of LVG, patients with cirrhosis had BMI of 31 ± 5.9, while those who did not have the pathology, 29 ± 8.2. At the end of 24 months, the first group reached a BMI of 25 ± 2.3, and the second group, 26 ± 1.9. Throughout the analysis period, $p > 0.05$.

Finally, to evaluate the presence and evolution of liver cirrhosis in group 1, three types of tests were performed: biochemical, ultrasound and histopathological, in two moments: preoperatively and operatively immediately after bariatric surgery and, later, in

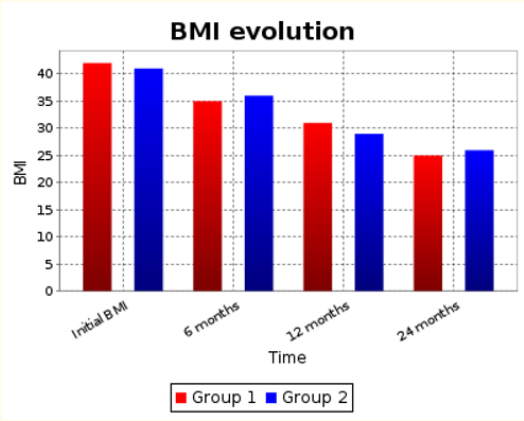

Figure 3

the preoperative and immediate surgery of cholecystectomy. In the biochemical evaluation, the criterion of hepatic steatosis is considered the dosage of aspartate aminotransferase (AST) > 35 g/dl. In the first evaluation, the AST value, in g/dl, was 42 ± 5.6, while in the second was 29 ± 4.9. In the ultrasound test, the degree of steatosis was evaluated by echogenicity of the hepatic parenchyma compared to renal, ranging from zero (normal) to six (fibrosis). The first test presented a value of 3.84 ± 2.12, while the second, 1.44 ± 0.7. In the histopathological evaluation, a significant improvement was observed in all patients.

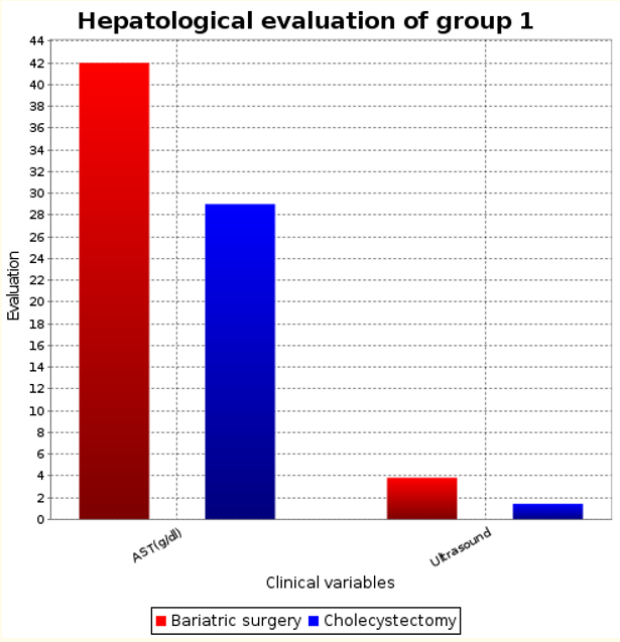

Figure 4

Thus, having concluded the results of the present study, it can be observed that the demographic question did not have significant variations between the groups, but presented data that are in agreement with other analyses, such as the report performed by the World Health Organization in 2000 that showed the epidemiological profile of obesity in America and the Caribbean (United States, Brazil, Barbados, Jamaica and Cuba), wherein there were more women patients than men [22], which is evident when analyzing the patients who underwent bariatric surgery in the present study.

As for associated comorbidities, a pattern is noted in both groups in the pre-surgical and post-surgical profile, wherein, in clinical practice, an improvement in the various clinical manifestations of patients is found. Considering the current diagnostic criteria, there is a reversal or cure of the diseases in almost all patients after bariatric surgery. Attention is drawn only to GERD, which there was an emergence of cases in both groups. This can be explained by the surgical technique to which the patients were submitted, the LSG, because it is known that the structural alterations caused by the operative technique in sleeve gastrectomy present greater impairment of the anti-reflux mechanisms predisposing to the induction of GERD in the postoperative period when compared to the operative technique performed in the Roux-en-Y gastric bypass, for example [23].

