Nutrition, Diabetes and Pregnancy After Bariatric Surgery

Geetha Rao, MS, RD, CDE, CPT, CDTC, CLE
Palo Alto Medical Foundation, CA
desag1@pamf.org/rdgeeth@yahoo.com

Disclosure & Disclaimer

- This webinar is considered a resource, but does not define the standard of care in California. Attendees are advised to adapt the guidelines and resources based on their local facility's level of care and patient populations served and are also advised to not rely solely on the guidelines presented here.
- I have nothing to disclose.

Bariatric Surgical Population

- 80% women
- 48% of these are less than 40 yrs old
- 17.6% have experienced an infertility problem
- Currently women aged 18-45yrs undergo > 50,000 inpatient bariatric surgical procedures per year in the U.S.

AHRQ (Agency for Health Research and Quality) publication No. 08-E013. November 2008
Maggard et al. JAMA 2008; 300(19):2286-2296
Pregnancy After Bariatric Surgery

- **Outcomes** (after bariatric surgery vs obese women without surgery):
  - GDM 0 vs 22%,
  - Preeclampsia 0 vs 3.1%
  - Premature delivery 7.7 vs 7.1%
  - Low birth weight 7.7 vs 10.6%
  - Macrosomia 7.7 vs 14.6%

  Maggard et al. JAMA 2008; 300(19):2286-2296

Pros of Bariatric Surgery

- Increased fertility
- Decreased risk of pregnancy complications
- Decrease in complications of medical co-morbidities
- Possible decrease in rates of congenital malformations

Nutrition considerations for pregnancy post bariatric surgery is directly related to the type of surgery: restrictive and malabsorptive
Things To Consider For a Treatment Plan For Pre Pregnant Bariatric Patient

- What type of bariatric surgery was done and how long ago?
  - Malabsorptive? Restrictive? Combined?
  - The larger the weight loss and the more absorptive surface that was lost, the greater the risk for metabolic deficiencies

Restrictive Surgery

- Adjustable gastric banding (AGB)
- Sleeve gastrectomy (SG)
- Vertical banded gastroplasty (VBG)

Restrictive-Malabsorptive Surgery

- Roux-en-Y gastric bypass (RGB) (Combination procedure)
- Biliopancreatic Diversion with Duodenal Switch (BPD-DS)
**Bariatric Surgery Today**

**Adjustable Band Gastroplasty**

**GENERAL FEATURES**
- Inflatable balloon within the band orifice can be adjusted via a reservoir under the skin
- Average Weight loss
  - 50% of excess weight

**Vertical Sleeve Gastrectomy**

- 70-80% of stomach removed
- Tubular stomach takes the shape of a banana
**Bariatric Surgery Today**

### General Features
- **Roux-en-Y Gastric Bypass**
  - Pouch size: 1 oz
  - Pouch opening: 0.5 in
  - Roux-en-Y limb
  - Standard: 2 ft

- **Average Weight Loss**
  - 70% of excess weight

**“The Pouch-Tool”**

American Society for Metabolic and Bariatric Surgery (ASMBS)

---

**Bariatric Surgery Today**

### General Features
- **Biliopancreatic Diversion with Duodenal Switch (BPD-DS)**
  - Gastric pouch size:
    - Standard: 14 oz (1.5 cups)
  - Three segments
  - Alimentary tract: 6.5 ft
  - Biliary tract: 13 ft
  - Common channel: 1.5 ft

- **Average Weight Loss**
  - 80% of excess weight

American Society for Metabolic and Bariatric Surgery (ASMBS)

---

**Considerations: Pregnancy after Bariatric Surgery**

- Risk of unexpected pregnancy increased after weight loss following surgery
- Cessation of menses should not be assumed to be due to the rapid weight loss
- Patients should delay pregnancy for 12-18 months after surgery (outside of the rapid weight loss phase); contraception needed
- Early pre-natal care
- Routine surgical f/u should continue as scheduled (gastric bands may need to be adjusted)
- Evaluate for nutritional deficiencies/ hypoglycemia
- Some co-morbid conditions may continue after surgery

Amounts of Food Usually Eaten Post Surgery

Stage 1 & Stage 2
- 1 month: 1 to 2 oz (2 to 4 Tbsp)

Stage 3
- 2 months: 2 oz (1/4-1/2 cup)
- 6 months: 3-4 oz (1/2 cup)
- 1 year: 4 to 5 oz (1/2-3/4 cup)
- 1 1/2 years to 2 years: 8 to 10 oz (1 to 1.5 cups)

Beyond
- 6 months: 3-4 oz (1/2 cup)
- 11/2 years to 2 years: 8 to 10 oz (1 to 1.5 cups)

American Society for Metabolic and Bariatric Surgery (ASMBS)

