The Effects and Management of Obesity on Pregnancy

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Case Presentation

Ms. M is a 36 yo G10P6036 at 41 weeks 0 days by LMP of 4/18/2010 c/w 3rd trimester Ultrasound at 31 weeks 2 days presents for postdates IOL. She is not having consistent contractions, she denies leakage of fluid, vaginal bleeding, and is feeling good fetal movements.
Case Presentation

PNC:
5 visits, initial weight 395 (weight gain 10 lbs), initial BP 124/82 (range 110-132/70-84)

PNI:
2: **Multi-gravid:** 6 NSVDS
3: **Obesity:** BMI 67
4: **Poor Prenatal care:** late presentation, only 5 visits

PNL:
- H/H 10.9/35, Rub Immune, RPR NR, HepB Neg, HIV neg, GC/CT neg, Blood Type A+, Ab neg, GCT 106, GBS neg

Sonos: at GA 31w 2d, dating c/w LMP, EFW 2049 (40th %tile), anterior placenta
Case Presentation

Obhx:
1991: FT NSVD, M, 8 lbs 4 ounces
1993: TOP 1st trimester, D+C
1994: TOP 1st trimester, D+C
1995: FT NSVD, M, 8 lbs 7 ounces
1996: FT NSVD, F, 8 lbs 10 ounces
1997: TOP 1st trimester, D+C
1998: FT NSVD, F, 8 lbs 6 ounces, complicated by diagnosis of WPW
2005: FT NSVD, F, 7 lbs 11 ounces
2008: FT NSVD, M, 8 lbs 0 ounces
Case Presentation

GynHx: 11/28/5
   no hx of abnormal paps, STD’s, fibroids, ovarian cysts.
PMhx: WPW, Obesity
PShx: Cardiac Ablation
Shx: denies tobacco, alchol, illicit drug use.
   Lives with all 6 children, FOB involved, good social support from family, especially her 2 sisters
Meds: PNV, Metoprolol 75mg bid, Flecainamide 100mg bid
Allergies: NKDA
Case Presentation

PE on Admission for IOL:
T 36.9°C BP 132/86 HR 92 RR 18
Gen: Morbidly obese, unable to fit in bed, only able to sit on room chair
CV: RRR normal S1 and S2
Lungs: CTAB no wheezes, no crackles
Abd: gravid, non tender, leopolds EFW 3600
Ext: 1+ pitting edema BLE
FHT: baseline 140, moderate variability, +accels, - decels
Toco: irregular contractions
SVE: 1/L/H
Case Presentation

A/P 36 yo G10P6036 at 41w0d presenting for post dates IOL

1) Admit to L+D, IVF, NPO, check CBC, T+S, RPR

2) Labor: not active, will induce due to a Bishops <5 with cervical ripening, Cervidil.

3) Fetus: Category 1, reassuring

4) WPW: continue Metoprolol, Flecainamide, Cardiology Consult

5) GBS neg

6) Analgesia per pt request.
Hospital Course

After admission and Cardiology consult it was decided to start Ms. M’s IOL with Cervidil. Cardiology input reaffirmed the plan to continue Metoprolol and Flecaïnamide, with an extra dose of Flecaïnamide at bedside at all time if Ms. M became tachycardic. After 12 hours of Cervidil, on resident exam it was noted that the Cervidil was in the wrong position. This was thought secondary to difficult placement due to body habitus. At this time her exam 1/L/H. The decision was made to place another Cervidil. During this time Ms. M remained in her room chair. The team was unable to locate a bariatric bed. As the fetal tracing remained category I, Ms. M was able to remain in this position.

