ROBITIC SLEEVE GASTRECTOMY FOLLOWING LIVER TRANSPLANTATION

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RUNNING TITLE: Robotic Sleeve Gastrectomy

WORD COUNT: 2078

KEYWORDS: Bariatric Surgery – Sleeve gastrectomy – Liver transplant - Obesity

ABSTRACT

Background: Obesity following liver transplantation is a common medical problem that increases the morbidity and mortality of patients. Still, no standard of treatment for this type of obesity has been identified. While bariatric surgery has been reported as an option, no specific procedure has been defined.

Objective: The authors present a robotic sleeve gastrectomy as a suggested treatment option for a patient with increased BMI following a liver transplant.

Setting: The University of Illinois at Chicago.

Methods: A 62-year-old woman with a history of liver transplantation followed by obesity, with a BMI of 53 kg/m², underwent a robotic sleeve gastrectomy after being enrolled in the bariatric surgery program.

Results: The procedure was successfully completed robotically. The operation lasted 158 minutes with minimal blood loss. There were no complications. At 3 months follow up, the patient's BMI had decreased to 48 kg/m². Immunosuppressive drugs serum levels were unchanged following surgery and she remained at the same immunosuppressive therapy.

Conclusion: Robotic sleeve gastrectomy represents a safe alternative for the treatment of obesity in a transplanted patient. The procedure provides good results with no alterations in the immunosuppressive therapy. Longer follow-up and additional data gained from a larger series is needed in order to make more definitive conclusions.

INTRODUCTION

Obesity represents a worldwide health issue, with nearly one quarter of the adult world population considered overweight and almost 10% obese.[1] In the United States, the prevalence of obesity is increasing and, if this trend continues, by 2030, 51.1 % of adults will be obese.[2]

Obesity is a particular problem in patients undergoing liver transplant. Reports show that almost one third of transplant patients become obese within 3 years following a liver transplant.[3] In the United States alone, 7% of patients undergoing liver transplants are considered obese.[4] The reason for this weight gain is due mainly to immunosuppressive therapy that the patient receives following a transplant.[5] Nair et al[4] also reported that mortality at 5 years following liver transplant was significantly higher in morbidly obese patients. Their results suggested liver transplant recipients should maintain a BMI below 35 kg/m² in order to avoid further complications.

Bariatric surgery represents a valid therapeutic option for patients who become morbidly obese following liver transplantation and other failed nonsurgical therapies. A few bariatric procedures after liver transplant have been described previously,[6-9] however, no strong evidence as to ideal procedure exists. Additionally, there are factors that should be taken into account when deciding what the ideal procedure is. For example, Roux-en-Y gastric bypass is a malabsorptive procedure that can alter absorption of the immune suppressive medications. This was indicated in some reports,[10-11] but was not the case in another study.[12] Moreover, because gastric banding is a restrictive procedure that requires implantation of a foreign body, this can represent a higher risk

for infection in an immunosuppressive patient. Another option is sleeve gastrectomy (SG), a restrictive procedure with a component of metabolic changes, but where no malabsorption is involved.

Herein, the authors describe a case of robot-assisted laparoscopic sleeve gastrectomy in a patient who became morbidly obese following an orthotropic liver transplantation.

CASE PRESENTATION

A 62-year-old woman with a history of diabetes mellitus, hepatitis C, liver cirrhosis, and hepatocellular carcinoma underwent liver transplantation in August 2008. During postoperative follow up, the patient's weight gain resulted in an increased BMI, from 41 kg/m² to 53 kg/m². After many unsuccessful trials of nonsurgical weight loss therapies, the patient was enrolled in the bariatric surgery program at the University of Illinois at Chicago. Once the program was completed, the patient was offered the option to undergo a sleeve gastrectomy as surgical weight loss treatment.

The preoperative evaluation included an upper gastrointestinal swallow, cardiac and transplant clearance. The operation was planned to be performed robotically.

Surgical Technique

The patient was positioned supine in low lithotomy position. Trocar placement followed the usual laparoscopic technique for sleeve gastrectomy (Fig. 1). Using an open approach, a 12 mm

trocar was placed slightly to the left and above the umbilicus used for the robotic camera. A diagnostic laparoscopy showed multiple adhesions from the previous procedure involving the small bowel, stomach, omentum, and liver. Two 8 mm robotic trocars were placed in the left upper quadrant for the left arm and third arm of the robot respectively. A third 8 mm robotic trocar was placed in the right upper quadrant for the right arm. An additional 12 mm trocars was placed in between the left arm and camera port for assistant. The da Vinci® surgical system was brought cranially and docked into position.

