Obesity and Obstetric Complications

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Obesity Classification

- **Class I Obesity – BMI 30 – 34.9**
  - 5’4” woman who weighs 175 lbs has BMI = 30

- **Class II Obesity – BMI 35 – 39.9**
  - 5’4” woman who weighs 205 lbs has BMI = 35

- **Class III Obesity – BMI ≥ 40**
  - 5’4” woman who weighs 235 lbs has BMI = 40

  *Don’t “eyeball it” – calculate BMI and write it on the chart*

Etiology of Obesity

- Genetics & Fetal Programming
- Environment
- Behavior
- Psychology
**PRHE**

**Mission:** To create a healthier environment for human reproduction and development by advancing scientific inquiry, clinical care, and health policies that prevent exposures to harmful chemicals in our environment.

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**Endocrine Disruptors and Obesity**

- Chemicals that bind with hormone receptors in the human body
- Example: BPA and estrogen
- Higher exposure to BPA in utero associated with higher offspring body weight at age 7 (Hoepner et al, Columbia Center for Children’s Environmental Health)
- Evidence that animals are also becoming more obese over time

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Animal studies have shown similarities in the way the brain responds to **classic drugs of abuse** (e.g., morphine, alcohol, nicotine) and to **sugar** (Avena, Rada, and Hoebel 2008).

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**Obesity is associated with metabolic dysfunction**

- Some obese have little to no metabolic dysfunction
- Many normal weight people have metabolic dysfunction

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**Obesity**

**Chronic inflammation**

**HTN, DM, liver disease**
Obesity and Stigma

- Weight bias = inequities in education, employment, & healthcare
- Widespread negative stereotypes: “lazy, unmotivated, lacking discipline, not competent, non-compliant, sloppy”
- Implicit bias tests in providers shows strong preference for thin
- Obese persons are less likely to undergo recommended cancer screening

Obesity and Stigma

- 68% of women with BMI > 55 reported delaying healthcare because of their weight, and 83% reported that their weight was a barrier to getting care
- Women reported disrespectful treatment and negative attitudes from providers, embarrassment about being weighed, and too small gowns, exam tables, equipment

Obesity and Stigma

- Language is important
- In one study, patients preferred the term “weight” to “obesity” or “fat”
- Focus treatment goals on patients’ behavioral and lifestyle changes (rather than emphasizing weight measurement as only measure of success)
- Avoid blaming and judgmental statements
Stigma – Role of Providers

“It’s interesting because we recently had someone who was over 400 pounds who got transferred to us because her out-of-the-city hospital was too terrified of delivering her. They thought if she needed a C-section or whatever it would be impossible to do it and they just didn’t want to deal with her. So we induced her and it was just like passing the hot potato. No one wanted to be around. We induced her for days, we sent her home, we brought her back, we induced her some more. Because there’s a situation – you may not want to pull the baby out but you do not want to do a C-section either.”

- Academic CNM, from focus group study

Early Pregnancy Concerns

• Spontaneous abortion & recurrent loss more common
• Fetal anomalies, esp neural tube defects
• 20% decrease in detection of anomalies by ultrasound

Antepartum Complications

• GDM and DM2
• Chronic hypertension
• Postterm pregnancy
• Difficult ECV

Intrapartum Complications

• Prolonged labor
• Lower likelihood of VBAC success
• Preeclampsia
• Higher rates of cesarean delivery
• Anesthetic complications
• Macrosomia and shoulder dystocia
• Stillbirth
Postpartum Complications

- Longer hospital stays
- Infections
  - Wound infection and endometritis
- Lower rates of breastfeeding

Long-term Risks to Offspring

- Obesity
- Cardiometabolic diseases
- Autism/developmental delay

Fetal Programming

- Animal studies support the role of diet during pregnancy on body composition and metabolism after birth
- Improving diet during pregnancy may have long-term benefits for offspring

Prenatal Care for Obese Women
### At first prenatal visit

- Screen for DM2 (repeat at 24 wks if neg)
- Measure and record BMI in chart
- Review weight gain goals and strategies with patient
- Discuss risks especially re: weight gain
- If concern for CHTN: baseline Cr, 24hour urine, LFTs

### Fetal growth

- Obese women at increased risk for both SGA and LGA
- If fundus easily palpated, can follow fundal height
- If fundus not easily palpated, consider serial ultrasound for fetal growth

### Antenatal Testing

- Increased stillbirth risk in obese women
- No RCT to support or refute benefit of antenatal testing, but many recommend it
- At SFGH we start weekly NST/AFI at 32 weeks for women with BMI of 40 or greater

### Intrapartum Management
When to deliver?

- No evidence to support nor refute, but we consider **induction of labor at 39-40 weeks** in women with BMI ≥ 40, especially if cervix is favorable
- Elevated risk of IUFD

*If induction is not progressing after 24+ hours and maternal/fetal status reassuring (and intact membranes), will stop induction and either try again in a few days or wait for spontaneous labor*

Trial of Induction – new study

- Unpublished cohort study, UCSF
- Women sent home after failed IOL, reassuring maternal and fetal status and no urgent indication for delivery
- ~70% ultimately delivered vaginally
- ~23% came in later in spontaneous labor, the rest came back for second induction attempt
- This is our approach to BMI >= 40