MNT Goals

- To facilitate adequate weight gain to promote fetal growth
- To provide mineral and vitamin supplementation to prevent or correct deficiency
- To assess nutrition education needs during pregnancy and lactation

Nutrition Guidelines

- Patients can usually tolerate 1200 kcals/day post surgery; recommended 1300-1500 kcals/day
- Foods difficult to tolerate during year post surgery are fruits, vegetables and protein food sources
- Protein to be eaten before fats and carbs
- Dietary recommended intake (DRI) for protein is 1.1 g/kg of IBW for preg >6 months post surgery; 1.5 g/kg of IBW for preg < 6 months post surgery
- 20-30 mins to eat meals
- Food should be well chewed

**Nutrition Guidelines**

- Avoid liquids during meals; 30-60 mins before or after meal.
- Sugar free, caffeine-free non-carbonated beverages.
- 3-6 small meals per day.
- Avoid chewing gum.
- Saline fill adjusted during pregnancy.

**Weight Gain**

- If preg is within 6 months of surgery, wt loss of > 2 lbs/wk, nutrition support (slow-drip enteral feeds or TPN) or supplementation may be needed to facilitate fetal growth.
- Saline fill adjusted during pregnancy.

**Weight Gain Issues**

<table>
<thead>
<tr>
<th>Early pregnancy (&lt;6 months post-op)</th>
<th>Late Pregnancy (&gt;6 months post-op)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor intake with food records</td>
<td>Monitor restriction (8-12 oz/meal)</td>
</tr>
<tr>
<td>Monitor urinary ketones</td>
<td>Monitor intake with food records</td>
</tr>
<tr>
<td>Avoid OGTT, use SMBG</td>
<td>Monitor urinary ketones</td>
</tr>
<tr>
<td>Consider nutrition support with wt loss or inadequate fetal growth</td>
<td>May tolerate OGTT</td>
</tr>
<tr>
<td>Consider saline adjustment for lap band patients</td>
<td>Lap band adjustment with prolonged nausea/vomiting or after dietary modifications fail</td>
</tr>
</tbody>
</table>

Supplying Nutrients:

- Micronutrient deficiencies:
  - Most commonly seen deficiencies are iron, Vit B12, folate and Calcium

Retrospective Study...
(Mead et al. 2014)

- 113 women after BPD, RGB and SG
- H/H (hemoglobin/hematocrit) levels decreased significantly during pregnancy in all groups
- Folic acid levels increased after surgery and further during pregnancy
- Decreased Vit B12 levels after all types of surgery and no further decrease during pregnancy

Retrospective Study...
(Mead et al. 2014)

- Serum albumin level decreased significantly during pregnancy after all types of surgery, significantly after BPD
- Calcium levels did not change during pregnancy
- Significant improvement in BG levels

Considerations: Pregnancy after Bariatric Surgery

- Both types result in potential nutritional deficiencies:
  - Iron
  - Vitamin B12
  - Folate
  - Calcium

Iron Deficiency

- Iron deficiency is common after RGB
- 40-64 mg/day iron supplementation in the form of ferrous fumarate may be needed
- Women with restrictive-only procedure, such as VGB or AGB generally do not experience iron deficiency and routine supplementation may not be required

Vitamin B12

- Commonly occurs following gastric bypass surgery
- Vitamin B12 deficiency often results in elevated serum homocysteine levels
- 300-600 mcg/day of Vitamin B12 in readily absorbed crystalline form

Shields, L. and Tsay, GS. Editors, California Diabetes and Pregnancy Program Sweet Success Guidelines for Care. Developed with California Department of Public Health; Maternal Child and Adolescent Health Division; revised edition, Chapter 7 updated September 2015.


Folate

- Also known as folic acid, Vit B6, folacin and tetrahydrofolic acid, is essential for production of Hgb and regulation of nerve cell development in the embryo and developing fetus
- In gastric bypass surgery, folic acid bypasses duodenum
- Supplementation with PNV (prenatal vitamins) containing 1000mcg of folic acid prior and during pregnancy is usually sufficient

Calcium/Vitamin D

- Calcium with Vit D is absorbed in duodenum
- Following RGB, duodenum is bypassed, preventing access to primary absorption site for Calcium.
- Daily supplementation of 1500 - 2000 mg/day of calcium citrate with added Vit D is recommended for RGB and 1500 mg for AGB.

Supplementation Cont’d.

