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Robotic Conversion of Sleeve Gastrectomy to Gastric Bypass With Large Hiatal Hernia Repair

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Introduction

Approximately 60% of the US population is overweight and 30.5% of the population is obese[1,2]. The prevalence of morbid obesity in the Western world has steadily increased over recent decades[3]. Currently, the most effective means of losing substantial weight and maintaining that weight loss remains bariatric surgery[3,4,5].

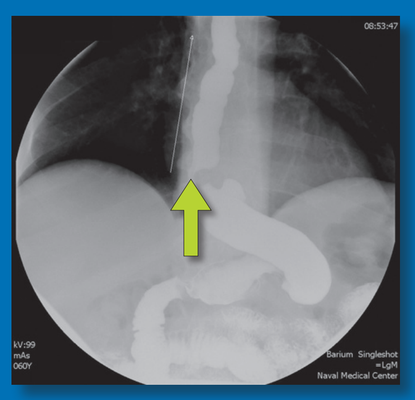
The favorable outcomes of bariatric operations in the treatment of obesity together with improvements in laparoscopic techniques have markedly increased the acceptance and demand for bariatric operative interventions in the past decade6. An estimated 130,000 bariatric procedures were performed in 2005 compared with 14,000 in 19987. Concomitant with the rising prevalence of patients who have undergone bariatric surgery is an increasing incidence of patients requiring revisional operations for unsuccessful weight loss or complications of bariatric procedures. Revisional surgery has, therefore, become an important aspect of modern bariatric care.

The success of the laparoscopic approach for primary bariatric surgery is well documented, however reoperative bariatric surgery is often technically demanding and associated with a higher complication rate. Our program has introduced the use of robotic surgery to aid in limiting these challenges. We present the beneficial use of robotics to perform conversion of a sleeve gastrectomy (SG) to a long limb gastric bypass (LL-GBP) with a large hiatal hernia repair (HHR) using a minimally invasive approach.

Methods

The patient is a 56 year-old super-super obese man with a BMI of 66 kg/m^2 and PMHx of OSA, DM II, HTN, CAD and CHF. His PSHx is significant for OS cataract surgery. After a thorough bariatric evaluation, he was deemed a suitable candidate for weight loss surgery and, initially, underwent an uncomplicated laparoscopic vertical sleeve gastrectomy as a first-stage procedure.

One year post-operatively, he experienced a 35% extra-body weight loss (EBWL) equal to a 131 lbs total weight loss. At the second annual post-operative appointment, his BMI remained stable at 48 kg/m^2 and he weighed 358 lbs. An evaluation with upper endoscopy and upper GI series revealed a large hiatal hernia.



He was deemed a suitable candidate for a second-stage weight loss procedure to offer further gastric restriction as well as a malabsorptive component. Consent was obtained for conversion to a LL-GBP with a HHR. The video accompanying this poster demonstrates the use of robotic surgery to perform this complex operation.

Results

Successful completion of robotic conversion of SG to LL-GBP with large HHR (Fig 5). The operation was performed in 210 mins with less than 50 cc of estimated blood loss. He was discharged home on POD 2 and his recovery was uneventful. At the 7th month post-op visit, he lost an additional 21% EBW for a total of 55% and lost an additional 60 lbs for a total 166 lbs weight loss. His co-morbidities significantly improved with no CPAP needed and DM II resolution as well as a decrease in his medication requirement for HTN and CHF.

Interval Post-op Course

Post-op Appt	Weight Loss
1 year	35% EBWL; 131 lbs
2 year	stable BMI = 48; 358 lbs

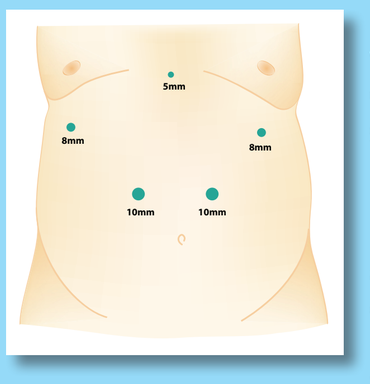
Hospital Course

OR Time	210 minutes
Estimated Blood Loss	< 50 mls
Length of Stay	2 days

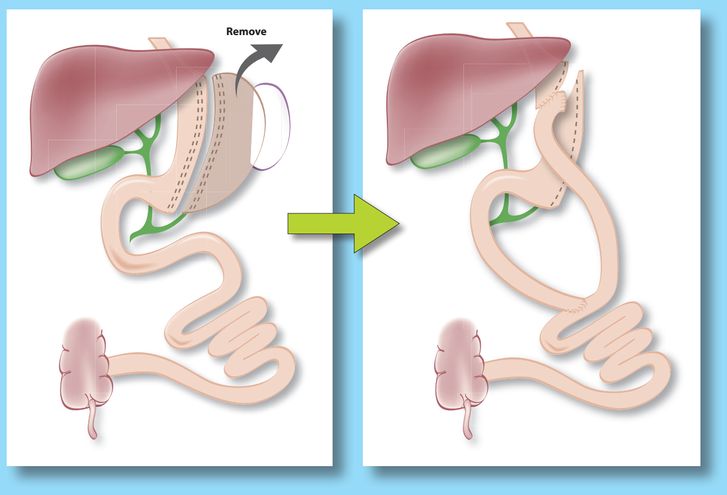
Results

	7 months
EBWL	21% (55% total)
Weight Loss	60 lbs (166 lbs total
Co-morbidities Resolved Improved	 OSA, DMII HTN, CHF
Complications	none

Technique



Access to the abdomen was achieved using an optical trocar under visual guidance in the right pararectus position with the remaining trocars placed under direct visualization after insufflation. Initial exploration of the abdomen revealed the expected post-surgical anatomy and no contraindications for the planned procedure. The same 5 ports were used for the laparoscopic and robotic portions of the operation.



