SCIENTIFIC PAPER JSLS

Single-Incision Versus Conventional Laparoscopic Adjustable Gastric Banding

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ABSTRACT

Background and Objectives: Laparoscopic adjustable gastric banding is an effective and popular bariatric surgery for weight loss in obese patients that traditionally involves up to 5 incisions. Recently, a more minimally invasive single-incision technique has been developed. In this retrospective study, we compare conventional and single-incision laparoscopic adjustable gastric banding with regard to weight loss and complication rates in a cohort of demographically similar patients.

Methods: From February 2009 to February 2010, 59 patients underwent laparoscopic adjustable gastric banding by one surgeon at an outpatient surgery center. All patients were compared by age, sex, preoperative body mass index, 30-day complication rates, and excess weight loss. Thirty-seven operations were performed by a conventional, 5-incision technique, whereas 22 patients underwent the single-incision technique. The success of these techniques was determined by comparing complication rates and average percentage excess weight loss at 6-month follow-up intervals.

Results: Patients who underwent conventional laparoscopic adjustable gastric banding had a mean age of 41.2 years and preoperative body mass index of 48.2 kg/m^2 compared with 43.9 years and 40.3 kg/m^2, respectively, for the single-incision patients. The mean operative time in the single-incision group was longer than that in the conventional group: 47.1 minutes versus 37.4 minutes ($P = .0027$). The overall percentage excess weight loss was not statistically different between the 2 groups for each follow-up period. There were no complications or deaths in either group.

Conclusion: Although patients undergoing bariatric surgery may choose the single-incision technique for cosmetic purposes, this retrospective review comparing single-incision and conventional laparoscopic adjustable gastric banding shows longer operative times with equivalent weight loss and morbidity.

Key Words: Bariatric surgery, Laparoscopic surgery, Weight loss.

INTRODUCTION

Laparoscopic adjustable gastric banding (LAGB) is an effective and commonly used bariatric surgery for weight loss in obese patients. As one of the most common bariatric procedures performed worldwide, the procedure has gained popularity in the United States since it received Food and Drug Administration approval in June 2001.[1,2] In addition to being efficacious, adjustable, and reversible, it is a minimally invasive procedure with a favorable safety profile and a low perioperative morbidity rate. Traditionally, adjustable laparoscopic gastric banding has been performed by use of 5 incisions, ranging from 5 mm to 3 to 4 cm in length. However, the advancement of surgical instrumentation and training has allowed for the development of a more minimally invasive surgical technique with single-incision laparoscopic adjustable gastric banding (SILS LAGB). With the introduction of natural orifice transluminal endoscopic surgery, laparoscopic surgery is being challenged to introduce even less invasive strategies with fewer incisions for trocars as in single-incision laparoscopic surgery (SILS).[3–5] In this study we seek to compare conventional LAGB and SILS LAGB with regard to weight loss and complication rates in a cohort of demographically similar patients. Aside from cosmesis, the benefits and drawbacks of SILS continue to be investigated.

METHODS

This study is a retrospective review of all LAGB procedures, both conventional and SILS, performed by one surgeon at an outpatient surgery center from February 2009 to February 2010. During this period, 59 patients underwent LAGB. Data for these patients were gathered from outpatient clinic records, operative reports, and electronic medical records. All patients were compared by age, sex, preoperative body mass index (BMI), 30-day complication rates, and excess

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DOI: 10.4293/108680813X13654754535034

weight loss (EWL). The type of operation performed was determined by the patient's preference. Thirty-seven of the operations were performed using a conventional, 5-incision LAGB technique. Twenty-two patients had SILS LAGB through an incision placed either in the left upper abdomen or in the periumbilical region. The technique involves placing two 5-mm trocars and one 15-mm trocar through the single incision. Liver retraction was accomplished through elevation of the left lateral lobe with elastic stays from the Lonestar Retraction System (Cooper Surgical, Trumbull, CT) or placement of a 2.5-mm specially formed K-wire placed through a minute stab wound in the epigastrium. We retrospectively assessed the success rates of these different techniques with regard to general rates of complications and average percentage EWL over three 6-month periods for a total of 18 months.

RESULTS

Thirty-seven patients underwent conventional LAGB (27 women and 10 men) with a mean age of 41.2 years and mean preoperative BMI of 48.2 kg/m^2. The 22 patients in the SILS group (21 women and 1 man) had a mean age of 43.9 years and mean preoperative BMI of 40.3 kg/m^2. The patients in both groups had an average of 2.1 morbidities, including arthritis, diabetes, hypertension, coronary artery disease, asthma, dyslipidemia, gastroesophageal reflux disease, joint pain, menstrual irregularity, sleep apnea, and an abdominal hernia. Although there were similar medical comorbidities in each group, a higher percentage of women chose to undergo SILS LAGB. The mean operative time in the SILS group was longer than that in the conventional LAGB group: 47.1 minutes versus 37.4 minutes ($P = .0027$). There were no complications or deaths in either group (**Table 1**). The overall percentage EWL was not statistically different between the 2 groups for each follow-up period (**Table 2**).

