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Laparoendoscopic single-site gastric bands versus standard multiport gastric bands: a comparison of technical learning curve measured by surgical time

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Abstract

BACKGROUND: We aimed to evaluate our learning curve comparing surgical time of laparoendoscopic single-site (LESS) banding with multiport laparoscopy.

METHODS: We performed a retrospective analysis of prospectively collected data comparing our first 48 LESS bands with our first 50 multiport laparoscopic bands at our institution. We then compared the first 24 LESS bands with the last 24 bands.

RESULTS: The average body mass index for the LESS group was significantly lower than for the laparoscopic group (43.19 vs 48.3; $P < .0001$). The surgical time was much faster toward the second half of our experience performing the LESS procedure (85.34 vs 68.8; $P = .0055$). LESS banding took significantly longer than our early traditional laparoscopic adjustable gastric banding (76.85 vs 64.4; $P = .0015$).

CONCLUSIONS: We conclude that in experienced hands, single-incision banding is feasible and safe to perform. Long-term data are needed to prove that LESS banding is as good a surgery as traditional laparoscopic surgery.

Bariatric surgery is becoming more prevalent today because of the increasing rate of morbid obesity. Similar to most other general surgical procedures, bariatric surgery has evolved from an open approach to a minimally invasive approach. In fact, the standard of care has been shifted from open gastric bypass to laparoscopic gastric bypass and laparoscopic adjustable gastric banding. Several studies have been published and peer-reviewed to show that minimally invasive bariatric surgery is as safe as and more cost effective than open bariatric surgery, as well as more cosmetically pleasing for the patients.[1,2] With the development of new technology and new surgical techniques, a trend has been developing toward more minimally invasive bariatric surgery in the form of laparoendoscopic single-site (LESS) surgery with the first single-incision surgery described by Navarra et al[3] in 1997.

Because of the complexity of bariatric surgery from a technical standpoint in patients who have central obesity and fatty livers, many have criticized the safety, effectiveness, and credibility of single-incision bariatric surgery. The improvement in technology including flexible cameras and curved or reticulating instruments have allowed for safe and effective bariatric surgeries through single incisions. Several small series have been published that have shown LESS

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Table 1 Patient demographics

	LESS (n = 48)	Multiport group (n = 50)	*P* value
Age, y	36.8	38.36	NS
Height, in	64.7	65	NS
Weight, lb	255.7	291	<.0001
BMI, kg/cm^2	43.19	48.3	<.0001
Hiatal hernia, %	14.8	10	NS
EWL, %	11.2	12.5	NS
Surgical time, min	76.85	64.4	.0015

banding to be as safe as laparoscopic adjustable gastric banding (LAGB) with comparable postoperative pain, hospital stay, operating room cost, and surgical time.[4,5]

After achieving a vast amount of experience in band placement at our institution, and with the desire to implement new and innovative technology, we have applied single-site surgery to gastric banding. As with any new technology and surgical procedure there is a learning curve before becoming proficient in the procedure. The purpose of our study was to evaluate this learning curve as measured by surgical time. Very early weight loss data also were examined as the initial step comparing effectiveness (Table 1).

Methods

This study was a retrospective analysis of prospectively collected data from a cohort undergoing LAGB at a teaching community hospital. All surgeries were performed by one surgeon with the assistance of a rotating fourth-year level general surgery resident. Since the inception of the laparoscopic band program at our institution more than 1,200 patients have received lap bands using the pars flaccida technique with gastrogastric fundoplication using a running suture with 3 bites as well as an antislip stitch below the gastric band. These were performed using three 5-mm trocars and one 15-mm trocar along with the Nathanson liver retractor.

The charts of the first 50 LAGB procedures performed by the surgeon (his initial banding experience) were reviewed for surgical time, patient demographics, incidental hiatal hernia, and percentage of excess weight loss.

After more than 700 LAGB procedures had been performed, the first LESS procedure was performed at our institution in September 2009 with a total of 48 LESS bands to date. All LESS banding procedures were performed through a multichannel port. It has never been our belief to use a single incision with multiple separate fascial ports because we believe it leaves the patient more prone to develop hernias. The initial 20 procedures were performed with reticulating disposable instruments (RealHand, Novare Surgical Systems, Cupertino, CA), but owing to high cost, our institution switched to nondisposable curved instruments. A 5-mm flexible tip laparoscope (EndoEye; Olympus, Center Valley, PA) was used in each case, which enables superior visualization. A separate 2-mm stab incision was made in the subxiphoid region through which a Mini-Lap (Stryker Dobbs Ferry, NY) liver retractor was inserted. This retraction provides excellent exposure to the hiatus, which we believe to be paramount for successful lap band placement. We do not believe this leaves a noticeable scar on the patients' abdomen.

We compared the surgical times from the first 50 LAGB procedures performed with the 48 LESS bands performed by the same surgeon. We split our LESS data into early and late experience (first 24 and second 24 patients). The 2 groups were compared in the following categories: demographics, surgical time, complications, and 3-month excess weight loss.

Results

The 48 patients who underwent LESS had an average age of 36.8 years and their height, weight, and body mass index (BMI) were 64.7 inches (range, 56–69 in), 255.7 pounds (range, 209.2–343.9 lb), and 43.19 kg/cm^2 (range, 35.8–56.3 kg/cm^2), respectively. Three patients in this group were men and 45 patients were women. The demographics of the first 50 patients who underwent the standard multiport LAGB were as follows: average age of 38.36 years (range, 25–63 y), with an average height, weight, and BMI of 65 inches (range, 59–72 in), 291 pounds (range, 208–422 lb), and 48.3 kg/cm^2 (range, 37–64.1 kg/cm^2), respectively. All 50 LABG patients were women. By using the unpaired *t* test the difference in BMI was statistically significant ($P < .0001$), with the LESS cohort having a smaller BMI than the LAGB cohort.

The average surgical time for the LESS cohort was significantly longer than the surgical time for the standard multiport cohort with an average time of 76.85 to 64.4 minutes ($P = .0015$). However, when comparing the surgical time of the first 24 LESS patients with that of the last 24 LESS patients there was a substantial decrease in time, 85.34 versus 68.8 minutes, respectively ($P = .0055$). However, even the latter half of our LESS cohort had a significantly longer surgical time than our first laparoscopic experience, 68.8 versus 64.4 minutes ($P = .0001$).

Our early weight loss data do not show any statistically significant difference in excess weight loss with 3-month excess weight loss in the LESS group of 11.2% versus 12.5% in the laparoscopic group ($P = .79$).

No conversion to laparoscopy (conversion was considered when an extra trocar was placed or a formal Nathenson liver retractor was added) or laparotomy occurred and no intraoperative or postoperative complications occurred. Length of stay was always 1 day because it is our routine to keep patients overnight.

Retracting the liver allowed us to detect and repair hiatal hernias. Seven hiatal hernias were found during LESS band-