- Vitamin A: 5000 units/day; (no more than 5000 IU/day; excess associated with birth defects)
- DHA: 200 - 300 mg/day or combination PNV
Recommendations For Vitamin Supplementation After Bariatric Surgery

<table>
<thead>
<tr>
<th>Vitamin/Mineral</th>
<th>Roux-en-y</th>
<th>AGB</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVI</td>
<td>200% DR</td>
<td>100% DR</td>
</tr>
<tr>
<td>Vitamin B 12</td>
<td>Add 1000 mcg</td>
<td>No addition</td>
</tr>
<tr>
<td>Calcium</td>
<td>1500-2000 mg/d</td>
<td>1500 mg/d</td>
</tr>
<tr>
<td>Elemental iron</td>
<td>18-27 mg/d</td>
<td>18-27 mg/d</td>
</tr>
<tr>
<td>Fat Soluble Vits</td>
<td>A 10,000 IU D 2000 IU; K 300 IU</td>
<td>No addition</td>
</tr>
<tr>
<td>Folate</td>
<td>1000 mcg</td>
<td>1000 mcg</td>
</tr>
<tr>
<td>B Complex</td>
<td>1 serving</td>
<td>1 serving</td>
</tr>
</tbody>
</table>


Vitamin D Treatment Guidelines

<table>
<thead>
<tr>
<th>25 (OH) Vit D value</th>
<th>Optimal Vit D</th>
<th>Vit D Insufficiency</th>
<th>Moderate to Severe Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 30 ng/ml</td>
<td>&gt; 30 ng/ml</td>
<td>20 to 30 ng/ml</td>
<td>&lt; 20 ng/ml</td>
</tr>
</tbody>
</table>

Treatment

- Standard supplementation 800 to 1200 IU Vit D3
- Standard supplementation plus 1000 IU of Vit D3 daily for 3 months
- Standard supplementation plus 50,000 IU D2 twice weekly for 3 months

American Society for Metabolic and Bariatric Surgery (ASMBS)

Testing For GDM

- Not recommended for pregnancy post gastric bypass.
- OGGT would precipitate the physiologic response seen with dumping syndrome.
- Alternate measures to screen for GDM should be considered for patients who have undergone malabsorptive-type surgery.
Proposed Alternatives to GDM Testing

- Recommended to do a FBS/A1c
- CGM (continuous glucose monitoring) for at least 3 days to assess for blood glucose variances
- Check urine ketones
- Home BG monitoring for 1 wk during 24-28 wks preferred (fasting and 2-hr PP); BG goal: FBS < 90, 2-hr PP < 130

References:
- Shields, L and Tsay, GS. Editors, California Diabetes and Pregnancy Program Sweet Success Guidelines for Care. Developed with California Department of Public Health; Maternal Child and Adolescent Health Division; revised edition, updated September 2015.

Weight Gain During Pregnancy

- Women with AGB surgery display more wide ranging weight gain fluctuations.
- Women who delay pregnancy for at least 18 months to 2 years following their surgery, are most likely to have a normal pregnancy weight gain
- More ultrasound, fetal testing who continue to lose wt during pregnancy.

References:
- Shields, L and Tsay, GS. Editors, California Diabetes and Pregnancy Program Sweet Success Guidelines for Care. Developed with California Department of Public Health; Maternal Child and Adolescent Health Division; revised edition, Chapter 7 updated September 2015.

Weight Gain During Pregnancy

- IOM Recommendations
  - 25-35# for normal weight women
  - 15-25# for overweight women
  - 11-20# for obese women
- Post bariatric surgery patients should be followed closely for weight. Their weight changes must be interpreted in the context of their overall condition and phase after surgery.

References:
- Shields, L and Tsay, GS. Editors, California Diabetes and Pregnancy Program Sweet Success Guidelines for Care. Developed with California Department of Public Health; Maternal Child and Adolescent Health Division; revised edition, Chapter 7 updated September 2015.
- American Society for Metabolic and Bariatric Surgery (ASMBS).
Factors Interfering with Drug Absorption After Gastric Bypass

- Decreased absorptive surface of the intestine after Roux-en-Y gastric bypass leading to decreased absorption time.
- Extended release preparations are not recommended.
- Caution against using nonsteroidal anti-inflammatory drugs postpartum to avoid gastric ulceration.

Prescription Considerations For Bariatric Population

- Crushed or liquid forms of medication are absorbed best.
- Pills should be smaller than the size of a pencil eraser.
- Avoid sustained release or enteric coated products.
- Avoid OTC medications with fructose, corn syrup, maltose or honey.

Summary

- Contraceptive counseling is important.
- Increased risk of contraception failure.
- Consultation with an RD after conception.
- Forms of medication.
- Alternative testing for GDM.
- Monitor weight gain pattern.
- A broad evaluation for micronutrient deficiencies at the beginning of pregnancy.
Summary

- Close monitoring is required after malabsorptive procedures especially regarding protein intake
- More specific guidelines for pregnancy after BPD malabsorptive procedure is needed

Questions?