A Retrospective Study Measuring BMI and Related Comorbidities Before and After Bariatric Surgery

Samantha Hoselton, RN, MSN graduate student
Evelyn Brooks RN, PhD
Philip Hornbostel MD, FACS
Omar Ghamen MD

Purpose
To help educate patients, families, and healthcare professionals on the impact bariatric surgery can have on BMI and obesity-related comorbidities. Using the Health Belief Model as a study examination, the differences between age, sex, ethnicity, race, BMI, hemoglobin A1c, hypertension, Gastroesophageal Reflux Disease (GERD), sleep apnea, cholesterol, and diabetes status before and up to 26 months after Laparoscopic Sleeve Gastrectomy (LSG), Laparoscopic Roux-en-Y Gastric Bypass (LRYGB), and Laparoscopic Band Explant to Roux-en-Y Gastric Bypass (LB-RYGB) at Mosaic Life Care in St. Joseph, Missouri.

Health Belief Model
The Health Belief Model helps describe how a person comes to the decision to have bariatric surgery.

Introduction
- The CDC reported 30% of America as obese.6,7 Many Americans cannot lose weight on exercise and dieting alone and are turning to bariatric surgery.8,9
- The most common bariatric surgeries include the LSG and LRYGB.10,11
- Laparoscopic Adjustable Gastric Band is not done routinely due to complications.12 There has been an increase of Band Explant and converting to the RYGB. (LB-RYGB) at Mosaic Life Care.
- LRYGB is a safe and effective procedure for improving glyceemic control, obesity, body fat percentage and blood pressure control, blood lipid levels, without malnutrition or severe anemia in patients with T2DM and obesity.13
- Van et al. (2016) meta-analysis of a randomized control study reported LRYGB as superior to medical treatment for remission of Type 2 DM, improvement of metabolic condition, and cardiovascular health.14
- The LRYGB and LSG complication rate and outcomes on T2DM, HTN, OSAS, hypothyroidism, and weight loss at one year were similar. Weight loss was significantly greater for the LRYGB patients after two years when compared to LSG patients. GERD resolved in all LRYGB patients but only in 50% of LSG patients.15

Bariatric Surgery Review
1. Laparoscopic Sleeve Gastrectomy (LSG) removes approximately 80% of the stomach, leaving a tubular pouch that looks like a banana.16
2. Laparoscopic Roux-en-Y Gastric Bypass (LRYGB), considered the ‘gold standard’. A small one ounce pouch is made at the top of the stomach. The rest of the stomach and first part of the small intestine is bypassed. The remaining small intestine is connected to the small pouch.17
3. Laparoscopic Adjustable Gastric Band is an inflatable band placed around the upper stomach to create a small pouch. This reduces the amount of food the stomach can hold and the band is adjusted to the person.18

Sample
N= 61 female (71.9%) 141 male (28.1%)
N=483 (96.2%) Caucasian 15 (3%) African American 4 (0.8%) Other
100% Non-Hispanic or Latino
Age M= 50.72 (18-79)

Methodology
- IRB approval obtained
- Retrospective data collected (January 1 2015- May 31 2018)
- Names de-identified
- Qualifications for study: > 18 years of age BMI > 33 kg/m²
- Passed a psychological evaluation
- Data
  - Intake 0 (1 to 60 days prior to surgery)
  - Intake 1 (1 to 14 days after surgery)
  - Intake 2 (15 to 60 days after surgery)
  - Intake 3 (61 to 180 days after surgery)
  - Intake 4 (181 to 270 days after surgery)
  - Intake 5 (271 to 360 days after surgery)
  - Intake 6 (361 to 720 days after surgery)
  - Intake 7 (721 days after surgery)

Results

**Table 1.** MANOVA surgery

- **Preop BMI**
- **Preop HTN med**
- **Preop Hemoglobin A1c**

<table>
<thead>
<tr>
<th>Surgery (N)</th>
<th>MANOVA</th>
<th>Preop BMI</th>
<th>Preop HTN med</th>
<th>Preop Hemoglobin A1c</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSG (51)</td>
<td><strong>.50</strong></td>
<td>47.91 kg/m²</td>
<td>1.28</td>
<td>6.42%</td>
</tr>
<tr>
<td>LRYGB (44)</td>
<td><strong>.75</strong></td>
<td>47.7 kg/m²</td>
<td>1.29</td>
<td>5.94%</td>
</tr>
<tr>
<td>LB-RYGB (27)</td>
<td><strong>.76</strong></td>
<td>46.26 kg/m²</td>
<td>1.33</td>
<td>6.32%</td>
</tr>
</tbody>
</table>

MANOVA - Interval/Ratio level
*p<.001, **p<.01, ***p<.05

BMI: LSG vs LB-RYGB, p=.019

Discussion
- The BMI for LSG was significantly higher than LB-RYGB
- Although significant lower mean scores noted on BMI, BP medications, and Hemoglobin A1c for all surgeries from Preop to Intake 4 was significant, BMI was also significantly lower at intake 7.
- Non-parametric analyses revealed significant decrease in sleep apnea, GERD, hypertension, diabetes, and cholesterol for all surgeries at Intake 4 with hypertension and cholesterol having a significant decrease at intake 7.

Conclusion/ Limitations
- Bariatric surgery helps improve obesity and related comorbidities.
- Need for continued education for healthcare providers, patients, and families to understand how bariatric surgery can significantly improve a persons health.
- Limitations of this study include 1. Sample was predominately Caucasian, Non Hispanic women 2. Small sample size at intake 7 3. Unequal sample size
- Future implications included emphasis on long term follow up and Hemoglobin A1c
- Further research is needed for LB-RYGB outcomes and to explore ways to break barriers against the low number of men, other ethnicities and races receiving bariatric surgery.

References

**Table 2.** RANOVA for all surgeries

<table>
<thead>
<tr>
<th></th>
<th>Preoperative</th>
<th>Intake 4</th>
<th>Intake 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td><strong>.75(358)</strong></td>
<td><strong>.73(358)</strong></td>
<td><strong>.50(18)</strong></td>
</tr>
<tr>
<td>Blood pressure Meds</td>
<td><strong>.13(159)</strong></td>
<td><strong>.86(159)</strong></td>
<td><strong>.75(35)</strong></td>
</tr>
<tr>
<td>Hemoglobin A1c</td>
<td><strong>.74(34)</strong></td>
<td><strong>.89(34)</strong></td>
<td><strong>.65(21)</strong></td>
</tr>
</tbody>
</table>

Friedman for all surgeries

- Sleep Apnea N=237 **p<.014** N=66
- GERD N=241 **p<.014** N=66
- Hypertension N=242 **p<.014** N=67
- Diabetes Mellitus N=242 **p<.014** N=67
- High Cholesterol N=243 **p<.014** N=66

RANOVA - Interval/Ratio level; Friedman- Ordinal level
*p<.001, **p<.01, ***p<.05