On admission to L&D

- Consult anesthesia on admission (or prior)
- Place internal monitors if needed
- Assess IV access
- Prepare for shoulder dystocia, especially if GDM/DM2 or suspected macrosomia
- Staffing considerations

Cesarean with BMI >= 40
Preparing for cesarean

- 20-degree Left lateral tilt is even more important because of the added weight of the abdominal pannus, but,
- The tilt puts the midline far from the operating surgeon and is ergonomically challenging
- Retraction of the pannus with Montgomery straps and/or extra surgical assistants
- Retraction of the extremely large pannus can cause hypotension, difficult ventilation, and fetal compromise

Cesarean – type of incision and closure?

- No randomized trial of incision type; no evidence that vertical skin is preferable – choose based on surgeon’s preference
- When pannus is massive, a supra-umbilical incision may be considered – transverse or vertical
- Some evidence that vertical incisions are associated with more pain and poorer healing, but study results are mixed
- Vertical incisions may increase the risk of classical uterine incision if access to LUS is limited

Cesarean – type of incision and closure?

- Pre-op antibiotics – at least 2g cefazolin IV
- Subcutaneous sutures decrease risk of seroma, but not good evidence in BMI ≥ 50
- Drains not shown to provide benefit and may increase infection
- Staple vs. suture – ongoing clinical trial in obese women, but current evidence suggests some benefit of suture over staples
- If staples uses, delayed removal may improve outcomes

Supraumbilical Incision

- Pre-op antibiotics – at least 2g cefazolin IV
- Subcutaneous sutures decrease risk of seroma, but not good evidence in BMI ≥ 50
- Drains not shown to provide benefit and may increase infection
- Staple vs. suture – ongoing clinical trial in obese women, but current evidence suggests some benefit of suture over staples
- If staples uses, delayed removal may improve outcomes
Prevent difficult extraction of infant

- Make all incisions larger than usual – skin, fascia, and uterus
- Have vacuum available since fundal pressure may be difficult to apply
- Station of presenting part may be lower than it feels

DVT Prophylaxis?

Mechanical thromboprophylaxis (pneumatic compression) SCDs pre and post-operatively

Early ambulation

Enoxaparin 0.5 mg/kg every 12 hours (starting 12h post-op), or 40mg/day

Emergency Cesarean BMI ≥ 40

Need to plan for extra time to
- move patient to OR table
- induce anesthesia, and
- do the surgery

All will take longer, so have to move earlier to C/S especially for fetal indications

Incision to Delivery Time Increases with Increasing BMI

<table>
<thead>
<tr>
<th>BMI</th>
<th>Time (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;30</td>
<td>9</td>
</tr>
<tr>
<td>30-39</td>
<td>11</td>
</tr>
<tr>
<td>40-49</td>
<td>13</td>
</tr>
<tr>
<td>≥50</td>
<td>16</td>
</tr>
</tbody>
</table>
Length of labor

- First stage of labor *takes longer* among obese women
- As long as maternal and fetal status *reassuring,* may tolerate a slower labor curve in obese patient
- Second stage length NOT associated with BMI (nullips)

Why are cesarean rates so high among obese women?

- Much of this may be iatrogenic
- Obese women should be given a chance for a safe vaginal birth
  - **Allow labor to take longer**
  - Provide continuous labor support (doulas)
  - Obesity alone (BMI of 30-39/Classes 1-2) may not “risk a woman out” for midwifery or birth center delivery

Previous C-section: Balancing Risks

*Consider patient preferences and values*

Advantages of vaginal birth

VS.

Risks of unplanned c-section

[Table 2: Maternal Outcomes by Body Mass Index Categories for Trial of Labor Patients]

<table>
<thead>
<tr>
<th>Body Mass Index Category (kg/m²)</th>
<th>Normal: 18.5-24.9</th>
<th>Overweight: 25.0-29.9</th>
<th>Obese: 30.0-39.9</th>
<th>Morbidly Obese: ≥ 40.0</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failed trial of labor</td>
<td>304 (11.2)</td>
<td>1,077 (22.5)</td>
<td>1,930 (28.9)</td>
<td>644 (24.3)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Hospital stay ≥ 4 days</td>
<td>120 (4.4)</td>
<td>648 (14.0)</td>
<td>1,212 (18.9)</td>
<td>408 (15.9)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Endometritis</td>
<td>21 (0.9)</td>
<td>102 (2.3)</td>
<td>35 (0.5)</td>
<td>21 (0.8)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Repair</td>
<td>6 (0.5)</td>
<td>36 (0.8)</td>
<td>46 (0.7)</td>
<td>20 (0.1)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Dilatation</td>
<td>4 (0.1)</td>
<td>10 (0.2)</td>
<td>60 (0.9)</td>
<td>13 (0.5)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Repair/dilatation</td>
<td>2 (0.1)</td>
<td>7 (0.1)</td>
<td>14 (0.2)</td>
<td>5 (0.2)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Prematurity</td>
<td>24 (0.9)</td>
<td>92 (2.0)</td>
<td>169 (2.5)</td>
<td>19 (0.7)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Prematurity/dilatation</td>
<td>1 (0.0)</td>
<td>17 (0.4)</td>
<td>35 (0.5)</td>
<td>11 (0.4)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Maternal medical injury</td>
<td>13 (0.5)</td>
<td>19 (0.4)</td>
<td>10 (0.1)</td>
<td>11 (0.4)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Maternal surgical injury</td>
<td>6 (0.4)</td>
<td>33 (0.7)</td>
<td>14 (0.2)</td>
<td>10 (0.4)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Hypertension</td>
<td>4 (0.1)</td>
<td>8 (0.2)</td>
<td>14 (0.2)</td>
<td>5 (0.2)</td>
<td>&lt; .001</td>
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*Data are presented as %.
* P values were performed with the Mann-Whitney test for trend across all categories.
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Weight Gain During Pregnancy for Obese Women

