Objectives

1. Indications for Bariatric Surgery
2. Surgical Procedures and their safety and efficacy
   - Laparoscopic Gastric Bypass
   - Laparoscopic Sleeve Gastrectomy
   - Laparoscopic Adjustable Gastric Band
   - Open Biliopancreatic diversion
   - Intragastric Balloon
3. What is the impact of Bariatric Surgery on Pregnancy

What is Obesity?

- Excess fat accumulation which presents a risk to health and can be tracked through measuring body mass index (BMI)
- BMI = weight kg / height meters$^2$

<table>
<thead>
<tr>
<th>BMI CLASSIFICATION</th>
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<tbody>
<tr>
<td>Underweight</td>
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<tr>
<td>Normal range</td>
</tr>
<tr>
<td>Overweight</td>
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<tr>
<td>Obesity</td>
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<tr>
<td>Obesity class I</td>
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<tr>
<td>Obesity class II</td>
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<td>Obesity class III</td>
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Obesity in the US

"If more than 50% of the population is obese, then I'm not overweight, I'm average!"
Bariatric Surgery Candidates

- National Institutes of Health recommendations:
  - BMI >40 or BMI 35-40 with serious health problems linked to obesity including, but not limited to: Hypertension, Diabetes, GERD, Obstructive Sleep Apnea, Hyperlipidemia, Joint Pain, NASH
  - Patient’s size is affecting their quality of life
  - Patients who have failed traditional diets and exercise
  - Patients with stable mental and physical health
  - Patients who do not smoke or use other tobacco products
  - Patients who are not substance abusers

Restrictive

- Band
- Sleeve

Restrictive & Malabsorptive

- Roux en Y Gastric Bypass
  - (bypass 170-220cm)

- Biliopancreatic Diversion with Duodenal Switch
  - (150cm common channel)

- Stomach Intestinal Pylorus Sparing (SIPS)- Single Anastomosis (investigational)
  - (loop 300cm common channel)

Prior to Surgery

- BMI less then 60 (our requirement)
- Most insurance requires 3-6 months SWL
- Meet with:
  - Psychology (can impose their own requirements, repeat visits or more dietician visits)
  - Dietician
  - UGI
  - +/- Sleep study
  - +/-cardiac clearance

80% Of patients are women
Roux-en-Y Gastric Bypass Procedure

- Stomach is divided to create a small pouch to provide restriction (~30mL)
- Portion of small intestine (170-220cm) is bypassed to decrease absorption of nutrients

Roux-en-Y Gastric Bypass Advantages

- Average weight loss is 60 to 70% of excess weight in 1 to 1.5 years
- Health Improvements:
  - 90% of diabetics become diet controlled
  - 66% are cured of high blood pressure while 33% are on fewer blood pressure medications
  - 95% are cured of reflux and heartburn
  - 90% cured of sleep apnea
  - 90% cured of stress incontinence
  - 90% control high cholesterol/triglyceride
- 10 Year Weight Regain usually 10 to 15%

Laparoscopic Roux-en-Y Gastric Bypass Risks

<table>
<thead>
<tr>
<th>Short-term Risks</th>
<th>Long-term Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 to 3% experience leaks</td>
<td>Dumping</td>
</tr>
<tr>
<td>Abdominal infection or abscess</td>
<td>Internal hernia</td>
</tr>
<tr>
<td>1 to 2% experience blood clots (Most common cause of death)</td>
<td>Bowel obstruction or blockage</td>
</tr>
<tr>
<td>Wound problems: - Infection, hernia and scarring</td>
<td>Stricture or narrowing the intestine</td>
</tr>
<tr>
<td>Nausea and vomiting</td>
<td>Ulcers (NO SMOKING / NICOTINE OR NSAIDS!!)</td>
</tr>
<tr>
<td>Injury to: - Spleen, stomach and esophagus</td>
<td>Flatulence or gas</td>
</tr>
<tr>
<td>Mortality 0.5-5% (depending on size and health)</td>
<td>Diarrhea or constipation</td>
</tr>
</tbody>
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Internal Hernia

(1, sometimes called Peterson’s space), (2) or in the mesenteric opening of the biliopancreatic limb (3) in the opening of the transverse mesocolon

