



Best evidence topic

Does single-port laparoscopic sleeve gastrectomy result in improved short-term perioperative outcomes compared to conventional multi-port laparoscopic sleeve gastrectomy?



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ARTICLE INFO

Article history:

Received 30 March 2015
Received in revised form
2 August 2015
Accepted 6 August 2015
Available online 14 August 2015

Keywords:

Bariatric surgery
Laparoscopic sleeve gastrectomy
Morbid obesity
Single-incision surgery
Laparoscopic surgery
Minimally invasive surgery

ABSTRACT

A best evidence topic in bariatric surgery was written according to a structured protocol. The question asked whether single-port laparoscopic sleeve gastrectomy produces better short-term perioperative outcomes compared to the conventional multi-port laparoscopic sleeve gastrectomy in the treatment of morbid obesity. A Pubmed search generated 82 papers, 6 of which represented the best evidence to answer the clinical question. Of the 6, 1 paper was an updated analysis of the same patient cohort. The evidence on this subject is good. Five papers were level III, nonrandomized studies, 2 of which were prospective and 3 were retrospective cohort studies. The sixth paper was a level II, randomized, prospective study. We conclude that single-port laparoscopic sleeve gastrectomy results in less use of postoperative analgesia and better cosmetic satisfaction compared to multi-port laparoscopic sleeve gastrectomy in the short-term. The two groups showed comparable results in terms of mean operative time, mean hospitalization, and percentage excess weight loss. There was no difference in rate of postoperative complications including trocar site incisional hernia, staple line leaks, and bleeding.

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1. Introduction

A best evidence topic was constructed according to a structured protocol [1].

2. Clinical scenario

You are at your private practice discussing with a morbidly obese, middle-aged patient who is considering undergoing bariatric surgery, specifically a laparoscopic sleeve gastrectomy (LSG), to aid in the treatment of morbid obesity. You are skilled in performing laparoscopic sleeve gastrectomy both single-port and multi-port, so you offer the choice to your patient. He asks which approach is safest. You resolve to check the literature to determine

whether single-port LSG or multi-port LSG is associated with better perioperative outcomes in the short-term.

3. Three-part question

In patients undergoing laparoscopic sleeve gastrectomy for surgical treatment of morbid obesity, is a single-port or a multi-port approach superior in optimizing short-term perioperative outcomes?

4. Search strategy

A Pubmed search with both keywords and MeSH terms was performed as follows:

Search 1:

(transumbilical[All Fields] AND (“laparoscopy”[MeSH Terms] OR “laparoscopy”[All Fields] OR “laparoscopic”[All Fields]) AND sleeve [All Fields]) OR (“single person”[MeSH Terms] OR (“single”[All

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Fields] AND "person"[All Fields] OR "single person"[All Fields] OR "single"[All Fields] AND sleeve[All Fields] AND ("gastrectomy"[MeSH Terms] OR "gastrectomy"[All Fields]) AND versus [All Fields]).

Search 2:

("single person"[MeSH Terms] OR ("single"[All Fields] AND "person"[All Fields]) OR "single person"[All Fields] OR "single"[All Fields]) AND incision[All Fields] AND ("laparoscopy"[MeSH Terms] OR "laparoscopy" [All Fields] OR "laparoscopic"[All Fields]) AND sleeve[All Fields] AND ("gastrectomy"[MeSH Terms] OR "gastrectomy"[All Fields]).

5. Search outcome

Search 1 returned 46 results. Of these, 27 were irrelevant and 14 were not comparison studies between single and multi port approaches. The remaining 5 papers directly compared single port and multi-port LSG. Search 2 returned 36 results. Of these, 16 were irrelevant, 15 were not comparison studies, and 4 were the same papers found in Search 1. The remaining 1 paper directly compared single port and multi-port LSG. In total, 6 papers were found that directly compared single port and multi port LSG as surgical treatment for morbid obesity and were therefore chosen as the best evidence to answer the three-part clinical question. Of the 6, 1 paper was an updated analysis of the same patient cohort.

6. Results

A summary of the results of the five papers (two prospective, three retrospective) is presented in [Table 1](#).

7. Discussion

Laparoscopic sleeve gastrectomy (LSG), laparoscopic Roux-en-Y gastric bypass (LRYGBP) and laparoscopic adjustable gastric banding (LAGB) are commonly performed bariatric surgical procedures for weight reduction in the United States [8]. Usually the LSG procedure requires an average of five trocars plus the camera which is placed between the umbilicus and xiphoid [8,9]. However, given the success of single-port surgeries for numerous gynecologic and urologic procedures, a single-port approach to laparoscopic sleeve gastrectomy was developed and first reported in July 2008 [10]. Saber et al. described the potential advantages to this single-port approach, which include improved cosmesis and avoiding muscle penetration which minimizes postoperative pain, facilitates a more rapid recovery, and reduces wound complications [10]. Furthermore, avoiding lateral placement of ports eliminates the risk of epigastric vessel injury [10].

