Simultaneous liver transplantation and sleeve gastrectomy: first reported case in East Asia

Yang Liu, Meng-Yi Li, Li-Ying Sun, Lan Jin, Wei Qu, Jun Wang, Zhi-Jun Zhu, Zhong-Tao Zhang, Lin Wei

Department of General Surgery, Beijing Friendship Hospital, Capital Medical University & National Clinical Research Center for Digestive Diseases, Beijing 100050, China.

To The Editor: Bariatric surgery, as an effective treatment for patients with morbid obesity and its related metabolic diseases, is gaining increasing popularity. Non-alcoholic fatty liver disease (NAFLD) is a common comorbidity associated with morbid obesity. Growing evidence suggests that patients with non-alcoholic steatohepatitis are at high-risk of adverse outcomes such as cirrhosis and liver-related mortality. Liver function failure caused by NAFLD is predicted to become the most common reason for liver transplantation (LT) in the United States by 2025.[1] The estimated prevalence of obesity is 20% to 30% in LT recipients in the United States.[2] LT is the only radical treatment for end-stage liver disease. If patients with end-stage liver disease and morbid obesity cannot effectively control their body weight after LT, the donor liver will be at high-risk of NAFLD again. Simultaneous LT and sleeve gastrectomy (SG) may be performed for effectively controlling post-operative body weight and metabolic disorders in these patients. We present a case of simultaneous LT and SG for a patient with end-stage liver disease and morbid obesity.

The patient was a 42-year-old man (height, 1.73 m; body weight, 110 kg; and body mass index [BMI], 36.8 kg/m^2). He had hyperlipidemia and moderate obstructive sleep apnea syndrome without diabetes or hypertension. His clinical manifestation was end-stage liver disease (portal hypertension, severe hypoproteinemia, and refractory ascites) due to hepatitis B-induced cirrhosis. He also had a history of upper gastrointestinal hemorrhage and spontaneous bacterial peritonitis. The results of his pre-operative clinical evaluation were as follows: albumin level, 22.8 g/L; total bilirubin level, 69 μmol/L; prothrombin time, 17.6 s; liver function, Child grade C; and Model for End-stage Liver Disease score, 30. Massive ascites, splenomegaly, gastric varices, and gastric wall edema were observed during surgery. In accordance with the pre-operative plan, classic non-bypass orthotopic LT was performed in the first step. The above-mentioned manifestations were significantly improved after LT. Then, the dissociation of the greater curvature was smoothly performed, and thick veins were directly ligated. The start point of the gastric resection was 6 cm away from the pylorus. Five Echelon stapler reloads (Ethicon Endo-Surgery; Johnson & Johnson, NJ, USA) were used in the order of black, green, gold, blue, and blue. The Echelon stapler black reload consists of the maximum staple height, with an open stapler height of 4.2 mm and closed height of 2.3 mm. The gastric tissue was squeezed for 1 min before resection. No blasting or bleeding occurred on the staple line. Finally, the staple line was reinforced with a running suture [Figure 1]. The post-operative recovery of the patient was generally good. Transient renal insufficiency was observed but soon recovered. Upper gastrointestinal radiography was performed 3 days post-surgery and revealed no evidence of gastric leakage. Then, the liquid diet was advised. The patient was discharged on day 14 post-surgery. His body weight decreased to 88 kg at 3 months post-surgery. His percent total weight loss (% TWL) was 20%. His bodyweight further decreased to 80 kg at the 6-month follow-up, with a %TWL of 27.3%. The function of his new liver recovered well during follow-up [Supplementary Table 1, http://links.lww.com/CM9/A87].

