

Bariatric surgery in individuals with liver cirrhosis: A narrative review

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SUMMARY

Introduction: Bariatric surgery has become the gold standard treatment for morbid obesity, but there is no consensus regarding its safety and efficacy among individuals with chronic liver diseases.

Objective: To critically evaluate the existing evidence on literature about bariatric surgery in individuals with liver cirrhosis.

Method: Narrative review performed by means of an online search in the MEDLINE and LILACS databases.

Results: Bariatric surgery is safe and effective in individuals with chronic liver disease without clinical decompensation or significant portal hypertension. Individuals with severe liver function impairment present significantly higher surgical morbidity and mortality. Among candidates to liver transplantation, surgery may be performed before, after and even during transplantation, and there is a predominant trend to perform it after. Vertical sleeve gastrectomy seems to be the most adequate technique in this group of subjects.

Conclusion: Bariatric surgery is safe and effective in individuals with compensated cirrhosis without significant portal hypertension, but presents higher morbidity. Among candidates to liver transplantation and/or individuals with severe portal hypertension, morbidity and mortality are significantly higher.

Keywords: liver diseases, obesity, bariatric surgery, liver cirrhosis, liver transplantation.

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INTRODUCTION

Since the second half of the 20th century, the world has seen a significant increase in the prevalence of overweight and obesity. According to the World Health Organization (WHO), there are more than 1.4 billion adults over their ideal weight, including more than 200 million men and almost 300 million women that are obese. Currently, 65% of the world's population lives in countries where obesity and overweight are responsible for more deaths than malnutrition.¹

Likewise, the prevalence of obesity among cirrhotic individuals who are candidates for liver transplantation has almost doubled since the 1990s, reaching more than 30%.^{2,3} Furthermore, obesity and metabolic syndrome

have presented an increasingly significant causal relationship with chronic liver disease.⁴ Non-alcoholic fatty liver disease (NAFLD) is currently the third leading cause of liver transplantation in the United States of America (USA). Also, there is evidence that, if suitable diagnostic criteria are applied, about 2/3 of cases characterized as cryptogenic cirrhosis are actually caused by NAFLD.^{5,6} It is predicted that in 2030, NAFLD will be the leading cause of liver transplantation in the USA.⁷

In recent years, bariatric surgery has become the gold standard treatment for morbid obesity, leading to better results compared to clinical treatment.⁸ However, among obese patients with chronic liver disease, there is no consensus regarding the most effective and safest therapeutic

strategy. The association between obesity and cirrhosis is a complex situation for various reasons. Encouraging the adoption of lifestyle changes in individuals with severe liver diseases is difficult, and bariatric surgeries present greater risks, with less favorable rates of morbidity and mortality. In addition to the isolated risk of liver disease, in patients with NAFLD and obesity, the existence of other comorbidities, such as atherosclerotic cardiovascular disease, diabetes, hypertension, dyslipidemia, metabolic syndrome and chronic nephropathy, is common.⁹ Given that the intersection between obesity and NAFLD is increasingly common, a deeper understanding of these interconnections and the possibilities of more suitable and safer management for the proper treatment of both conditions is necessary.

OBJECTIVE

To conduct a critical analysis of the existing literature on the realization of bariatric surgery on patients with liver cirrhosis.

METHOD

A narrative review of the literature was conducted via an online search of the MEDLINE (via Pubmed) and LILACS (via Bireme) databases, using as keywords “bariatric surgery,” “liver diseases” and “liver cirrhosis.” The articles were located and reviewed, with an emphasis on those reporting on the results of bariatric surgical techniques in individuals with cirrhosis and/or chronic liver diseases.

RESULTS AND DISCUSSION

In subjects with mild to moderate liver disease without cirrhosis, several studies have demonstrated the occurrence of regression of NAFLD after bariatric surgery, including individuals with significant fibrosis.^{10,11} This improvement occurs not only due to weight loss, but is also related to complex mechanisms linked to the structural and biochemical changes caused by the surgery, such as improved insulin sensitivity, increased incretin and adipokine activity, reduction of chronic inflammation and decreased lipid supply in the portal system.¹²

The main risk factors for postoperative impairment after performing bariatric surgery in chronic liver diseases are portal hypertension and hepatocytic insufficiency. In relation to severe cirrhotic liver transplant candidates, the choice of the most appropriate surgical technique and the time for completion of the surgery are relevant aspects that have not been completely established, especially due to the scarce literature on these topics.

