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CASE REPORT

Intragastric Balloon Followed by Biliopancreatic Diversion in a Liver Transplant Recipient: A Case Report

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Abstract Liver transplantation is a life-saving procedure for end-stage liver disease. In liver transplant recipients, morbid obesity influences post-operative survival and graft function. In 1996, our patient underwent a successful liver transplantation because of a HCV-related liver failure (body mass index (BMI) 31). Follow-up showed a functional graft and the development of severe obesity up to a BMI of 61 in January 2006. In January 2007, he was submitted to intragastric balloon therapy for 6 months, reaching a BMI of 54. In September 2007, he underwent a biliopancreatic diversion. During follow-up to March 2008, he reached a BMI of 42 with ameliorations of comorbidities. In May 2008, during a hospital admission, he suddenly died of a heart attack. Post mortem study revealed a myocardial infarction. This is the first world case report for this approach. According to our opinion, patient's death was not related to bariatric surgery.

Keywords Liver transplantation · Morbid obesity · Biliopancreatic diversion

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Introduction

Obesity is one of the most important health problem in Western societies, also called as "a new global epidemic" by the WHO.

Morbid obesity is defined as a body mass index (BMI) ≥40 or ≥35 with associated comorbidities. Various treatments have been in use: Conservative medical therapies in these individuals generally fail, while surgical operation shows satisfactory results [1].

Morbid obesity surgery has the potential to determine resolution of obesity related diseases [2]. It is also considered as the most effective treatment to achieve long-term weight loss and better quality of life.

The feasibility of bariatric surgery in liver transplant recipients is still a matter of debate. Liver transplantation has shown important progress in treatment of patients with end-stage liver disease. Quality of life in these patients has been lately improved with a majority of them being alive at 10 years after liver transplantation. Associated comorbidities as obesity influence the quality and quantity of life of transplanted patients increasing morbidity and mortality.

Morbid obesity is commonly associated with Nonalcoholic Fatty Liver Disease (NAFLD), which is believed to be the most common type of chronic liver disease and could lead to nonalcoholic steatohepatitis and cirrhosis. In obese patients, liver biopsies show some kind of liver disease in 93% as portal inflammation or hepatitis, and NAFLD progresses in 20–40% to cirrhosis [3].

In liver-transplanted patients, these are risk factors that are considered as certain accelerators of basic pathology increasing morbidity and mortality.

In the present article, we describe a multidisciplinary approach to a patient with morbid obesity after orthotopic liver transplantation (OLT), who was firstly treated with intragastric balloon positioning and then with biliopancreatic diversion.

Case Report

A 57-year-old super-super-obese white man (height 198 cm, weight 238 kg, BMI 61) who previously underwent an OLT (1996) for cirrhosis secondary to hepatitis C was referred to our bariatric surgery team in January 2007. His clinical history included hypertension, type II diabetes, hyperuricemia, dilatative cardiomyopathy, and heart failure. Thoravision showed emphysematous changes in bronchial tree. He was a smoker, affected by sleep apnea syndrome.

In 1996, the patient underwent an OLT with a cadaveric graft using a piggy-back side-to-side cavo-caval technique with end-to-end donor common bile duct anastomosis. After surgery, he started a standard cyclosporine-based immunosuppressive regimen and continued anti-viral (HCV) therapy with lamivudine. In the years following the OLT, his weight has increased from 121 to 238 kg.

Because of unsatisfactory results with medical treatment, he was referred to our bariatric group in 2007. After discussing with the patient, we planned an intragastric balloon (BIB) treatment in order to achieve a preoperative weight loss and a subsequent biliopancreatic diversion (BPD). In January 2007, he underwent intragastric balloon positioning with no complications and early discharge. The patient experienced a weight reduction of 28 kg (weight 210 kg, BMI 54) in July 2007 and, consequently, the BIB was removed.

In September 2007, he underwent an open biliopancreatic diversion according to the Scopinaro technique [4]. The abdomen was entered through an upper middle line incision, starting with the scar of the subxiphoid "T" of the OLT and extended down toward the umbilicus. Adhesions were removed. Standard gastric resection was performed with a remaining pouch of 200 cm^3. The small bowel was measured backward from the ileo-cecal valve for a distance of 250 cm, and the small bowel was cut across at this point. The proximal end of ileo-jejunum tract was joined to the stomach pouch with a latero-lateral anastomosis on stomach's posterior wall. The end of the upper section was joined to the lower loop so as to make a new opening 50 cm from ileo-cecal valve. In this way, an alimentary limb of 200 cm and a common channel of 50 cm were performed (Figs. 1 and 2).

During post-operative follow-up, at 6 months, he reached a BMI of 42 (weight 165 kg, height 198 cm) with no complications and ameliorations of comorbidities.

Fig. 1 Our patient on the operating table

Cyclosporine and lamivudine dosages did not need to be adjusted in our patient because of stable blood serum levels of the drugs before and after biliopancreatic diversion.

In May 2008, while being admitted for a routine check-up in the Transplant Unit, he suddenly died of a heart attack. Necroscopic examination showed myocardial infarction.