Furthermore, it is known that bariatric surgery, especially in cirrhotic patients, is associated with an increased perioperative risk for abdominal and non-abdominal surgery due to multiple risk factors, such as hypoalbuminemia, anemia, malnutrition, coagulation abnormalities, thrombocytopenia, renal failure, susceptibility to infections, and risk of decompensation [24]. It was observed that in the postoperative period the Surgical Site Infection (SSI) draws attention especially in group 2, and may be, along with the general condition of the patient, related to the package of care in order to reduce the risk of SSI. Ferraz., *et al*. [25] proposed a care package that comprised five evidence-based core interventions - smoking cessation, normothermia, glycemic control, timely trichotomy and selection of antibiotic prophylaxis, as well as four additional measures, including preoperative chlorhexidine bath, use of supplemental oxygen, administration of morphine in the spinal space and removal of sterile curative within 48 hours. Studies are lacking to prove the real effectiveness of these care packages, but in this

study, with a multidisciplinary approach, low rates of post-bariatric SSI could be observed.

As for the evaluation of cirrhosis due to steatosis pre-bariatric and post-bariatric, a significant improvement of the parameters used is observed, which indicates a promising approach for the therapy of obese patients with hepatopathy due to steatosis, being in accordance with the literature [26]. Added to this fact, and even recognizing a higher relative risk of these patients to the surgical approach, it was observed that the benefit outweighs the risk, to the extent that there was an improvement of clinical parameters of patients in general and, simultaneously, it was not observed worse postoperative outcomes when compared to non-cirrhotic patients.

Conclusion

Bariatric surgery was presented as a surgical intervention that leads to a successful therapy when comparing the preoperative and postoperative parameters of comorbidities of patients in this study. It is noteworthy that these cirrhotic patients should be evaluated and compensated appropriately, and at the same time, the appropriate surgical technique and modality should be analyzed, since no method is one hundred percent risk-free, since LSG, the most widely used technique in recent years, can lead to postoperative GERD, for example. However, surgery has shown efficacy when performed in patients with well-compensated cirrhosis, typically Child's A, by assessing minimal risks of complications from surgical or hepatic factors, even when compared to non-cirrhotic patients, and healing of steatosis hepatopathy.

Conflict of Interest

There is no conflict of interest in this study.

Bibliography

1. Marques, Emanuele Souza., *et al*. "Effective strategies for prevention, control, and treatment of obesity in primary health care setting for adolescents, adults, and elderly people: A protocol for systematic review and meta-analysis". *Medicine* 97.22 (2018): e10925.

2. Battineni Gopi., *et al*. "Impact of Obesity-Induced Inflammation on Cardiovascular Diseases (CVD)". *International Journal of Molecular Sciences* 22.9 (2021): 4798.

3. Endalifer Melese Linger and Gedefaw Diress. "Epidemiology, Predisposing Factors, Biomarkers, and Prevention Mechanism of Obesity: A Systematic Review". *Journal of Obesity* (2020): 6134362.

4. Guo Chunmei., *et al*. "Association of total sedentary behaviour and television viewing with risk of overweight/obesity, type 2 diabetes and hypertension: A dose-response meta-analysis". *Diabetes Obesity and Metabolism* 22.1 (2020): 79-90.

5. Martí Del Moral Amelia., *et al*. "Consumo de alimentos ultra-procesados y obesidad: una revisión sistemática" Ultra-processed food consumption and obesity-a systematic review". *Nutricion Hospitalaria* 38.1 (2021): 177-185.

6. Kim Jieun., *et al*. "Overweight or obesity in children aged 0 to 6 and the risk of adult metabolic syndrome: A systematic review and meta-analysis". *Journal of Clinical Nursing* 26.23-24 (2017): 3869-3880.

