

**2 years follow up of wound complications associated with laparoendoscopic single-site adjustable gastric banding**

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## ABSTRACT

25 **Background:** In an effort to provide better cosmesis for patients, there has been a surge recently in the use of laparoendoscopic single-site adjustable gastric banding. There is little data, however, on the long-term wound complications resulting from this technique.

**Objective:** The authors conducted a retrospective review of patients to identify the extent of wound complications found during a minimum follow-up period of 2 years after the  
30 laparoendoscopic single-site adjustable gastric banding procedure. Complications evaluated included infection, hernia rates, and port and tubing complications.

**Setting:** All the laparoendoscopic single-site adjustable gastric banding cases were performed at University of Illinois Medical Center by a single surgeon.

**Methods:** Twenty five patients underwent single-site laparoscopic adjustable gastric banding  
35 between March 2009 and January 2010 and were reviewed retrospectively. The single incision was made with multi-fascial trocar placement using conventional laparoscopic instruments. Patients were followed up during band adjustments, clinic visits, and via telephone interviews.

**Results:** Six months after the surgery, one patient required port removal due to port site infection with internalization of the tubing. A second patient experienced a foul smelling clear discharge  
40 and was treated with antibiotics, with no additional consequences. No incisional hernias or flipped ports were noted.

**Conclusions:** In our experience, laparoendoscopic single-site adjustable gastric banding produced a low rate of port and wound site complications in patients during a minimum follow-up period of 2 years. The authors believe this is a valid alternative to the standard procedure,  
45 providing cosmetic advantages and a low wound complication rate in morbidly obese patients.

**KEYWORDS:** Bariatric Surgery – wound complication - Single incision – adjustable gastric banding

## Introduction

The laparoendoscopic single-site (LESS) procedure has been widely applied to all fields of surgery and its use continues to increase. In general surgery, several articles have been published on its use in various areas,<sup>1-4</sup> including bariatric surgery.<sup>5-6</sup>

The LESS approach is more challenging compared to traditional multi-port laparoscopy. This is due in large part to the lack of triangulation within a parallel working environment, an unstable visual field, and the need for counter-intuitive movements that require the use of specialized flexible instruments. Additionally, the lack of a first assistant requires the procedure be performed by a surgeon who is experienced in advanced laparoscopic skills.

The clear benefits of this approach are improved cosmesis and less pain. There are several studies evaluating the immediate perioperative and short-term outcomes, although the concern about long-term hernia rates remains unanswered.<sup>5,7-14</sup>

Herein, the authors present data on wound complications during a minimum follow-up period of 2 years after laparoendoscopic single-site adjustable gastric banding.

## Material and Methods

All the laparoendoscopic single-site adjustable gastric banding (LESS-GB) cases performed at the University of Illinois Medical Center by a single surgeon (SMA) were reviewed and analyzed. From March 2009 to January 2010, a total of 25 patients underwent LESS-GB and 24

were prospectively followed. One patient required reoperation for stoma obstruction, had a larger band placed in traditional multi-port approach, and thus was excluded from this series. Of the 24 patients, there were 22 women (88.5%) and 2 men with a median age of 38 years (range 18 to 59 years) and a mean body mass index (BMI) of 45.4 (range 35 to 59 kg/m<sup>2</sup>). Detailed  
75 demographics and surgical technique have been previously published.<sup>8</sup>

The band was inserted using a pars flaccid technique same as traditional multi-port placement. There were no special preoperative cleansing regimens followed. The abdomen was prepped with DuraPrep<sup>TM</sup> Surgical solution prior to surgery. A 4 to 6 cm incision was made in the supra-  
80 umbilical area. In order to accommodate 3 to 4 trocars placed through separate fascial entrances and to maximize the distance between these trocars to compensate for lack of triangulation and minimize the external collision, significant undermining of the wound was performed. The subcutaneous adipose tissue was cleared to show the clear fascia at the beginning of the procedure itself. A 5 mm low profile trocar was used to enter the abdomen under direct  
85 visualization, using a rigid 30 degrees camera. Additional 5 mm trocar Applied Medical® Low Profile Access System and a 15 mm regular trocar were placed. The adjustable gastric band (Realize<sup>TM</sup> Band, Ethicon, Cincinnati OH) was positioned in pars flaccid technique around the stomach and gastrogastic plication sutures were placed in hand-sewn technique. The tubing of the band was exteriorized through the 15 mm trocar fascial defect. 5 mm trocar fascial defects  
90 were closed with an absorbable suture. The port was secured to the abdominal fascia by the REALIZE® Injection Port and Applier device (figure 1) through the operative incision. The wound was closed in layers of running deep dermal and subcuticular layer with an absorbable suture. All of the wound closures were performed by a combination of fellow or

resident and medical students involved in the case.

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Patients were followed up several times over a minimum two year follow-up period, during clinic visitations and/or adjustment of bands. Patients who did not show up for in-person evaluation were followed up by telephone interview. Long-term wound complications were specifically sought. Data was collected prospectively in a dedicated bariatric database and reviewed retrospectively.