Discussion

The treatment of morbid obesity is complex, and it involves several disciplines like internal medicine, psychiatry, and surgery. Conservative medical therapy in morbidly obese patients is often powerless, while surgical approaches have emerged as useful alternatives with good short- and long-term results [5]. In this case report, a super-super-obese patient (BMI 61, 238 kg weight, 198 cm height), who underwent OLT, was managed with a two-steps approach. Both treatments (BIB and BPD) obtained good weight loss results with amelioration of comorbidities.

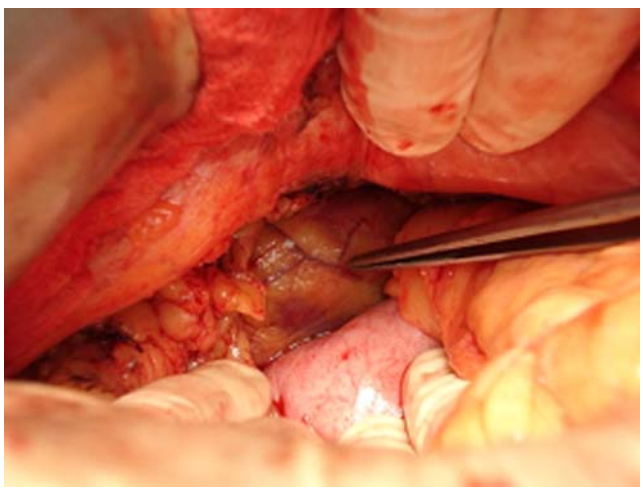

Fig. 2 Transplanted liver

The goal of the application of BIB in this patient was to reduce weight as a preparation for the surgical approach. In this case, we achieved a significant weight reduction of 28 kg. As reported by Spyropoulos et al., BIB placement can be considered an effective first-stage treatment of high-risk super-obese patients in need of surgical intervention, and it gives the chance of improving general health status and decreases morbidity and mortality [6]. Biliopancreatic diversion is a complex operation associated with good long-term results regarding weight loss and diabetes control. As shown by Guedea et al. [7], quality of life was also satisfactory in most patients after BPD, improving many aspects of life as self-esteem, sexual, and social relations. Most obese patients suffer from metabolic disorders as hypertension, hyperlipidemia, diabetes, cardiovascular problems, and liver dysfunction. After biliopancreatic diversion, weight loss is associated with the resolution of many of these dysfunctions and improvement of quality and quantity of life.

Liver transplantation has been successfully performed in morbidly obese patients, with long-term results similar to nonobese controls [8], but metabolic complications such as hypertension, diabetes, and hyperlipidemia may lead to increased cardiovascular morbidity and mortality in the former group [9].

In super-obese patients submitted to OLT, steatohepatitis may lead to dysfunction of the transplanted graft. Morbid obesity may increase the risk for nonalcoholic steatohepatitis and cirrhosis, with significant morbidity in the post-transplant course [10]. This is the reason why in morbidly obese patients, as shown by Duchini at al. [11], obesity surgery (in that case Roux-en-Y gastric bypass) could lead to weight loss, correction of metabolic abnormalities, and regression of hepatic dysfunction secondary to recurrent steatosis.

Increasing of weight after liver transplantation may be caused by various medications, poor physical activity, and increased caloric intake. In previous studies, it was shown that about 21.6% of liver transplant recipients become obese within 2 years after liver transplantation [12]. Appropriate weight reduction and intensive treatment of obesity in the post-transplant period is highly recommended. Diet and life style modifications are important but rarely effective. Pharmacological treatment of obesity in these patients is difficult to perform because of potential drug interactions and side effects.

Malabsorptive surgery, as biliopancreatic diversion, has the potential to cause malnutrition and decrease of absorption of vitamins and drugs. Protein malnutrition is the most serious metabolic disorder, characterized by edema, alopecia, asthenia, and hypoalbuminemia. The exact food habits and appropriate nutritional supplement could avoid side effects and re-operations with lengthening of the common limb. Some authors state that malabsorptive surgery is not indicated for transplanted patients because of the risk of decreased drug absorption [13]. Transplanted patients must follow immunosuppressive therapy lifelong, and drug blood levels should be maintained to avoid graft rejection. Cyclosporine is used in several diseases such as rheumatoid arthritis, psoriasis, and allogenic transplantation of the kidney, liver, heart, pancreas, etc. It is assimilated in the gastrointestinal tract, follows hepatic metabolization by the cytochrome P450 system, and its excretion is mostly biliary, with only 6% eliminated through the urinary tract [14, 15]. In our case, we did not notice any interference in cyclosporine serum levels. Weight reduction was followed by normalization of both liver laboratory tests and metabolic parameters, with the normalization of blood pressure and glycemia. No surgical complications appeared during and after operation.