In patients with severe cirrhosis, perioperative morbidity and mortality are higher than those observed in

the obese population. Takata et al.¹³ assessed 15 patients with severe liver disease (six of which were cirrhotic patients) treated with vertical sleeve gastrectomy and noted a 33% loss of excess weight after one year, with perioperative complications in two (13.3%) patients, both of whom were cirrhotic. In 26 transplant candidates submitted to vertical sleeve gastrectomy assessed by Lin et al.,¹⁴ perioperative complications were noted in 23.1%, with no mortality. The average loss of excess weight after one year was 50% and seven patients were submitted to transplant, without complications related to the bariatric surgery.

In a retrospective study based on a database analysis at the national level in the USA, Mosko et al.¹⁵ noted higher mortalities in clinically compensated (0.9%) and non-compensated cirrhotic patients (16.3%) when compared to individuals free of liver disease (0.3%). Furthermore, in centers with a low volume of bariatric surgery, mortality reached 41% among individuals with decompensated cirrhosis.

Incidental diagnosis of liver cirrhosis in the intraoperative period of bariatric surgery is not rare, and is reported in 1 to 4% of cases.^{16,17} Dallal et al.¹⁸ analyzed a sample in which 90% of patients with cirrhosis had been diagnosed incidentally in the intraoperative period of the bariatric intervention and noted that among individuals with compensated cirrhosis (Child-Pugh A), the Roux-en-Y gastric bypass had a mortality rate similar to the general population, but with more episodes of transient renal dysfunction, greater surgery time and more bleeding and the need for blood products. Woodford et al.¹⁹ studied 14 patients with intraoperative diagnosis of cirrhosis during placement of an adjustable gastric band, without changes in hepatocyte function or portal hypertension, and did not note significant mortality or morbidity. Pestana et al.²⁰ conducted a retrospective study comparing patients with Child-Pugh A cirrhosis and without portal hypertension, noting similar morbidity and mortality and considering surgery as being well-tolerated and safe therapeutic option in patients with compensated liver diseases and mild portal hypertension.

In a systematic review, Lazzati et al.²¹ found a 66% loss of excess weight within two years, comparable to that found in the general population. Vertical sleeve gastrectomy was the procedure conducted the most, and perioperative mortality was similar to that in the general population. However, the morbidity rate, in particular the frequency of reoperations, and the mortality rate in the first year were higher. The heterogeneity of the studies and the small number of individuals analyzed, even after the compilation of data, have been identified as

factors that generate potential biases and limit the findings. Another systematic review, conducted by Jan et al.,²² showed favorable results comparable to those of the general obese population in relation to weight loss and the resolution of comorbidities. On the other hand, the authors underscore that the risks are significantly higher, with 21.3% surgical morbidity, 1.6% perioperative mortality and 2.4% late-onset mortality. The risk of decompensation of liver function was also high (6.5%) and should be taken into consideration. The main results of the studies evaluated are presented in Table 1.

Among severe cirrhotic patients that are candidate to liver transplant, the choice of technique to be employed is fundamental due to two key issues: potential damage to the absorption of immunosuppressive medication and the possibility of endoscopic access to the biliary tree. There are no studies examining the pharmacokinetics of immunosuppressants in liver transplant patients undergoing bariatric surgery. In kidney transplant patients undergoing gastric bypass, however, there are reports of a need for larger doses of tacrolimus, sirolimus, mycophenolate sodium and cyclosporine.²³ With regard to access to the biliary tree, stenoses are common after deceased donor transplants, occurring in up to 17% of cases.²⁴ Due to these factors, vertical sleeve gastrectomy appears to be the most appropriate technique in this group of patients, as it does not cause significant malabsorption and enables endoscopic access to the biliary tree.

The ideal time for bariatric surgery in liver transplant candidates is another controversial issue. There is a pos-

sibility of performing the procedure before, after and even during transplantation. A relevant concern in this regard is the impact of obesity on the outcome of the transplant. Recent studies have reported that operative mortality, two-year survival and graft viability are similar in obese and non-obese individuals. Perioperative morbidity is slightly higher.^{2,3} Performing bariatric surgery in non-compensated transplant candidates leads to higher morbidity and mortality, including the occurrence of anastomotic fistulas, which often reaches 12.5%.^{21,22}

Recently, there has been growing interest in the possibility of endoluminal treatments for obesity in individuals with high surgical risk. An endoscopic intragastric balloon implant in this group of patients, which is an attractive alternative, has presented satisfactory results in studies conducted by Choudhary et al.²⁵