Patients with BMI >40 kg/m^2 have a high-risk of primary graft dysfunction and significantly higher mortality than their normal-weight counterparts primarily due to worse cardiovascular outcomes. Therefore, some obese patients have a high possibility of losing transplantation opportunity. If patients with morbid obesity have end-stage liver disease, they would certainly need not only LT but also weight control. Bariatric surgery is currently the only therapy for severe obesity that has been shown to significantly affect weight loss. LT combined with bariatric surgery is definitely an effective method for patients with end-stage liver disease and obesity. However, no clear guidelines have been currently established in terms of bariatric surgery among patients with cirrhosis or which type of bariatric surgery is the optimal choice.[3] Although bariatric surgery can be performed by laparoscopy before LT, severe problems still need to be addressed, such as portal

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Correspondence to: Prof. Lin Wei, Department of General Surgery, Beijing Friendship Hospital, Capital Medical University & National Clinical Research Center for Digestive Diseases, No.95 Yong-an Road, Xi-Cheng District, Beijing 100050, China
E-Mail: weilin@ccmu.edu.cn

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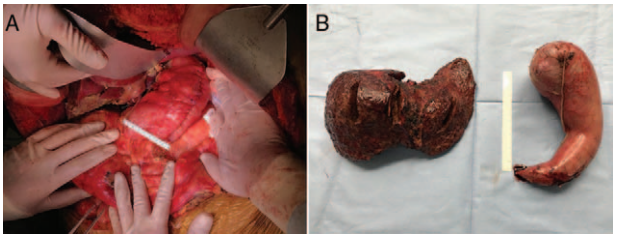

Figure 1: Simultaneous liver transplantation and sleeve gastrectomy in a morbid obesity patient with end-stage liver disease. (A) Status after liver transplantation combined with sleeve gastrectomy. (B) Resected diseased liver and gastric tissue.

hypertension, coagulation dysfunction, and gastric wall edema. The available data suggest that bariatric surgery before LT is associated with high morbidity and mortality. Moreover, when performing SG before LT, the major complication rate was up to 17.9%.[4] However, if performed after LT, abdominal adhesions and long-term use of immunosuppressors will definitely increase the risk of bariatric surgery. The available data suggest that bariatric surgery after LT is also associated with a high complication rate. The major complication rate of SG was up to 26.7%.[5] A systematic review indicated that the mortality and complication rates of simultaneous LT combined with bariatric surgery were lower than those of staging surgery, regardless of whether bariatric surgery was performed before or after transplantation.[6] SG is currently the most frequently performed surgical procedure among bariatric surgery worldwide, followed by Roux-en-Y gastric bypass surgery (RYGB). Two randomized controlled trials showed that regarding weight loss control and metabolic disorder remission, SG and RYGB had equivalent long-term effectiveness, but SG had fewer complications. Heimbach *et al*[7] reported seven cases of simultaneous LT combined with SG in 2013. The mean BMI was 48 kg/m^2, with a reduction to 29 kg/m^2 after an average follow-up of 17 months. Zamora *et al*[8] reported the results of a 3-year follow-up study of 13 patients who underwent simultaneous LT combined with SG. The average 3-year %TWL was 34.8%, while the 3-year %TWL in the control group was 3.9%. Furthermore, hypertension, insulin resistance, and hepatic steatosis were more effectively controlled in the combination surgical group. Currently, no clear indications and contraindications have been established for simultaneous LT combined with SG. If the liver transplant candidates had severe obesity and obesity-related metabolic disorders, simultaneous LT combined with SG can be considered for implementation. However, SG may lead to severe reflux. Thus, some research studies suggest that patients with pre-existing symptomatic gastroesophageal reflux disease despite medication or patients with hiatal hernia (>4 cm) were not suitable for SG. Computed tomographic angiography and gastroscopy were recommended for pre-operative preparation to assess the severity of perigastric varices. On the basis of the well-planned operational procedure, venous hypertension was alleviated obviously after LT. In addition, the stapler with the maximum height was used to reduce the occurrence of bleeding and blasting, with enough time for tissue squeezing. The gastric antrum should be preserved as much as possible to avoid obstruction. Finally, although it has been reported that suturing cannot reduce the occurrence of gastric leakage, we still performed a running suture to reinforce the staple line. To the best of our knowledge, this might be the first case reported on simultaneous LT and SG in East Asia.

Simultaneous LT and SG might be an effective method to treat end-stage liver disease with morbid obesity. To ensure the safety of patients to the utmost extent, surgical procedures should be simultaneously performed by transplantation and bariatric surgery teams by using mature surgical techniques. Research studies with large sample sizes and longer follow-ups are still needed to provide evidence-based data.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

None.

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