Sleeve Gastrectomy → Gastric Bypass

Laparoscopic Phase

Reduction of Hiatal Hernia
- Circumferential mobilization of the distal esophagus, reduction of the stomach into the abdominal cavity and resection of hernia sac
- Hiatal defect was later closed during the robotic phase

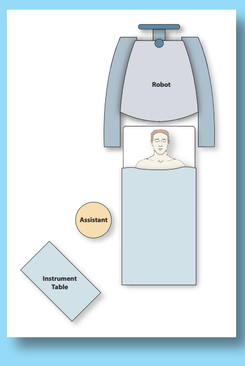
Creation of Gastric Pouch
- Peri-gastric technique along lesser curve used to gain access to the lesser sac.
- Use of endo-GIA stapler to divide stomach transversely 5-7 cm from the gastro-esophageal junction to create the gastric pouch

Roux-en-Y Reconstruction
- Ligament of Treitz was identified with omentum and transerve colon retracted cephalad
- Proximal jejunum (or biliopancreatic limb) was measured 100 cm and divided.
- Additional 150 cm of jejunum (or the roux limb) was measured and a stapled jejuno-jejunostomy was created
- Mesenteric defect was closed with running permanent suture
- Proximal roux limb was tacked to the gastric pouch in preparation for the robotic phase of the operation

Robotic Phase

Crural Repair
- After steep reverse Trandelenberg positioning, the robot was docked
- Crural defect was repaired with pledgeted permanent suture

Creation of Gastro-jejunostomy
- 34 French orogastric tube was placed orally for sizing and a 2 layered, sewn anastomosis was completed
- A methylene blue leak test was negative



Conclusion

Surgical treatment of the super-super obese (BMI > 60 kg/m^2) has been a significant challenge with a higher peri-operative morbidity and mortality. Commonly, this patient population is approached with a two-staged operative plan. The first operation consists of a lower risk procedure that offers gastric restriction, namely a laparoscopic vertical sleeve gastrectomy. After 12-24 months when the patient has a lower BMI and lower operative risk, the second-stage procedure is performed to offer further gastric restriction as well as a malabsorptive component. Traditionally, this procedure is a biliopancreatic diversion with duodenal switch (BPD-DS). However, another option is the Roux-en-Y gastric bypass (RnYGBP), which is the most commonly performed weight loss procedure in the United States, and has been performed as a replacement for the BPD-DS with good success[8].

These reoperative bariatric procedures introduce a higher morbidity and mortality compared to elective procedures. To reduce the challenges in these advanced minimally invasive operations, surgical robotics has been integrated into our bariatric surgical program. The advantages include improved ergonomics, microprecision articulating instruments, less abdominal wall trauma and 3-dimensional optics. Robotic surgery has been used to perform a variety of bariatric procedures in the literature, has shown a significant decrease in morbidity and mortality for the RnYGBP[9] and may aid in the reduction of surgical risks and complications of complex revisional bariatric procedures.

References

1) Ogden CL, Carroll MD, Curtin LR et al. Prevalence of Overweight and Obesity in the United States, 1999-2004. *JAMA.* 2006;295(1):1549-55.

2) Hedley AA, Odgen CL, Johnson CL et al. Prevalence of Overweight and Obesity Among US Children, Adolescents, and Adults, 1999-2002. *JAMA.* 2004;291(23):2847-50.

3) Buchwald H, Avidor Y, Braunwald E, et al. Bariatric Surgery: A Systemic Review and Meta-Analysis. *JAMA.* 2004;292(14):1724-37.

4) Christou NV, Sampalis JS, Liberman M, et al. Surgery Decreases Long-Term Mortality, Morbidity, and Health Care Use in Morbidly Obese Patients. *Ann Surg.* 2004;240(3):416-424.

5) Brolin RE, Cody RP. Weight Loss Outcome of Revisional Bariatric Operations Varies According to the Primary Procedure. *Ann Surg.* 2008;248(2):227-232.

6) Nguyen NT, Root J, Zatnabadt K et al. Accelerated Growth of Bariatric Surgery with the Introduction of Minimally Invasive Surgery. *Arch Surg.* 2005;140:1198-1202.

7) Santry HP, Gillen DL, Lauderdale DS. Trends in Bariatric Surgical Procedures. *JAMA.* 2005;294(15):1909-1917.

8) Regan JP, Inabnet WB, Gagner M, Pomp A. Early Experience with Two-Stage Laparoscopic Roux-en-Y Gastric Bypass as an Alternative in Super-Super Obese Patient. *Obes Surg.* 2003;13:861-864.

9) Snyder BE, Wilson T, Leong BY, Klein C, Wilson EB. Robotic-Assisted Roux-en-Y Gastric Bypass: Minimizing Morbidity and Mortality. *Obes Surg.* 2010;20:265-270.