During the 2nd Cervidil Ms. M began to show borderline elevation in her BP’s. Evaluation for Preeclampsia was done and the UA showed 2+ protein. Magnesium Sulfate was started. Upon the removal of the next Cervidil Ms. M’s exam was unchanged. A cervical foley was then placed and Pitocin started. When the cervical foley was removed Ms. M’s exam showed 6/90/-2. At this point, her tracing began to show recurrent decelerations and the decision to take her to the OR for C-section for arrest of labor, non-reassuring tracing was made.
Hospital course

In the OR, the C-section lasted well over 3 hours. It was complicated by the obesity, with difficult retraction, dissection as well as blood loss with EBL of 1500. On attempt to close, the OB team discovered a large ventral hernia. The General Surgery team was called and entered the case repairing the hernia with mesh. Ms. M remained in the hospital for 10 days with course complicated by poor wound healing and endomyometritis.
Obesity in Pregnancy

While this case brings to mind many issues with management of Labor such as induction, continuous monitoring, management of pre-eclampsia the thing that was so striking during the case was how the patient's obesity was such a barrier to care from the simple logistics of positioning, to placing the cervidil, to the labor course itself, ending ultimately in arrest and C-section.
The Reality

Prevalence of obesity in the United States is rising dramatically especially among women of reproductive age.
- Obesity in 1962 13% of US Population
- 2011 66% of Americans are classified as overweight or obese (62% of women)
- Only one state has prevalence of Obesity <20% \(^1\) (Colorado).
Obesity in Pregnancy

Prevalence of Obesity in Pregnancy as of 1999

- more than 40% of women initiating prenatal care are obese (BMI >30)
- 8% are extremely obese (BMI >40)
- complicates 28% of pregnancies
- 1 in 10 >250 lbs, 1 in 20 >300lbs

-values are thought to be much greater today
Obesity in Pregnancy

- Research over the last few decades, as obesity has been on the rise, has demonstrated consistently that obese women are at a higher risk for adverse maternal, fetal, and neo-natal outcomes.

- Newer data even suggests that infants of obese mothers are at higher risk for lifelong metabolic complications including DM, HTN, Heart disease, and obesity from what is known as “in-utero programming of adult disease”\(^1\)
Increased Risk with BMI > 30

- gestational hypertension
- gestational diabetes
- preeclampsia
- fetal macrosomia
- spontaneous abortion
- cesarean delivery
- fetal malformations
- protracted labor
- operative vaginal delivery
- increased C-section rate
- neural tube defects in the fetus
- stillbirth

- difficult estimation of fetal weight and interpretation of external fetal heart rate and patterns of uterine contraction
- decreased VBAC success
- increased risk of childhood obesity.
- operative and postoperative complications: excessive blood loss, longer operative time, wound infection, endometritis, and anesthetic challenges
Obstetric Complications by Maternal BMI

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Obesity vs. Control</th>
<th>Class III obesity vs. Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adj Odds Ratio (95% CI)</td>
<td>P Value</td>
</tr>
<tr>
<td>GDM</td>
<td>2.6 &lt;.0001</td>
<td>4.0</td>
</tr>
<tr>
<td>Gestational HTN</td>
<td>2.5 &lt;.0001</td>
<td>3.2</td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>1.6 .007</td>
<td>3.3</td>
</tr>
<tr>
<td>Birthweight &gt;4500g</td>
<td>2.0 .0006</td>
<td>2.4</td>
</tr>
<tr>
<td>Birthweight &gt;4000g</td>
<td>1.7 &lt;.0001</td>
<td>1.9</td>
</tr>
<tr>
<td>Preterm delivery</td>
<td>1.1 .4</td>
<td>1.5</td>
</tr>
<tr>
<td>Operative Vaginal Delivery</td>
<td>1.0 .9</td>
<td>1.7</td>
</tr>
<tr>
<td>PPROM</td>
<td>1.3 .14</td>
<td>1.3</td>
</tr>
<tr>
<td>IUGR</td>
<td>0.9 .82</td>
<td>0.8</td>
</tr>
<tr>
<td>Placenta Previa</td>
<td>1.3 .4</td>
<td>0.7</td>
</tr>
<tr>
<td>Placenta Abruption</td>
<td>1.0 .9</td>
<td>1.0</td>
</tr>
<tr>
<td>Cesarean Delivery</td>
<td>1.7 &lt;.01</td>
<td>3.0</td>
</tr>
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Secondary analysis of a prospective cohort of <16,000 unselected patients in the US