Table 1.
Demographics

	LAGB	SILS LAGB	*P Value*
No. in cohort	37	22	
Mean age, yr	41.2	43.9	
Average preoperative BMI, kg/m^2	48.2	40.3	.0001
Mean operative time, min	37.4	47.1	.0027
Sex, % female	72.9	95.5	.08491

Table 2.
EWL Comparisons

Follow-Up	LAGB (%)	SILS LAGB (%)	*P Value*
0–6 mo	17.0	18.3	.3008
7–12 mo	30.9	28.7	.7317
13–18 mo	44.6	44.2	.9645

DISCUSSION

Minimally invasive surgery for weight loss has become a common practice in bariatric surgery in the past 10 years because of the reported decreased postoperative pain, shorter hospital stay, and increased patient satisfaction.[6] In the same respect, LAGB has become a standard bariatric surgery technique and has been proven safe and effective.[7] The attempt to continue to minimize and improve minimally invasive surgery has led the push behind SILS LAGB. Instead of having 5 individual incisions, this technique uses only 1 incision for all of the ports. In theory, patients should have decreased postoperative pain, improved cosmesis, and increased satisfaction.[5,8] Although this was not specifically addressed here, cosmesis has been noted to be important to obese patients. Up to 70% of patients undergoing bariatric procedures are women who consider scarring to be an important factor.[6] Patients also consider the number of scars to be important to their cosmetic satisfaction and thus advocate for single-incision surgery more versus traditional multiincision laparoscopy.[9] We did not specifically address the issue of cosmesis, but the patients who received SILS through the periumbilical incisions have their scars completely hidden in the umbilical fold, which provides these patients with an obvious cosmetic benefit. Studies that have shown that pain is actually increased after SILS surgery attribute it to the excessive retraction of the fascia in the small single-incision space.[4] Two studies comparing SILS LAGB with conventional LAGB have shown decreased postoperative analgesic requirements and a shorter duration of outpatient analgesic use.[10] Although it was not measured here, we did not appreciate any increased pain medication requirements in our cohort. However, it must first be proven to be a safe and effective method of performing weight loss surgery.

The results from this study show that SILS LAGB can be performed safely and effectively. Different incisions were used during SILS LAGB, either in the left upper abdomen or in the periumbilical region, based on the case number in the cohort, preoperative BMI, and body habitus. Incidentally, both of these port placement sites showed no statistical difference in estimated weight loss compared with the conventional 5-port LAGB. As mentioned in the "Methods" section, some patients had an additional minute stab wound in the epigastrium for a specially formed K-wire liver retractor

to be placed. We believe that this did not significantly violate the "cosmesis" of the procedure but did improve our visualization and, thereby, the safety of the technique. Neither group had any postoperative complications or deaths. There has been some concern that this larger single incision might result in increased subsequent incisional hernias; however, none of our patients have returned with this problem. Similarly, no incisional hernias were noted in a 2-year follow-up of patients who underwent SILS LAGB with a similar multifascial trocar technique.[11] Despite the fact that the periumbilical incision provided the best cosmetic option for the patient, we did note some increased difficulty in accessing the port in this location during postoperative adjustments because of the curvature of the abdomen in the periumbilical region. This may play a role in deciding where to place the port in SILS. Other studies have noted that an umbilical incision may not be the ideal choice because it is located too far from the phrenoesophageal area, the angle of dissection and the view are too shallow, and it is difficult to move the instruments in the correct direction from the midline.[3,8]

A notable difference in this study occurred in patient selection; SILS LAGB patients had a lower mean BMI than conventional LAGB patients. This is attributable to patient preference, with patients with lower BMIs frequently requesting a more esthetically pleasing outcome. Although not statistically significant, the percentage of female patients requesting SILS LAGB was higher than the percentage who preferred the traditional conventional approach, further supporting other studies that show the importance of cosmesis especially in female bariatric patients.[6,12] In addition, the operative time with the SILS technique was longer, but this is expected to decrease as the experience with SILS increases. Other articles have also noted the increased operative time with SILS compared with conventional port placement, attributing it to the learning curve with any change in procedure and also increased technical difficulty with limited instrument triangulation and lack of tissue retraction.[4,5,8,13] Further experience, ideal port placement, and technology improvement should all help to make SILS and conventional LAGB more comparable in these areas. With appropriate advanced laparoscopic training, less experienced surgeons should be able to duplicate the safety profile.

To further evaluate the advantages of SILS versus conventional LAGB, a larger cohort of patients studied over a greater period is required. Although it seems obvious, further evaluation of the perceived cosmetic benefits of the patients in the SILS group compared with the conventional group is needed, along with additional investigation of ideal port placement in the SILS technique, in either the left upper abdomen or the periumbilical region.

CONCLUSION

This study showed that EWL and complication rates were similar between LAGB patients and SILS LAGB patients in our cohort. Although not specifically evaluated, it appears that cosmesis may be one benefit of an SILS approach that may offset the longer operative time. As instrumentation and technique improve, SILS LAGB may become more available to a wider patient population.

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