Vejovis Journal

Robotic Sleeve Gastrectomy for Morbid Obesity Our initial experience

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Abstract

AIM OF THE STUDY: We evaluated the initial result and the very short-term outcomes of Robotic Sleeve Gastretomy at our Institution.

METHODS: A retrospective analysis of the initial 10 patients who underwent Robotic Sleeve Gastrectomy (RSG), between September 2019 and March 2020, was performed. The aim of this study was to assess the safety, the operative time and short-term efficacy of RSG as a treatment option for weight reduction. Data collected included operative time, perioperative complications, length of hospital stay.

RESULTS: Our initial 10 morbidly obese patients, who underwent RSG had an average preoperative BMI 44.6 kg/m2. There were 8 women and 2 men, with mean age 48.6 (range 30 to 61 years). Mean operative time was 1.5 hour (range 1.0-2.0). We had no conversion to open or laparoscopic procedure. There were neither postoperative complications nor mortality. Median hospital stay was 4 days.

CONCLUSIONS: In our initial experience, RSG is a safe and effective treatment option for obese patient. Follow-up will be necessary to evaluate long-term results.

Introduction and Background:

During the last decade, the advent of the da Vinci Surgical System (Intuitive Surgical, Sunnyvale, CA, USA) has enabled many complex procedures to be performed with minimally invasive techniques in bariatric surgery [3]. Sleeve gastrectomies are a less technically demanding procedure, and for this reason, we used them to gain confidence and operative skills using the da Vinci system in our learnig curve.

There is a strong interest in the surgical treatment of morbid obesity in concomitance with the epidemic of obesity. Bariatric surgery proved effective in providing weight loss and correction of comorbidities. Robotic Roux-en-Y gastric bypass (RRYGB) and Robotic Sleeve Gastrectomy (RSG) are the most commonly performed surgical procedures for weight reduction in Robotic Surgery Centers. There are hormonal modifications induced by RSG that differ from those found after a purely restrictive procedure, involving Ghrelin, Glucagon-like peptide 1, Peptide YY and oxyntomodulin.

Patients and methods From September 2019 to March 2020, 10 patients underwent Robotic Sleeve Gastrectomy (RSG). There were 8 women (80%) and 2 men (20%), with a mean age 48.6 (range 30 to 61years). Average preoperative BMI was 44.6 kg/m2. Patient's comorbidities included sleep apnea in 4 patients (40%), hypertension in 4 patients (40%), NIDDM in 6 patients (60%) and hypertriglyceridemia in 5 patient (50%).

Technique: Patient is given I.V. antibiotic prophylaxis and low-molecular weight heparin 40 mg in the holding area. The procedure is performed with the patient supine. Foley catheter and orogastric tube after intubation.

PORTS PLACEMENT: A 12 mm port is placed at the umbilicus for the placement of an Air Seal. Under direct vision. A 11 mm port is placed 20 cm below the target anatomy area (that was considered at the fundus of the stomach level) and 4 cm to the right of the midline. A 8 mm port is placed 8 cm on the right at the same level. A 8 mm port placed 4 cm on the left of the midline and a 8mm port at a 8 cm distance at the same level. (Fig.1)

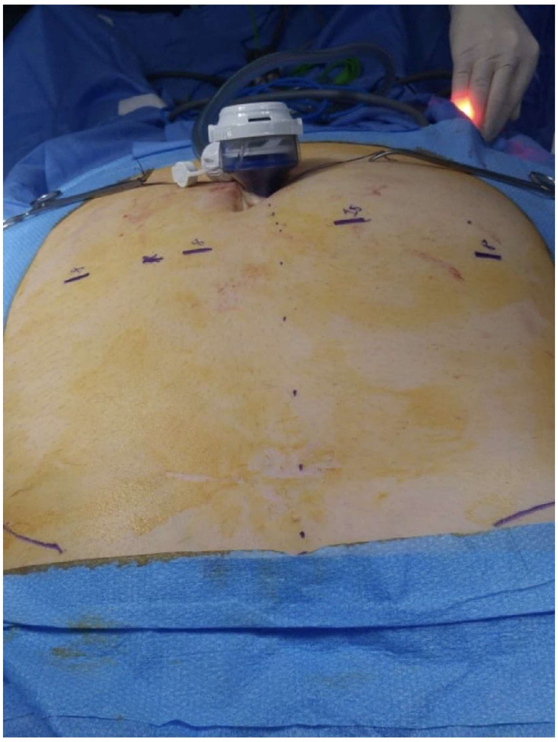

Fig.1

The robotic cart is positioned over the patient's right (which was covered with head protection designed for this purpose). (Fig.2)

Fig.2

Once the general setup was ready, the procedure begins with the console surgeon using a bipolar grasper in the left hand and a Vessel Sealer in the right hand. (Fig.3)

