Clamp-based Sleeve Gastrectomy versus Bougie-based Sleeve Gastrectomy: A cost and outcomes comparison

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Introduction

Obesity is a major problem in the United States with >40% US population is overweight or obese. Metabolic and Bariatric Surgery is the best way for patients to lose weight, become healthier and keep the weight off. Laparoscopic Sleeve Gastrectomy has gained popularity accounting for 60% of bariatric surgeries performed in the US. The technique has not been standardized and varies across surgeons. Some surgeons use an endoscope or bougie of various sizes to guide creation of the sleeve. Other variations in the technique including use of staple line reinforcement or oversewing the staple line.

Clamp-based Sleeve Gastrectomy (CSG) aims to standardize the technique of sleeve gastrectomy (SG). The single-patient-use laparoscopic stomach clamp (Standard Bariatrics, Cincinnati, OH) is 25 cm long and fits through a 12-mm trocar. In the CSG, a 20-French orogastric tube is used and the clamp is positioned approximately 6cm from pylorus, 3cm from incisura and 1cm from the gastroesophageal junction to guide gastric sleeve creation. It is hypothesized that the CSG approach allows standardization of the SG to create a more uniform gastric sleeve. We aim to compare one-year outcomes and operative costs of CSG and 40-French Bougie-based SG (BSG) techniques.

Methods

A single-surgeon, retrospective consecutive cohort study was performed to compare SG patients over a 2-year period (N=175; N=90 BSG, N=85 CSG) with 1-year follow-up. Demographics and Outcomes data were obtained from MBSAQIP Registry and by querying the electronic medical record. Cost data were acquired by querying patient chargers. Statistical analysis was performed by using R Statistical Software (version 4.0.3). Continuous variables were assessed by Student's t-test and categorial variables by Chi-Square analysis. A $p<0.05$ was considered statistically significant.

Results

Patients' demographics in the two groups were relatively similar, except for CSG group having 4 patients with Chronic Obstructive Pulmonary Disease compared to no patients in BSG group. Pre-operative Body Mass Index (BMI) of the BSG and CSG cohorts were similar (44.0 versus 41.4 kg/m^2 respectively)[Table 1]. Operating time was greater in the CSG versus BSG group (64 minutes [range 60-74] versus 59 minutes [range 52-68]). The disposable clamp cost is $265, but the total operative supply cost was $180 less in the CSG group when compared to the BSG group ($1692 [1692-1692] versus $1872 [1706-2106], $p<0.001$). This cost difference was likely due to CSG group requiring four staple loads with staple line reinforcement (SLR) while the BSG group required five. Thirty-day readmission rates were similar in BSG and CSG groups (2.2 vs 1.2%). Percent Excess Weight Loss (%EWL), Percent Total Weight Loss (%TWL) and change in BMI at 1 year was similar between the two cohorts, 47.5%, 19.0% and -8.30 kg/m^2 in BSG group versus 56.8%, 20.4% and -8.10 kg/m^2 in CSG group respectively.

Demographics

	Bougie	Clamp	P-value
Number	90	85	
Age	40.5	44	0.12
Comorbidities			
HLD	28	30	0.56
HTN	48	46	0.92
CAD	2	2	0.95
DM	18	16	0.84
COPD	0	4	0.04
OSA	41	30	0.17
Weight at Surgery	256 lbs (236-291)	249 lbs (232-285)	0.31
BMI	44.0 (40.8-46.7)	41.4 (39.1-45.2)	0.18

Outcomes

	Bougie	Clamp	P-value
OR Time	59 mins (52-68)	64 mins (60-74)	<0.05
Length of Stay	1.1 days (1.0-1.1)	1.1 days (1.0-1.2)	0.39
Total Supply Cost	$1,872 (1706-2106)	$1,692 (1692-1692)	<0.05
Stapleline Reinforcement Cost	$975 (922-1152)	$775 (775-775)	<0.05
Reload Cost	$708 (663-829)	$563 (563-563)	<0.05
Clamp Cost	-	$265	<0.05
Readmission in 30 days	2 (2.2%)	1 (1.2%)	0.59
1 year %EWL	47.5% (35.8-62.9)	56.8% (37.8-63.8)	0.84
1 year %TWL	19.0% (15.3-27.2)	20.4% (15.5-22.8)	0.52
1 year delta BMI	-8.3 (-11.3 to -6.2)	-8.1 (-9.4 to -5.5)	0.25
Mortality	0	0	0.71

Conclusions

CSG has similar outcomes to BSG for %EWL, %TWL and BMI change after 1 year with similar complication rates. While the operative time is longer in the CSG group, it is unlikely to be clinically relevant and there are significant cost savings using CSG due to a need for fewer staple loads.

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