According to many studies, post-transplantation diabetes mellitus and post-transplantation metabolic syndrome (PTMS) might be lifestyle-related and induced by post-OLT immunosuppression [16]. Whatever the origin, the presence of the PTMS has been associated with an increased prevalence of cardiovascular disorders, which becomes a prevailing cause of morbidity/mortality in long-term OLT survivors [17]. It is well known that elevated BMI and cholesterol [18] and hypertension are significantly more frequent in OLT subjects on cyclosporine as immunosuppressive drug, whereas the development of diabetes is more common in subjects on tacrolimus. Nevertheless, the clinical and biochemical features of MS are highly prevalent in OLT patients, independently of etiology of liver disease and type of immunosuppressive treatment.

Post-OLT cardiovascular death risk is important, and it is calculated around 11.8% in most series [19–22].

According to our opinion, this two-steps approach is feasible and reasonable to a patient with a previous OLT and super-super obesity. Patient's death was unpredictable and probably related to his past clinical history of morbid obesity and heart failure. The choice of the operation was related to his severe–severe obesity. In our experience, Roux-en-Y gastric bypass is less effective than BPD in these patients. Further patients are needed to establish a safe and effective approach to these severely sick patients looking for a chance of survival.

References

1. Deitel M, Shikora SA. The development of the surgical treatment of morbid obesity. J Am Coll Nutr. 2002;21(5):365–71.
2. Maggard MA, Shugarman LR, Suttorp M, et al. Meta-analysis: surgical treatment of obesity. Ann Intern Med. 2005;142(7):547–59.
3. Ong JP, Elariny H, Collantes R, et al. Predictors of nonalcoholic steatohepatitis and advanced fibrosis in morbidly obese patients. Obes Surg. 2005;15:310–5.

4. Scopinaro N, Adami GF, Marinari GM, et al. Biliopancreatic diversion. World J Surg. 1998;22:936–46.
5. Butte JM, Devaud N, Jarufe NP, et al. Sleeve gastrectomy as treatment for severe obesity after orthotopic liver transplantation. Obes Surg. 2007;17(11):1517–9.
6. Spyropoulos C, Katsakoulis E, Mead N, et al. Intragastric balloon for high-risk super-obese patients: a prospective analysis of efficacy. Surg Obes Relat Dis. 2007;3(1):78–83.
7. Guedea ME, Arribas del Amo D, Solanas JA, et al. Results of biliopancreatic diversion after five years. Obes Surg. 2004;14 (6):766–72.
8. Keeffe EB, Gettys C, Esquivel CO. Liver transplantation in patients with severe obesity. Transplantation. 1994;57:309.
9. Guckelberger O, Bechstein WO, Neuhaus R, et al. Cardiovascular risk factors in long-term follow-up after orthotopic liver transplantation. Clin Transpl. 1997;11:60.
10. Sawyer RG, Pelletier SJ, Pruett TL. Increased early morbidity and mortality with acceptable long-term function in severely obese patients undergoing liver transplantation. Clin Transpl. 1999;13:126.
11. Duchini A, Brunson ME. Roux-en-Y gastric bypass for recurrent nonalcoholic steatohepatitis in liver transplant recipients with morbid obesity. Transplantation. 2001;72(1):156–9.
12. Everhart JE, Lombardero M, Lake JR, et al. Weight change and obesity after liver transplantation: incidence and risk factors. Liver Transpl Surg. 1998;4:285.
13. Hibberd AD, Trevillian PR, Roger SD, et al. Assessment of the bioequivalence of a generic cyclosporine A by a randomized controlled trial in stable renal recipients. Transplantation. 2006;15 (81):711–7.
14. Deogracias ML, Dominguez-Diez A, Palomar-Fontanet R, et al. Biliopancreatic diversion in a renal transplant patient. Obes Surg. 2007;17:553–5.
15. Malinowski SS. Nutritional and metabolic complications of bariatric surgery. Am J Med Sci. 2006;331(4):219–25.
16. Bianchi G, Marchesini G, Marzocchi R, et al. Metabolic syndrome in liver transplantation: relation to etiology and immunosuppression. Liver Transpl. 2008;14:1648–54.
17. Perkins JD. Influence of obesity with concurrent diseases on liver transplant survival. Liver Transpl. 2007;13:928–9.
18. Wang J, Zhang Z-R, Chou C-F, et al. Cyclosporine stimulates the renal epithelial sodium channel by elevating cholesterol. Am J Physiol Renal Physiol. 2009;296:F284–90.
19. Moreno Planas JM, Rubio Gonzales E, Herreros de Tejada A, et al. Late mortality in patients with liver transplantation: causes and risk factors. Transplant Proc. 2003;35:707–8.
20. Lukes DJ, Herlenius G, Rizell M, et al. Late mortality in 679 consecutive liver transplant recipients: the Gothenburg liver transplant experience. Transplant Proc. 2006;38:2671–2.
21. Pan C, Jain A, Fung JJ. Analysis of causes of late mortality in liver transplant recipients. Zhongguo Wei Zhong Bing Ji Jiu Yi Xue. 2004;16:547.
22. Pruthi J, Medkiff KA, Esrason KT, et al. Analysis of causes of death in liver transplant recipients who survived more than 3 years. Liver Transpl. 2001;7(9):811–5.