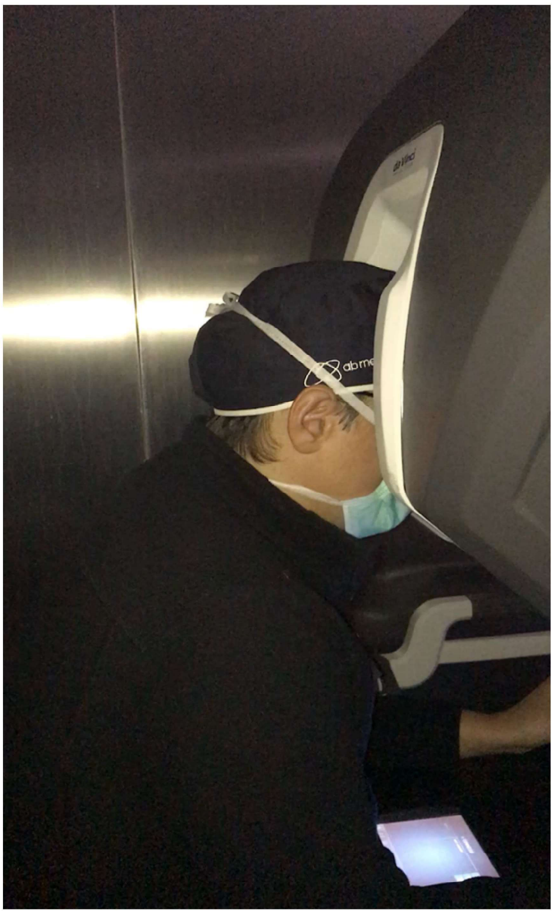

Fig.3

The third da Vinci arm used another forceps in order to retract the liver from the 8 mm trocar placed in the right-hand side of the patient.

The greater curvature of the stomach is sectioned at the lowest point in order to reach the lesser epiploic sac. The division of the gastrocolic and gastrosplenic ligament continues exactly as in a standard

LSG. The robot ensures precision in the upper part of the stomach, in order to avoid any injury to the spleen and properly visualize the vessels. Dissection continues up to 6 cm from the pylorus following dissection of the upper part of the stomach.

At this stage of the procedure, the anaesthesiologist inserts a 29 Fr bougie to calibrate the sleeve. A robotic stapler (Sureform 60cm) is used to divide the stomach from the lowest tip of the greater gastric curvature, 6 cm proximally to the pylorus (Fig.4), towards the lateral edge of the bougie. Then, the anaesthesiologist fills the sleeve with diluted methylene blue in order to detect any leakage from the staple line.

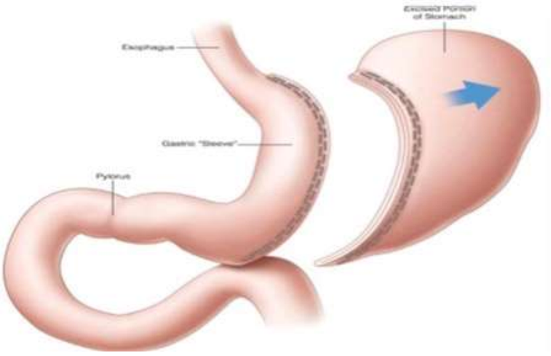

Fig.4

Postoperative care

During the first 24 hours after the operation, all patients receive only intravenous fluids, morphine PCA and low molecular weight heparin. On postoperative da 1, the patients are encouraged to ambulate and on postoperative day 2, the I.V. fluid and morphine PCA are discontinued. The patients start to take liquids on postoperative day 3, that is Stage 1 diet, according to our Bariatric diet protocol (Tab.1).

They are discharged on postoperative day 4 with a Stage 2 bariatic diet, according to our Bariatric protocol, on oral pain medication prn, PPI's P.O. and low molecular heparin SQ for 2 weeks.

BARIATRIC DIET

Stage 1 (Small portions of sugar-free clear liquids).
Begin: Post-op — Day 1
Diet instructions: Three fluid ounces (90cc) of regular bouillon or diet Jello® per meal, plus three to five ounces of water or flat diet ginger ale per hour between meals (as long as fluids do not exceed eight ounces/hour)
Fluid goal: as tolerated • Patient is instructed to sip slowly, and to stop as soon as they experience the first feeling of fullness. (No more than eight ounces over one-hour period). • Diet ginger ale must be flat to avoid stomach discomfort. • Do not use straws. No carbonated beverages. • Patient to record all fluids taken in. • Patient must use one-ounce medicine cups to avoid drinking too fast.

- Sugar-free, clear liquids All beverages that are flat, caffeine-free and ten calories or less per serving are allowed
- Water • Sugar-free, non-carbonated beverage — such as Crystal Light® • Sugar-free fitness beverage — such as 0 calorie Propel Fitness Water® • Bouillon or broth • Decaffeinated coffee and tea
-“Flat” decaffeinated diet soft drinks such as flattened diet ginger ale • Diet Jell-O® or Gelatein 20®
- Tomato or V-8 juice® • Sugar-free popsicle: (less than 20 calories each; limit two to three per day)

Stage 2 (Protein shakes primarily-) Begin: Post-op — Day 2. Duration: Two weeks

Diet instructions: Approximately three protein shakes per day plus two to three snacks per day. Fluid goal: 48-64 ounces per day Protein goal: Minimum of 60 grams of protein daily • The objective of this stage is to provide the patient with enough protein for adequate nutrition and to aid in healing, while minimizing injury to the stomach. • The patient needs to keep food records, monitoring food and fluid intake. • Liquids should be sipped slowly over the course of an hour. Do not exceed more than eight ounces of fluid in one hour. • If protein intake continues to be inadequate one week after surgery, please notify the dietitian or medical provider.