Careful lysis of adhesions was performed using robotic scissors, monopolar hook, and fenestrated bipolar forceps (Fig. 2). Once the adhesions from the liver were completely lysed, the gastroesophageal (GE) junction was dissected. The short gastric vessels were transected along the greater curvature all the way up to the GE junction using a robotic Harmonic® device (Ethicon Endo-Surgery, Cincinnati OH). Once the greater curvature of the stomach was completely mobilized, a 38 French blunt bougie was introduced through the mouth and guided to the pylorus in order to assist with the gastric transaction.

The stomach was transected starting 5 cm proximally to the pylorus using the Echelon Flex™ 60 Endopath® Stapler (Ethicon Endo-Surgery) green load with Seamguard® tissue reinforcement (Fig. 3A). The stapler was handled by the bedside surgeon. A total of seven loads were used to completely transect the stomach and create the gastric sleeve. Interrupted stitches with 3/0 PDS® sutures were used to reinforce the suture line at the crossing of the staplers (Fig. 3B).

Once the procedure was complete, an esophagogastroduodenoscopy was performed in order to evaluate intragastric bleeding and perform an air leak test. A liver biopsy was also performed using robotic scissors. The specimens were removed through the umbilicus using an ENDOPOUCH® Specimen Retrieval Bag System. A drain was left on the left upper quadrant.

Results

The operation was completed in 158 minutes. The console time was 110 minutes and blood loss was 20 cc. The patient had an uneventful postoperative period and was discharged on postoperative day 4. At 3 months follow up, the patient's BMI had decreased to 48 kg/m^2.

The liver biopsy showed a non-alcoholic fatty liver disease with moderate steatosis, mild lobular inflammation, and no significant hepatocyte ballooning degeneration. Kleiner score was 3 and fibrosis stage 0. The patient was kept at the same dose of FK506 (Prograf ®); 2 mg in the morning and 1 mg in the evening. Serum levels did not change after surgery.

DISCUSSION

The number of transplants performed in recent years continues to increase. A common occurrence following this procedure is weight gain, occurring as a result of the immunosuppressive therapy (mainly corticosteroids) that the patient receives after surgery. This obesity alone represents a significant risk factor for morbidity-mortality following transplantation. In fact, reports show that morbid obese patients have a lower 5-year survival following transplant.[5] Thus, the surgical treatment of morbid obesity in these patients is a valid option, despite the high risk population.

Among the various bariatric procedures available, sleeve gastrectomy appears to be a good option for transplanted patients. It is a restrictive non-malabsorptive procedure that does not interfere with absorption of immunosuppressive therapy. Additionally, although it is primarily a restrictive operation, it is also associated with metabolic changes such as the reduction of ghrelin levels. The resection of the gastric fundus is also associated with reduction of hunger.[13-15]

Alternative procedures, such as gastric bypass, combine malabsorption and restriction. Since absorption rates are unpredictable, the adjustment of immunosuppressive medications can be challenging, possibly jeopardizing the outcome of the transplanted organ. Gastric banding is another safe option for the transplanted patient, in part due to the low morbidity. It can, however, represent an increased risk for infection as patients are immunosuppressed and the procedure requires a foreign body to be implanted.

This is the first report of a minimally invasive sleeve gastrectomy using the da Vinci® surgical system in a liver transplant patient. A successful SG was reported in a previous case of liver transplantation but it was performed as an open procedure.[6]

The minimally invasive approach in transplanted patients should be attempted first as it reduces the surgical trauma and wound infection. It can also help to reduce the complication rate, as well as the short- and medium-term survival of the implanted graft.[16] The advantages of the robotic system include three dimensional vision, a stable surgical platform, articulated instruments, a fourth arm, and different energy sources that are available. These advantages help to facilitate the

complex steps that are required when performing surgery following liver transplantation, including adequate exposure and lysis of adhesions. The use of robotic technology can also help to reduce the risk of perforation or hemorrhage during adhesiolysis. In this case report, a meticulous adhesiolysis was performed without any organ injury and with minimal blood loss.

We consider robot-assisted minimally invasive sleeve gastrectomy to be a safe alternative for the treatment of obesity in the transplanted patient. It results in superior weight loss results as compared to gastric banding and involves no malabsorption. More data and a larger series are still needed in order to draw definitive conclusions regarding long-term outcomes and complications of bariatric procedure following transplantation.

DISCLOSURE

The authors have no conflicts of interest or financial ties to disclose.

KEYWORDS: Bariatric Surgery – Sleeve gastrectomy – Liver transplant - Obesity

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Figures Legends

Figure 1. Schematic figure of the positioning of the trocars. (C) Camera port; (A) Assistant port; (R1) Robotic rigth arm port; (R2) Robotic left arm port; (R3) Robotic third arm port;

Figure 2. Lysis of adhesion between liver and stomach.

Figure 3 A. Gastric tubular resection. **B.** Reinforcement of the suture line.