

A Short-Term Retrospective Analysis of the Titan SGS™ Stapler Versus Traditional Staplers in Laparoscopic Sleeve Gastrectomies

Jason Silvers MD*, Michelle Abramova DO, Jillian Cassidy PA-C, Mir Ali, Dena Arumugam MD, Seth Kipnis MD

Jersey Shore University Medical Center Department of Surgery 1945 NJ-33 Neptune, NJ.

*Corresponding Author: Jason Silvers, Jersey Shore University Medical Center Department of Surgery 1945 NJ-33 Neptune, NJ,

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Abstract

Background/Aim

Laparoscopic sleeve gastrectomy is the most common bariatric operation performed in the United States. Recently, the choice of staplers for sleeve gastrectomies has grown with the release of Standard Bariatrics' Titan SGS™ stapler. A previous study demonstrated no new or extraordinary adverse effects; however, research on the incidence of known adverse effects is limited. The only data in the literature is industry sponsored. In this study, we examined short term risks and benefits of using the Titan SGS™ stapler for sleeve gastrectomies. We have no conflicts of interest or industry sponsors.

Materials and Methods

We retrospectively identified patients who underwent laparoscopic or robotic sleeve gastrectomy at a single institution by two surgeons, and analyzed two groups: one using the Titan SGS™ stapler, and one using traditional laparoscopic staplers. We examined 30-day postoperative complications, operative time, and cost of procedure. Variables examined were age, gender, BMI, length of stay, and procedure time.

Results

The Titan SGS™ provided a statistically significant reduction in operative time and cost. Average case time using Titan SGS™ was 01:03:42 (hr:min:sec) compared to 01:21:47 with traditional stapler ($p=0.0008$). The relative cost and charge to patients were, respectively, \$317.10 and \$713.48 less than the traditional stapler. There was no difference in complication rate. On average, the Titan stapler shortened our operative time by 18 minutes and saved over \$300.

Conclusions

The Titan SGS™ stapler provided significant benefits in operative time and cost, without significant difference in complication rate. However, small sample size and low power may limit the study.

Key words: sleeve gastrectomy; bariatric surgery; stapler; laparoscopy

Introduction

Laparoscopic Sleeve Gastrectomy (SG) is the most common bariatric procedure performed globally to treat obesity in tandem with its associated chronic diseases and comorbidities (1). Advancements in surgical technologies are continuously providing new options with potential benefits compared to the current methods. Standard Bariatrics has recently developed a new stapler, called the Titan SGS™, which has the opportunity to provide some benefit over traditional staplers used in laparoscopic sleeve gastrectomies. The aim of this study is to display the outcome of the first 63 sleeve gastrectomies using the novel Titan SGS™ single use stapler at our institution from October 2022 to January 2023.

Materials and Methods

This was a retrospective, two surgeon, single-center study of patients who underwent sleeve gastrectomy. The study protocol was approved by the Institutional Review Board. A total of 63 electronic medical records were reviewed of patients who underwent robotic or laparoscopic sleeve gastrectomy with standard linear stapling methods between July 2022 and September 2022 and those who underwent robotic or laparoscopic sleeve gastrectomy with the Titan SGS™ stapler between October 2022 and January 2023.

Our institution has an annual mean of 125 bariatric cases from 2020-2022. We are accredited as a Comprehensive Bariatric Center with accreditation in Adolescent Bariatrics and Obesity Medicine - we are the only such center in New Jersey.

This study included adult patients (>18 years old) with body mass index (BMI) >40 kg/m², or BMI >35 kg/m² and at least one significant medical comorbidity, who underwent sleeve gastrectomy at a single institution. Exclusion criteria were as follows: (i) patients with BMI >70 kg/m²; (ii) previous gastric surgery or gastric band placement; (iii) patients with greater than 1 hour lysis of adhesions intraoperatively; (iv) patients undergoing combined operations. After applying exclusion criteria, 36 patients using standard stapling methods were included while 21 patients using Titan SGS™ stapler were included in the analysis. The 6 exclusions consisted of three patients with BMI greater than 70 kg/m², one patient who underwent

combined sleeve gastrectomy and cholecystectomy, and two patients who had prior gastric surgery: one excision of gastric polyp and one gastric band.

Data was obtained through systematic electronic medical record review to include medical record number, date of birth, gender, date of surgery, preoperative BMI, procedure time, length of stay and complications or readmission data. An internal statistician team was utilized to perform statistical analysis to compare standard stapling methods to Titan SGS™ stapler for operative times, operative cost and post-operative complications.

For the traditional stapler group, the cost was determined using the stapler with 5-6 staple loads fired with staple line reinforcements and a single 12 mm trocar. For the Titan SGS™ group, cost was determined by the Titan SGS™ stapler and the Titan 19 mm trocar. Additionally, this group occasionally included a 5-mm clip applicator when used for bleeding noted at the staple line intra-operatively, or a locking suture used to prophylactically buttress the staple line occasionally per surgeon preference.