Gastric Bypass

- Dumping Syndrome "Complication"
  - Early Dumping (15 minutes)
    - Caused when sugar enters the small bowel, hyperosmolality of food
    - Hypotension
    - Hypoglycemia and subsequent insulin response leading to hypoglycemia
    - Dizziness
    - Fatigue
    - Colicky abdominal pain
    - Nausea
    - Diarrhea
    - Tachycardia
    - Patients are glad they have it

- Late dumping (2-3 hours)
  - Secondary to hyperglycemia and subsequent insulin response leading to hypoglycemia
  - Dizziness
  - Fatigue
  - Diaphoresis weakness
  - Helps patients avoid sweets (Avoid simple sugars, frequent small meals, separating solids from liquids by 30 minutes, early dumping self limiting 7-12 weeks

Laparoscopic Sleeve Gastrectomy

Formed around a 36-40F baggie

Advantages

- >50% excess weight loss at three years
- Improves:
  - Diabetes
  - Heart disease
  - Sleep apnea

Risks

- Less than 1% experience leakage
- Less than 1% experience blood clots
- Not reversible if Barrets with HGD, may remove conduit for esophagectomy needing colonic interposition
- Reflux
- Failure to lose weight and weight regain
- Vitamin deficiencies and malnutrition
- Death between 0.25%-1% (depending on size and health)
Adjustable Gastric Band

Advantages
• 40-50% excess weight loss at three years
• No cutting of the stomach

Risks
• Requires a foreign device to remain in the body
• Can result in possible band slippage or band erosion into the stomach
• Highest rate of re-operation
• Require frequent re-adjustments and checks

Gastric Band

Biliopancreatic Diversion with Duodenal Switch

• Typically done open
• Only appropriate under certain circumstances
• Extreme version of the Gastric Bypass (bypasses 80% of the small intestine)
• More Malabsorptive
  - Higher risks at time of surgery
  - Higher nutrition risks

Endoscopic Intragastric Balloon

• The gastric balloon is available for patients with a BMI between 30 and 40.
• Patients can keep the balloon in for a maximum of six months. After that time it is removed.
• Estimated weight loss is 30% - 35% of excess weight. On average, patients who had the balloon lost between 25 and 30 pounds during the six month period.
• Some of the side effects of the procedure are vomiting and abdominal pain.
• Generally, insurance companies will not pay for the procedure.
• Out of pocket expensive

Risks
• Can deflate and migrate distally causing obstruction
• Can cause pancreatitis after auto-inflation
• Can cause gastric perforation
• Pregnancy contraindication

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Nutritional Deficiencies

Obese patients commonly exhibit deficiencies preoperatively
— Vitamin D (40-100%), Iron (44%)

Postoperatively - Typically after malabsorptive - Roux en Y gastric Bypass/DS
— Most common:
  • B12 (30-70%), Folic Acid (1-40%), Vitamin D, Calcium and Iron (52%)
— Less common:
  • B1 (Thiamine), B6, Vitamin A, Zinc, selenium, magnesium, copper, Vitamin E, Vitamin K, Folic acid (non-compliance), Vitamin C, zinc
Thiamine Deficiency
Wernicke's Encephalopathy

- Any malnourished patient (RYGB) who has severe nausea and vomiting should get a Banana bag (including Thiamine) in the ER to prevent this complication
- Vision changes, Ataxia, Mental Status Changes
- If patients are diagnosed after symptoms develop mental status changes may be permanent.

Nutritional Deficiencies

- Need Bariatric MVI or regular MVI with 200% recommended daily values, AND Vitamin D & Calcium
- No gummy vitamins

Bariatric Surgery and Pregnancy


Bariatric Surgery to Pregnancy

- Time to CONTRACEPTION
  - Recommendation to postpone pregnancy until stable weight
  - 1 year Sleeve or Roux en Y gastric bypass
  - They know their operation!
- Contraception
  - We recommend dual contraception or long-acting reversible (IUS or progestogen implant)
  - Combined oral contraception may be less reliable after bariatric surgery

Bariatric Surgery to Pregnancy

- Nutrition
  - Based off pre-pregnancy BMI, and gestational weight gain
  - Minimum 60g of protein per day (our standard recommendation)
  - If gestational diabetes recommend low glycemic index foods (avoiding carbs)
  - Severe malnutrition may require enteral or parental nutrition
- Vitamin levels
  - Optimize 3-6 months prior to pregnancy
  - Take MVI with recommended levels (Bari MVI + Prenatal)
  - Check every trimester
  - Folic acid, Vitamin B12, Ferritin, Transferrin, CBC, Vitamin D 25-OH, Calcium, Phosphate, Magnesium, PTH, Vitamin A, PT, INR, Serum Protein, Albumin, CMP, B12
  - Check first trimester
  - Vitamin E, Zinc, Copper, Selenium