A case report by Campsen et al.²⁶ showed the realization of adjustable gastric band implantation during a liver transplant had satisfactory results after 6 months. Heimbach et al.²⁷ reported the combined realization of liver transplantation and vertical sleeve gastrectomy in seven patients with one case of a fistula on the staple line and zero mortality. The combined option is interesting because it reduces the number of surgical approaches in high-risk patients. On the other hand, this approach requires complex logistics (especially the concomitant availability of transplant and bariatric teams) and can combine serious complications that are not related to either procedure.^{21,22,26,27} Therefore, in patients with non-compensated cirrhosis or with moderate to severe portal hyper-

TABLE 1 Main results of bariatric surgery in individuals with liver diseases.

Study	N	Type of study	Surgical technique	Morbidity	Perioperative mortality	Late mortality
Takata et al. ¹³	15	Retrospective cohort	Vertical sleeve gastrectomy and gastric bypass	13.3%	0	0
Lin et al. ¹⁴	26	Retrospective cohort	Vertical sleeve gastrectomy	23.1%	0	0
Mosko et al. ¹⁵ (Compensated cirrhosis)	3,888	Retrospective cohort	Several	NR	0.9%	NR
Mosko et al. ¹⁵ (Decompensated cirrhosis)	62	Retrospective cohort	Several	NR	16.3%	NR
Dallal et al. ¹⁸	30	Retrospective cohort	Gastric bypass	30%	0	3.3%
Woodford et al. ¹⁹	14	Prospectively collected database analysis	Adjustable gastric band	14.3%	0	0
Shimizu et al. ³¹	23	Prospective database analysis	Vertical sleeve gastrectomy and gastric bypass	34.8%	0	4.3%
Lazzati et al. ²¹	56	Meta-analysis	Several	23.2%	0	5.3%
Jan et al. ²²	122	Meta-analysis	Several	21.3%	1.6%	NR

N: number of patients; NR: not reported.

tension, conducting the liver transplantation first and bariatric surgery *a posteriori* is preferred. The clearest advantage of this option is the selection of patients who have had a favorable outcome after transplantation and developed or maintained obesity, now with improvements in hepatocyte function and portal hypertension. Morbidity is higher than in the general population (reoperation rate of up to 33%) but mortality is similar.^{21,22,28-30}

CONCLUSION

In individuals with liver disease and preserved hepatocytic function and without significant portal hypertension, bariatric surgery is an effective and safe therapeutic option, with results close to those of patients without liver disease. In these cases, the techniques used the most are vertical sleeve gastrectomy and Roux-en-Y gastric bypass. In patients with severe liver diseases, candidates for transplantation or post-transplant patients, the most appropriate technique is vertical sleeve gastrectomy. Performing surgery prior to transplantation is significantly worse than in the general population and should be avoided. Considering the current encouraging results of liver transplantation in obese patients, the post-transplant approach seems to be the most appropriate. The realization of prospective controlled studies with large samples is required so that we can obtain more definitive conclusions.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

RESUMO

Cirurgia bariátrica em indivíduos com cirrose hepática: uma revisão narrativa

Introdução: A cirurgia bariátrica tornou-se nos últimos anos o tratamento padrão-ouro para a obesidade mórbida; porém, entre obesos portadores de hepatopatia crônica, não existe consenso a respeito de sua segurança e efetividade.

Objetivo: Análise crítica da literatura existente sobre a realização de cirurgia bariátrica em portadores de cirrose hepática.

Método: Revisão narrativa por meio de pesquisa *online* nas bases de dados Medline e Lilacs.

Resultados: As cirurgias bariátricas em indivíduos cirróticos sem descompensação clínica levam a resultados satisfatórios. Já indivíduos com hepatopatia grave apresentam morbidade perioperatória e mortalidade significativamente maiores do que as observadas na população obesa sem hepatopatia. Em candidatos a transplante hepático, a ci-

urgia pode ser realizada antes, durante ou após o transplante, havendo uma tendência predominante à realização após o transplante. A gastrectomia vertical parece ser a técnica mais adequada nesse grupo de pacientes.

Conclusão: A cirurgia bariátrica é segura e efetiva em portadores de cirrose hepática compensada e sem hipertensão portal; porém, apresenta maior morbidade. Em candidatos a transplante e/ou indivíduos com hipertensão portal significativa, a morbimortalidade é significativamente maior.

Palavras-chave: hepatopatias, obesidade, cirurgia bariátrica, cirrose hepática, transplante de fígado.

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