The single-port approach involves a critical learning curve, thus increasing the technical difficulty of the surgical procedure. Since all instruments are inserted through a single port, there is loss of triangulation and instruments frequently clash against each other and the laparoscope [3]. The surgeon thus has to adapt to such crossing of the instrument shafts. Additionally, if two instruments were placed too closely to each other in the incision, the entry point would be too tight so that the instruments would interfere with one another. The procedure also requires significant coordination between the surgeon and the camera holder [11].

Saber et al. further conducted a retrospective study comparing perioperative outcomes of single-incision LSG versus conventional multi-port LSG [3]. This study found a significant difference in mean postoperative pain scores and length of hospital stay. Those undergoing single-port LSG had a mean hospital stay of 1.7 days while those undergoing multi-port LSG had a mean hospital stay of 2.3 days ($p < 0.05$). The reported pain score in those undergoing a

single-port approach was 4 while those with a multi-port approach was 6.5 ($p = <0.05$). This lower pain score translated into a reduced need for opioid analgesia, with a 20% less use in the single-port LSG group than the multi-port LSG group. There was a slight increase in mean operative time in the single-port LSG (128 min) than the multi-port LSG (110 min). However, this was of borderline significance ($p = 0.055$). This modest increase in operative time for the single-port approach may be due to the relative inexperience in performing a single-port approach. A decrease in operative time is likely with improved mastery of the single-port procedure. Other secondary outcomes this study evaluated included resolution or improvement of comorbidities at 2.8 months including hypertension, diabetes, gastroesophageal reflux disease, hypercholesterolemia, stress urinary incontinence, back pain, arthritis, hypothyroidism, sleep apnea, and depression. The results were comparable in the two test groups. The percentage excess weight loss was 25.7% in the single-port group and 22.6% in the multi-port group. These results were comparable between the two groups. There were no intraoperative or postoperative complications at the 2.8 month follow up in either group. The limitations of this study include the nonrandomized, retrospective nature, small study size, and the short follow-up time. There was no report of conversion to open surgery or standard laparoscopy requiring need for additional trocars.

In 2014, Lakdawala et al. conducted a study that prospectively analyzed perioperative outcomes in single-port versus multi-port LSG in a larger group of 600 subjects over 2 years [4]. This study further demonstrated significantly less postoperative pain and need for analgesia as well as greater cosmetic satisfaction at 6 months in the single-port cases. Excess weight loss and resolution of comorbidities were comparable in both groups at 6 months, 1 year, and 2 years. This is the only study to analyze medium-term outcomes up to 2 years as well as short-term outcomes. Wound infection was seen in 2 patients who underwent the single-port approach while delayed incisional hernia from the trocar site was seen in 3 patients (1%). None of the patients in the multi-port group had an incisional hernia. There were 2 early leaks in the single-port approach and 1 leak in the multi-port group. This study does provide a robust amount of data, although the subjects were not randomized. Furthermore the generalizability of the data reported in this study may be limited as the single-port technique appears to have been refined during the study. The authors report that in the first 45–50 single-port LSG cases, it took up to 120 min in some cases to complete the procedure from skin to skin. However, as the technique became more standardized, the mean operative time decreased. After the first 100 cases of single-port LSG, the operating time decreased so that the overall average operating time for all 300 single-port subjects was 45 min. No conversion to open surgery or standard laparoscopy requiring additional trocars was needed.

Delgado et al. conducted a prospective study that addressed this topic [5]. In addition to demonstrating no difference in excess weight loss at 3 and 6 months or resolution of comorbidities at 6 months between the two groups, this was the only study to find a significantly greater operative time with the single-port approach (79.2 vs 54.1 min, $p = 0.002$). However, as with Lakdawala's 2014 study, the operative time for single-port LSG improved as more single-port cases were performed. The procedure was better standardized in the latter half of the cases. Complications at 30 days included 2 patients in the single-port group and 1 in the multi-port group who presented with postoperative hemoperitoneum requiring early reoperation 1 day after surgery. There were no operative wound infections in either group and no evidence of late stenosis or other complications during follow up at 3 and 6 months. There were no conversions to open surgery, but one patient in the

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