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HARVARD MEDICAL SCHOOL
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Metabolic and Bariatric Surgery in Adolescents: A Single Center's Seven-Year Update

Michael Kochis, MD, EdM[1]; Christa Bizimana, MS[1]; Alyssa Stetson, MD, MPH[1]; Maimouna Sy, BS[1]; Vibha Singhal, MD, MPH[2]; Denise Gee, MD[1]; Janey S A Pratt, MD[3]; Cornelia L Griggs, MD[1]

[1] Massachusetts General Hospital, Department of Surgery, [2] Massachusetts General for Children, Department of Pediatrics, [3] Stanford University, Department of Surgery

Background

- Metabolic and bariatric surgery (MBS) is gaining traction as a treatment option for adolescents with severe obesity
- Our Weight Center (WC) last published on adolescents who underwent MBS from 2001 to 2014
- Since then, trends have shown:
  - Increasingly diverse patients
  - Laparoscopic sleeve gastrectomy (LSG) supplanting Roux-en-Y gastric bypass (LRYGB)

Study aims

Characterize demographics and outcomes among our WC's recent adolescent MBS patients

- Follow up
- Weight loss
- Comorbidity resolution
- Complications

Methods

Retrospective cohort study:

- Single academic institution in northeast USA
- Patients under 21 years with severe obesity
- Underwent MBS between 1/2014 and 12/2020

Data analysis:

- Categorical variables: n (% of N for each surgical group)
  - Chi square test
- Continuous variables: median (interquartile range)
  - Mann Whitney U test
- Percent total body weight loss (%TBWL) calculated at both WC and non-WC encounters
  - Stratified by latest follow up: [1-3), [3-5), ≥5 years
- Multiple regression: sex, age, pre-operative BMI, number of comorbidities, duration in WC program, %TBWL at 6 months, and latest %TBWL

Demographics

Table 1. Baseline demographics.

	LSG (N = 64)	**LRYGB** (N = 15)	**P value**
Sex			0.20
Female	45 (70.3)	13 (86.7)	
Male	19 (29.7)	2 (13.3)	
Race			0.78
White	34 (53.1)	8 (53.3)	
Hispanic	15 (23.4)	4 (26.7)	
Non-Hispanic Black	11 (17.2)	1 (6.7)	
Asian	2 (3.1)	1 (6.7)	
Other	2 (3.1)	1 (6.7)	
At first WC appointment:			
Age, years	16.9 (15.3–18.4)	17.2 (15.5–19.1)	0.43
BMI, kg/m^2	52.1 (44.8–57.5)	48.5 (45.4–51.7)	0.28
Duration in WC program, days	357 (263–578)	295 (247–1321)	0.92
At surgery:			
Age, years	18.0 (17.1–19.2)	19.9 (18.1–20.2)	*0.01**
BMI, kg/m^2	51.0 (44.1–56.0)	48.9 (46.3–53.1)	0.57

- LSG: 95% of all operations in latter five years

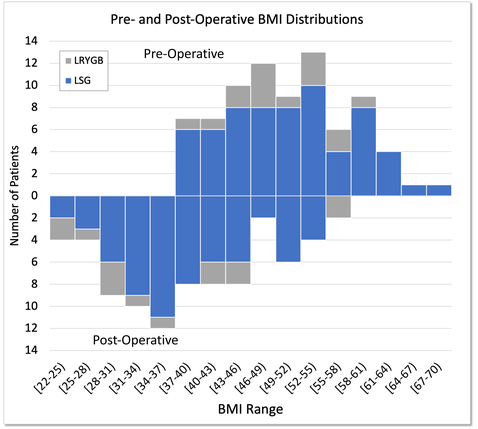
Follow Up and Weight Loss

Table 2. Follow up and weight loss outcomes.

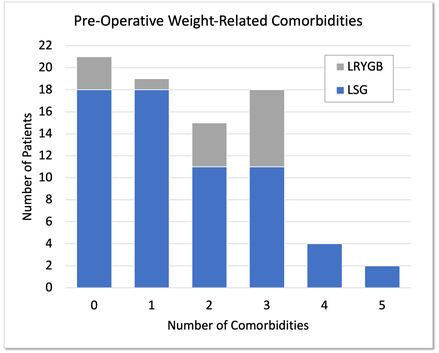
	LSG (N = 64)	**LRYGB** (N = 15)	**P value**
WC follow up at 6 months	46 (71.9)	10 (66.7)	0.69
6-month %TBWL	21.1 (16.6–27.5)	24.8 (20.4–28.5)	0.15
WC follow up at 12 months	27 (42.2)	6 (40.0)	0.88
12-month %TBWL	26.7 (17.0–33.5)	36.5 (31.2–38.9)	0.10
Latest follow up, years	3.0 (1.2–5.1)	2.4 (0.6–6.8)	0.94
%TBWL	22.7 (12.6–31.8)	27.6 (11.7–34.7)	0.94
Latest recorded weight loss, by latest follow up subgroup:			
1 up to 3 years	17 (26.6)	3 (20.0)	
%TBWL	27.5 (12.8–31.4)	40.4 (37.6–45.3)	–
3 up to 5 years	15 (23.4)	2 (13.3)	
%TBWL	20.4 (15.2–27.6)	25.8 (16.5–35.1)	–
≥5 years	17 (26.6)	5 (33.3)	
%TBWL	31.7 (15.5–34.7)	10.1 (1.5–16.5)	–

Limited sample size of the LRYGB group precluded statistical testing in each follow up subgroup.

- No differences in %TBWL for LSG or LRYGB patients across three follow up periods (p >0.05)
- No associations between pre-operative factors, %TBWL at 6 months, and latest %TBWL



Comorbidity Resolution



- 74% of patients had 1+ comorbidity pre-operatively
- Inconsistent documentation in WC notes post-operatively

Table 3. Pre-operative prevalence and post-operative improvement of comorbidities.

	Prevalence	**Rate of Improvement****
Prediabetes	36.7 (29)	63.6 (7/11)
Obstructive sleep apnea	29.1 (23)	30.8 (4/13)
Asthma	26.6 (21)	27.3 (3/11)
Polycystic ovarian syndrome	20.7 (12*)	60.0 (3/5)
Gastroesophageal reflux disease	19.0 (15)	37.5 (3/8)
Non-alcoholic Fatty liver disease	11.4 (9)	60.0 (3/5)
Dyslipidemia	8.9 (7)	25.0 (1/4)
Hypertension	8.9 (7)	40.0 (2/5)
Type 2 diabetes mellitus	2.5 (2)	100.0 (1/1)

*Denominator is 58 female patients.
**Denominator is number of patients with given comorbidity documented pre-operatively who also had comorbidity data available post-operatively.

Complications

- No operative mortalities
- One surgery-related 30-day readmission for abdominal pain
- One patient underwent a conversion from LSG to LRYGB after 14 months for severe reflux, then diagnostic laparoscopy for abdominal pain two years later
- 11% later underwent laparoscopic cholecystectomy

Conclusions

- Among largest series to date of adolescents undergoing LSG
- Cohort includes nearly half non-White patients
- Equivalent %TBWL and follow up rate between LSG and LRYGB
- MBS is safe and effective in achieving weight loss
- Loss to follow up and inconsistent comorbidity documentation are opportunities for improvement