7. Riaz Haris., *et al*. "Association Between Obesity and Cardiovascular Outcomes: A Systematic Review and Meta-analysis of Mendelian Randomization Studies". *JAMA Network Open* 1.7 (2018): e183788.

8. Safaei Mahmood., *et al*. "A systematic literature review on obesity: Understanding the causes and consequences of obesity and reviewing various machine learning approaches used to predict obesity". *Computers in Biology and Medicine* 136 (2021): 104754.

9. Udomittipong Kanokporn., *et al*. "Severe obesity is a risk factor for severe obstructive sleep apnea in obese children". *Journal of the Medical Association of Thailand = Chotmaihet thangphaet* 94.11 (2011): 1346-1351.

10. Eusebi Leonardo H., *et al*. "Global prevalence of, and risk factors for, gastro-oesophageal reflux symptoms: a meta-analysis". *Gut* 67.3 (2018): 430-440.

11. Chung Ann Y., *et al*. "Sleeve Gastrectomy: Surgical Tips". *Journal of Laparoendoscopic and Advanced Surgical Techniques. Part A* 28.8 (2018): 930-937.

12. Arterburn David E., *et al*. "Benefits and Risks of Bariatric Surgery in Adults: A Review". *JAMA* 324.9 (2020): 879-887.

13. Schiavo Luigi., *et al*. "Nutritional issues in patients with obesity and cirrhosis". *World Journal of Gastroenterology* 24.30 (2018): 3330-3346.

14. Berzigotti Annalisa and Juan G Abraldes. "Impact of obesity and insulin-resistance on cirrhosis and portal hypertension". *Gastroenterologia y Hepatologia* 36.8 (2013): 527-533.

15. Machado Mariana V and Helena Cortez-Pinto. "Obesity paradox in cirrhosis: is it real or just an illusion?". *Liver International : Official Journal of the International Association for the Study of the Liver* 36.10 (2016): 1412-1414.

16. Schwabe Robert F., *et al*. "Mechanisms of Fibrosis Development in Nonalcoholic Steatohepatitis". *Gastroenterology* 158.7 (2020): 1913-1928.

17. Zhou Wen-Ce., *et al*. "Pathogenesis of liver cirrhosis". *World Journal of Gastroenterology* 20.23 (2014): 7312-7324.

18. Ginès Pere., *et al*. "Liver cirrhosis". *Lancet (London, England)* 398.10308 (2021): 1359-1376.

19. Stasi Cristina., *et al*. "Epidemiology of Liver Cirrhosis". *Journal of Clinical and Experimental Hepatology* 5.3 (2015): 272.

20. Abbas Naeem., *et al*. "Perioperative Care of Patients With Liver Cirrhosis: A Review". *Health Services Insights* 10 (2017): 117863291769127.

21. Li Bei., *et al*. "Nonalcoholic Fatty Liver Disease Cirrhosis: A Review of Its Epidemiology, Risk Factors, Clinical Presentation, Diagnosis, Management, and Prognosis". *Canadian Journal of Gastroenterology and Hepatology* (2018): 1-8.

22. Ferreira Regicely Aline Brandão and Maria Helena D'Aquino Benicio. "Obesity in Brazilian women: association with parity and socioeconomic level". *Revista Panamericana de Salud Publica* 37 (2015): 337-342.

23. Nassif Paulo Afonso Nunes., *et al*. "Sleeve gastrectomy and gastric bypass in Roux-en-Y induce postoperative gastroesophageal reflux disease?" *ABCD. Arquivos Brasileiros de Cirurgia Digestiva* (São Paulo) 27 (2014): 63-68.

24. Younus Hafsa., *et al*. "Bariatric Surgery in Cirrhotic Patients: Is It Safe?" *Obesity Surgery* 30.4 (2020): 1241-1248.

25. Ferraz Álvaro Antonio Bandeira., *et al*. "Surgical site infection in bariatric surgery: results of a care bundle". *Revista do Colégio Brasileiro de Cirurgiões* 46.4 (2019).

26. Polyzos Stergios A., *et al*. "Obesity and nonalcoholic fatty liver disease: From pathophysiology to therapeutics". *Metabolism: Clinical and Experimental* 92 (2019): 82-97.