Table 1: Patient Characterizing in the control and Titan Group

	Control, N = 36	Titan SGS™, = 21
Age, mean	45	avg 47
Range	20-64	26-67
Sex, Female (%)	29 (80%)	16 (76%)
BMI, mean	47	44
LOS, days	1.28	1.04
Procedure Time, hours	1:21:47	1:03:42

Results

After a retrospective review, we found 63 patients who underwent laparoscopic or robotic sleeve gastrectomy during the period July 2022 and January 2023. Of those, 57 met inclusion criteria and were analyzed in this study. We divided them into two groups based on which stapler was used: one comprising 36 patients treated with the Titan SGS™ stapler, and the other comprising 21 patients treated with traditional stapler for sleeve gastrectomy.

The first endpoint we examined was operative time. The traditional stapler group had an average operative time of 01:21:47 (h:m:s), versus the Titan SGS™ group which had an average of 01:03:42. The average change in time in minutes from the traditional stapler group to the Titan SGS™ stapler group was -18.0833 (95% confidence interval -28.3067 to -7.8933, standard error = 5.091). Using an alpha of 0.05, this was a statistically significant difference (p=0.0008).

The second endpoint we looked at was operative cost. The average cost of using the traditional stapler for sleeve gastrectomy was \$2,362.10. This number included the cost of the stapler and at least 5 staple loads with staple line reinforcements. The average charge to the patient was \$5,314.73. The average cost of the Titan SGS™ stapler group was \$2,045.00, which included the Titan SGS™ stapler and 19mm trocar, a 5-mm clip applicator or a locking suture, which was occasionally used to reinforce the staple line per surgeon preference. Average charge to the patient was \$4,601.25. The average cost savings seen with the Titan SGS stapler group was \$317.10, and the average difference in charge to the patient was \$713.48.

The third endpoint of the study examined postoperative complications within 30 days, primarily staple line leaks and bleeding. There were zero staple line leaks in either group. In the traditional stapler group, there was only 1 patient (1/36, 2.78%) who returned to the hospital with bleeding, which was found to be from a liver laceration and not from the staple line and was managed

conservatively and discharged home without any intervention. In the Titan SGS™ stapler group, 4 patients returned to the hospital within 30 days of surgery; however 2 of those were for unrelated reasons. The other 2 patients (2/21, 9.52%) did come back with bleeding, though neither required operative intervention. One bleed was from a 5mm trocar site and the other was from the most distal portion of the staple line. This appeared to be from a vessel on the greater curve of the stomach that was included in the staple line localized via CT. Again, none of the patients required intervention. They were admitted for observation and ultimately discharged home without any further events or readmission.

Discussion

According to the American Society for Metabolic and Bariatric Surgery there was an estimated 122,065 laparoscopic SG performed in the US in 2020 (1). It is favored in bariatrics due to its simplicity, decreased long-term complications, and being comparable in weight loss and resolution of comorbidities compared to gastric bypass (2-4). Despite the success of SG, it is not without its complications. Traditionally, SG is performed with multiple, varying staple firings along the greater curvature.

The junctions and angulations in the staple line between firings are considered to be lead points of mechanical failure or ischemia which can lead to development of a staple line leak. Irregular staple lines may also add to long term issues with reflux and strictures (2-7).

In our practice a laparoscopic 60mm stapler is used with 3 rows and a close staple height of 2mm. The novel Titan SGS™ stapler, cleared by FDA for use in April 2021, was developed to produce a more consistent and symmetrical sleeve pouch anatomy. The Titan SGS™ is a powered linear cutting stapler, used with a standard 19mm trocar. It is 230mm in length, contains 342 staples that are organized in 6 staggered rows - 3 on each side of the cut line. The stapler is graded, from 2.2 to 1.2 mm to match the anatomic gastric mucosa along the greater curvature (8-9).

The anatomic landmarks: gastroesophageal junction, pylorus, and the incisura angularis are used to create an anatomic sleeve gastrectomy with a gentle curve - with ideal tubularization of the pouch remnant, which is achieved is less than 40% of radiologically captured sleeves (10). The variability of pouch anatomy can result in variable weight loss outcomes.

Limitations of this study include small sample size with low power. It is possible that differences in outcomes were not able to be detected, and that further study with larger sample sizes will be beneficial.

Conclusions

As this is new technology in the bariatric industry, the Titan SGS™ stapler is a recent addition to the practice of both surgeons and they are currently still within their learning curves of using it. In contrast, they have both used the traditional staplers for laparoscopic sleeve gastrectomies a combined 22 years of practice. On average, by using the Titan SGS™ stapler, we shortened our operative time by 20 minutes. Time was saved by avoiding reloading the stapler each time, checking the staple load, and specimen extraction was easier with the 19 mm trocar. Operating room staff also preferred using the Titan SGS™. They had less instruments to pick and open for each case. They did not need to know how to load the stapler. They required no training. Changes in operating room staff did not affect our operative time, as the Titan SGS™ stapler comes preloaded and ready for use.

Our institution's value analysis committee approved the stapler for use due to the cost savings that are seen per case. Our collected data confirms the cost saving for a typical 5 staple load sleeve gastrectomy.

In conclusion, the reduction in operative time with the new device was significant, and it will be interesting to continue to analyze these cases to see if an even greater reduction in operative time will be seen.

Disclosures

The authors have no conflicts of interest to declare.

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