The IOM Report and Guidelines

IOM Recommendations for Weight Gain in Pregnancy 2009

<table>
<thead>
<tr>
<th>Pre-pregnancy BMI (kg/m²)</th>
<th>IOM Recommended Gestational Weight Gain (kg / lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18.5 (Underweight)</td>
<td>12.5-18 / 28-40</td>
</tr>
<tr>
<td>18.5 – 24.9 (Normal)</td>
<td>11.5-16 / 25-35</td>
</tr>
<tr>
<td>25.0 - 29.9 (Overweight)</td>
<td>7-11.5 / 15-25</td>
</tr>
<tr>
<td>≥30.0 (Obese)</td>
<td>5-9 / 11-20</td>
</tr>
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</table>

Combined effects of obesity & excessive weight gain

- **Preeclampsia, macrosomia, and cesarean birth** increase with increasing weight gain among obese women
- Some evidence that weight gain <11 lbs decreases these risks, but may also increase risk of SGA
Does Prenatal Advice on Weight Gain Matter?

- Receiving correct advice about weight gain was associated with actual weight gain within guidelines;
- Receiving no advice about weight gain was associated with gain outside guidelines;
- About a third of women report receiving no advice about how much weight to gain.


Barriers to weight gain counseling

Insufficient nutrition training  
Belief that counseling is ineffective  
Concern about sensitivity of topic

CME, dieticians  
Literature  
normalize

What do patients want?

Appropriate gestational weight gain (GWG) is vital, as excessive GWG is strongly associated with postpartum weight retention and long-term obesity. How health care providers counsel overweight and obese pregnant women on appropriate GWG and physical activity remains largely unexplored.
What do patients want?

- Women were advised to gain too much weight or given no advice;
- Providers perceived as being unconcerned about excessive gain;
- Women desire and value weight gain advice from providers

The Healthy Moms Trial
Vesco et al, Kaiser Portland

- DASH diet, caloric restriction, weekly meetings
- Goal: maintain weight within 3%
- Mean pre-pregnancy BMI (36.2 kg/m²)

Outcome Data
The Healthy Moms Trial
Vesco et al, Kaiser Portland

Intervention participants gained less weight from randomization to 34 weeks gestation 5.0 vs 8.4 kg, mean difference = -3.4 kg, (7.5 lbs) 95% CI [-5.1, -1.8]
Lower proportion of LGA babies 9% vs. 26%, odds ratio = 0.28, 95% CI [0.09, 0.84]
No difference in SGA babies

Summary - Weight Gain Intervention Studies

- Small sample sizes – unknown if impact on outcomes other than weight (GDM, c-section, macrosomia)
- Not powered to exclude possibility of harm from weight restriction
- Diet and exercise can reduce weight gain among obese women
- More intensive (and expensive) interventions may be necessary to see an impact
Bariatric Surgery & Pregnancy

- 179,000 procedures in 2013, approx 36% in reproductive-age women
- Fewer obesity-related pregnancy complications post-surgery, but may have increased low birth weight infants
- Risks of vitamin deficiencies: iron, vitamin B12, calcium, folic acid, vitamin D

Dietary Advice

- Whole-foods diet, high in fiber and nutrients
- Reduce or cut out high-calorie, highly-processed, nutrient-poor foods
- Cut out high-calorie beverages including juice
- Replace refined grains with whole grains
- Replace saturated fat/trans fat with plant-based and fish-based fats (nuts, avocados, olive oil, salmon)
- Legumes – beans, lentils
- Supplements: Folic acid, Vitamin D – obese women are especially deficient in these
- Allow patient to choose goal, make a plan, write it down

Exercise/physical activity

- At least 30 min/day 5 days a week
- Base it on prior level of activity
- Walking
- Group activities

Summary

- Most obese women are gaining more than recommended weight
- More research needed to establish safety of minimal weight gain / weight loss during pregnancy
- Excessive weight gain compounds risks of obesity
- On L&D, be patient but be prepared!
- We can improve outcomes among obese pregnant women w/ lifestyle interventions (counseling, diet, exercise)
- Discuss weight issues BUT be aware of our biases, watch language and attitude
“You can leave pregnancy healthier than you started”

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