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## Results

During the study period, 24 patients underwent LESS adjustable gastric banding. All patients received a minimum of 2 years follow up, with an average of 33 months. Of the 24 patients, 20 patients (83.3%) were examined clinically by a surgeon and followed up with a fluoroscopic evaluation of the port and band during visits for band adjustment. The remaining 4 (16.7%) patients were followed up via telephone interviews. Patient co-morbidities, complications, follow-up and number of visit/adjustment are tabulated in table 3.

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In our series of 24 patients with a supraumbilical incision, the mean BMI was 45.4 (range 35 to 59 kg/m<sup>2</sup>) and the mean operative time was 78.8 min (range 25-129 min). One patient (4.2 %) required port removal with internalization of the tubing due to port site infection six months following surgery after having three adjustments and did not have band erosion. Another patient experienced a small amount of foul smelling clear discharge of the wound that was probed with a

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Q-tip in the ambulatory setting eight days after surgery. She was cautiously treated with oral

antibiotics without further sequel. There were no incisional hernias or flipped ports noted during the 33 months of follow up.

## **Discussion**

120 Laparoscopic adjustable gastric banding (LAGB) involves placement of a subcutaneous port with most surgeons extending one of the trocars site incisions in order to place the port. The LESS-GB procedure is very enticing because the incision used to perform the procedure is the same one used to place the port. This often requires placement of most ports through the single incision using a combination of multiple low-profile and regular trocars.

125 LESS-GB can require longer operative time with increased manipulation of trocars at tissue level due to the lack of triangulation, lack of a first assistant to perform exposure and retraction duties, and an unstable visual field. It requires relatively more undermining of subcutaneous tissue and multiple fascial defects are present in very close proximity. As such, it is believed that LESS-GB could lead to increased wound complications. Although most studies published to date have  
130 evaluated the perioperative outcomes, including wound complications (Table 1), without study of long-term outcomes.

Koh et al<sup>9</sup> reported a review of LAGB in 60 patients who had a periumbilical incision, with a  
135 minimum follow up of 6 months (range 6-15 months). The average BMI was 39.1 kg/m<sup>2</sup> (32-52kg/m<sup>2</sup>) and the average operative time was 55 min (range 30-160 min). Five patients had wound infections which were treated with oral antibiotics and dressing changes. The authors utilized a regiment of encouraging patients two weeks prior to surgery to clean the umbilicus

without undue trauma to skin and in the immediate preoperative period soaking the umbilicus  
140 with acriflavine wool or alcohol swab for 2 hours. The 15 mm trocar site fascial defect was  
closed with an absorbable suture.

Cheregi et al<sup>7</sup> reported single-incision laparoscopic surgery in 79 patients with an average BMI  
of 45 and a mean operative time of 67 min (range 40-94 min). One patient had the gastric band  
145 removed due to infection and a hernia at 14 months follow up.

At 2 years follow up, we identified two wound-related complications. One patient had a wound  
infection that presented at 6 months and involved internalization of the tubing with explantation  
of the port. It is worth noting that this patient's BMI was 52 with central morbid obesity and did  
150 not have band erosion. The infection was noted after third band adjustment. The second patient  
had the wound evaluated for small amount of foul smelling clear discharge during postoperative  
day eight which was probed with a Q-tip and cautiously treated with one course of oral  
antibiotics. None of these two patients presented any clear factors that would increase the risk of  
wound infection (table 3) and had same wound closing technique. There were no incisional  
155 hernias or port flips discovered under clinical and fluoroscopic evaluation. These factors were  
specifically sought after since at the onset of single site surgery most surgeons were concerned  
about long term hernia rates in the wound where several fascial defects were made in close  
proximity. We consider the "rule of threes" according to Hanley et al<sup>15</sup> be appropriate in this  
setting. Following this rule the larger the sample the less chance an incisional hernia occurs.  
160 Such that, the chance of this event is at the most three in the whole series, i.e., 3 out of 20

patients (excluding the telephone interviews that were not clinically evaluated) resulting in a 15% chance of occurrence of incisional hernia with 95% confidence interval.

However, in our experience of minimum two years follow up LESS-GB offered a comparable rate of complications related to the port and wound sites as reported in conventional and single-site laparoscopic gastric band placement (table 2). As previously published, our experience shows comparable pain with LESS-GB<sup>16</sup>, although other authors have reported increased pain with LESS-GB<sup>17</sup>.

#### **Conclusion:**

We believe LESS-GB can be proposed as a valid alternative to the standard procedure with a low complication rate in addition to the cosmetic benefit. Many studies have shown low wound complication rates in the immediate perioperative period and this study of minimum two years follow up finds similar low wound complication rates, as well as no incisional hernias or port-related complications (with a chance of 15% of occurrence ). Further studies based on larger series and longer follow up are needed to draw more definitive conclusions.

#### **Financial Disclosures**

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



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## Legends

Figure 1. REALIZE® Injection Port and Applier. A- Port applicator in position. B- Port applied

255 and fixed to the fascia.