Vitamin Recommended Daily Amount Recommended in Pregnancy

- Thiamine (B1)
  - 15mg preferred, 5mg/day
  - Thiamine with vitamin B complex if prolonged vomiting or IV infusion
- Cobalamin (B12)
  - 350-500 µg/day
  - Folic acid
  - Childbearing .4mg daily preconceptaion and first trimester (4-5mg if obese or diabetic)
  - Iron
  - Females 45-60mg/day (not with Calcium, antacids)
  - Calcium citrate
  - 1200-1500mg/day if BPD (1800-2400mg/d)
  - Vitamin D
    - 3000 IU/day until Vit D 25 (OH) >30
  - Vitamin A
    - 5,000 -10,000IU/d- DS (10,000 IU/d)
    - Should be B carotene in pregnancy
  - Vitamin E
    - 15mg/liter with ES
  - Vitamin K
    - 90-120µg/d- DS (300µg/d)
  - Zinc
    - 8-15mg/d
  - Copper
    - 1mg/d (8-15mg if zinc)
  - Selenium
    - 50µg/d
Obesity and Fertility

- Obese women are at risk for menstrual irregularities, polycystic ovary syndrome (PCOS) and anovulation—all increase the risk of infertility
- Obesity associated with 2x longer time to pregnancy vs normal weight even in eumenorrheic women
- PCOS affects 5-10% of women & associated with infertility due to irregular ovulation
- Increased weight exacerbates symptoms, weight loss 5% can improve ovulatory dysfunction
- Weight loss is first-line treatment for infertility
- PCOS affects 5-10% of women & associated with infertility due to irregular ovulation
- PCOS a major cause of infertility
- Weight loss may improve ovulatory dysfunction
- Case controlled studies demonstrate improved fertility after weight loss surgery
- Infertility decreased from 18.2-44% after surgery

Obesity in men is also associated with decreased reproductive function

Obesity and Pregnancy

- Obesity associated with increased
  - Gestational Diabetes
  - Gestational Hypertension
  - Preeclampsia
  - Increased C-section
  - Macrosomia
  - Congenital malformation
  - Miscarriage & Stillbirth
  - Impairs recovery after delivery

Maternal Fetal Outcomes

- Improved
  - Reduced rates of gestational diabetes mellitus (odds ratio 0.11—number needed to benefit 5)
  - Large for gestational age (odds ratio 0.31—number needed to benefit 6)
  - Gestational hypertension & all hypertensive disorders (odds ratio 0.38—number needed to benefit 11/8)
  - C-section rate (odds ratio 0.5—number needed to benefit 9)
  - Postpartum hemorrhage (odds ratio 0.32—number needed to benefit 21)

- Increased Risk
  - Increased small for gestational age infant (odds ratio 2.16, number needed to harm 211, more with malabsorptive)
  - Intrauterine growth restriction (odds ratio 2.16, number needed to harm 66)
  - Pre-term delivery (odds ratio 1.35, number needed to harm 196)

- No difference
  - Preeclampsia
  - NICU admission
  - Sepsis
  - Malformation

Pregnancy

- Assess Fetal Growth
  - Perform monthly fetal growth monitoring and assess for developmental problems (intracranial bleeding)
  - Additional detailed anomaly scan late 1st/2nd trimester especially if nutritional deficiencies

- Gestational Diabetes Screen
  - Avoid oral glucose tolerance test (OGTT) unless they have a band due to concerns for dumping
  - Capillary blood glucose of continuous glucose monitoring for one week between 24-28 weeks.
  - Check Hgb A1C and treat if >6.5

Post Partum

[I AM E D D I S]

How I see myself: Introducing my baby to people
Breast Feeding

• Recommended composition unchanged vs non weight loss surgery
• Children who were breastfed for at least 6 months less risk of obesity later in life
• Continue serial labs and same supplementation during pregnancy.


The End

Questions?

Thank you

University of Nebraska Medical Center

BREAKTHROUGHS FOR LIFE