– Fluid options All beverages that are flat, caffeine-free and 10 calories or less per serving are allowed
- Water • Sugar-free, non-carbonated beverage —
- Bouillon or broth
- Sugar-free fitness beverage
-Decaffeinated coffee and tea
-“Flat” decaffeinated diet soft drinks such as flattened diet ginger ale
-Diet Jell-O® or Gelatein 20®
-Tomato juice)

– High protein liquid drinks

Guidelines for high protein supplement: Calories: 150-250 calories/serving Protein: minimum of 12 grams/serving Sugar: maximum of 10-15 grams/serving

-Non-fat milk powder can be added to shakes for additional protein of 6 grams per 1/4 cup.
-Non-fat or 1% milk
-Tomato or low-fat cream soup (made with skim milk) 8 oz 6 0-2 85
- Sugar-free pudding (made with skim or 1% milk) 4 oz 6 0 76
-No sugar added cocoa (made with skim or 1% milk) 1 packet in 6 oz of milk 7 0 100
-Greek yogurt: Fat-free 6 oz 15-18 o 100-120

Tab.1

Our surgical follow up is at one week, one month and every three months thereafter, for the first year, then yearly. The patient will see an endocrinologist and dietician at our Institution 2 weeks postoperatively and follow up with them.

Results:

Mean operative time was 1 hour (range 0.8-1.5). We had no perioperative complications and no mortalities. Length of stay was 4 days in all patients. Postoperatively, all ten patients did extremely well. All of them reported immediate great reduction in total daily ingestion and early and prolonged satiety.

All patients returned to their regular activities within 4 weeks postoperatively.

Discussion:

With Robotic Sleeve Gastrectomy (RSG we inform our patients about the risks and benefits of the procedure and anticipate the possibility of a second stage operation in case of weight regain. RSG seems a safe operation for the high-risk and super super-obese (body mass index >60 kg/m2 patients and an alternative for the super obese (BMI 50-60) and morbid obese (BMI 35-40) patients. Sleeve gastrectomy is a purely restrictive operation that reduces the size of the gastric reservoir to 80–100 mL, permitting the intake of only small amounts of food and imparting a feeling of satiety earlier during a meal. It has been performed laparoscopically with good results [1]. In 2000, the Food and Drug Administration (FDA) approved the da Vinci Surgical System (Intuitive Surgical Inc, Sunnyvale, CA, USA) for use in general laparoscopic surgery, and since then many surgeons have used this system in order to improve their surgical outcomes [5]. It has also been used in bariatric surgery to complete demanding surgeries such as GBP, which requires high levels of expertise even in trained surgeons [6, 7].

Our data support the conclusion that both setup and docking of the robot can be achieved within an acceptable time after the learning curve. The learning curve process may have a low impact on overall surgical time. Set-up time and docking time were recently evaluated for different robotic surgeries, and it was shown that they could be initially time consuming but that they are easy to learn and have steep learning curves [8]. The same was found in our initial experience working with the same scrub-nurse team and the same surgical team members.

It is known that sleeve gastrectomy is a less technically demanding procedure compared to gastric bypass. However, when implementing new technologies such as robotic assisted surgery, it can be a more amenable procedure than gastric bypass.

Conclusion

Robotic Sleeve Gastrectomy (RSG) seems a safe treatment option for the high-risk and super super-obese patient and as a one stage procedure for the morbidly obese patients. Despite our initial experience is limited, Robotic Sleeve Gastrectomy seems a safe procedure.

Our early experience in RSG suggests that robotic surgery is safe, feasible, and could be an effective alternative to the conventional laparoscopic approach in bariatric surgery. Robotic surgery gives all the benefits of the laparoscopic approach, with added benefits in some challenging surgical cases.

Completion of a learning curve is mandatory even in experienced laparoscopic surgeons before undergoing technically demanding robotic procedures such as the Robotic Roux en Y Gastic Bypass(RRYGB). Despite the lack of tactile feedback, the long set-up time and continued high costs, robotic systems seems to be very useful in particularly challenging surgeries. According to our criteria and our results, the learning curve for a console surgeon for sleeve gastrectomy should be completed by around 10 cases. Once this point has been reached and the operator is confident in suturing and docking with the robot, more challenging techniques can be considered.

In our experience, sleeve gastrectomy can be achieved safely and could be considered as a preliminary step prior to attempting more complex bariatric procedures through a robotic assisted approach.

Conflict of Interests

The authors' declare that there are no conflicts of interests.

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Keywords: Robotic Bariatric Surgery, Ghrelin, Glucagon-like peptide 1, Morbid obesity, Peptide YY, Sleeve gastrectomy, Surgery, Weight loss.

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