In 2005 ACOG came out with a committee opinion for management of Obesity in Pregnancy\(^6\).
- preconception assessment and counseling of women who are obese, with provision of education about the risks and potential complications for mother and fetus.
- Nutrition advice with changes in diet and exercise before pregnancy is attempted.
- Weight loss also should be encouraged before initiation of infertility treatment because of the increased risk of spontaneous abortion in obese women who undergo this therapy.
- Counseling and exercise programs should continue after delivery.
- Women who have had bariatric surgery should be counseled to avoid pregnancy during the postsurgery phase of rapid weight loss. Check levels of vitamin B12, folate, iron, and calcium.
- Prenatal weight gain recommendations should correspond to the Institute of Medicine guidelines: 25 to 35 lb (11.4 to 15.9 kg) for women with a BMI below 25 kg per m\(^2\); 15 to 25 lb (6.8 to 11.4 kg) for women with a BMI of 25 to 29 kg per m\(^2\); and 15 lb (6.8 kg) for women with a BMI of 30 or greater kg per m\(^2\).
- Screen for GDM at first visit and throughout pregnancy
- Consider preemptive evaluation by anesthesia due to increased C-section rates.
Preconception and Interpregnancy Care

- though 2005 recommendations focused on this period, however by the time pregnancy is diagnosed the fetus already has been exposed to potentially “toxic metabolic environment” with impaired organogenesis
- also weight loss needed to effect the poor outcomes is not safe during pregnancy
- Still the ideal time to have an intervention is before conception
- Studies have shown that the risk of preeclampsia doubled with each 5-7 kg/m² increase in prepregnancy BMI
- Counseling in all overweight women of reproductive age, about weight loss and effects that weight can have on pregnancy
- Optimal weight loss program is unclear, but use of healthy diet and exercise is still advocated by ACOG
Preconception Counseling

Weight loss is the Most important thing for patients planning a future pregnancy


• OBJECTIVE: To examine the association between changes in prepregnancy body mass index (BMI) between a woman's first two pregnancies and incidence of preeclampsia in the second pregnancy.

• METHODS: We performed a population-based retrospective cohort analysis using data on women’s first two singleton pregnancies (n=136,884) in Missouri (1989–1997). The study was restricted to women without preeclampsia in the first pregnancy. Prepregnancy BMI (kg/m2) was categorized as underweight (less than 18.5), normal (18.5–24.9), overweight (25–29.9), and obese (30 or greater). Analyses were adjusted for confounders through multivariable logistic regression.

• RESULTS: The incidence rate of preeclampsia in the second pregnancy was 2.0%. In comparison with women who were of normal BMI in both pregnancies, the risk for preeclampsia increased when BMI changed between the first two pregnancies from underweight to obese (odds ratio [OR] 5.6, 95% confidence interval [CI] 1.7–18.2), normal to overweight (OR 2.0, 95% CI 1.7–2.3), normal to obese (OR 3.2, 95% CI 2.5–4.2), and overweight to obese (OR 3.7, 95% CI 3.1–4.3). Being obese or overweight in both pregnancies was associated with increased risk of preeclampsia in the second pregnancy. Women who increased their BMI from underweight to normal or overweight between pregnancies had risks of preeclampsia comparable with those with normal BMI in both pregnancies. African-American, but not white, women who had a reduction in BMI from obese or overweight to normal between pregnancies remained at increased risk for preeclampsia.

• CONCLUSION: Increases in prepregnancy BMI from normal weight to overweight or obese between pregnancies are associated with increased risk of preeclampsia in the subsequent pregnancy.
Bariatric Surgery and Pregnancy

- Referral to bariatric surgeon is appropriate for women BMI >40 or for women with BMI >35 with comorbid conditions.
- Best results when followed by lifestyle modifications.
- Avoid pregnancy for at least 12-18 months due to higher surgical complications and to avoid fetus from rapid weight loss.
- Monitor for surgical complications, vitamin deficiency (B12, folate, iron).
1st Trimester Care

- US on entry to care, for viability and dating as dating is more difficult in obese, as more prone to ovulatory dysfunction, oligomenorrhea
- PMhx for coexisting medical disorders (sleep apnea, gall bladder disease, HTN, thyroid disease, cardiac disease)
- Extra testing: are a baseline uric acid, creatinine, LFT’s, 24 hour urine warranted at first visit in case GHTN is later a concern? For class III obesity?
- Benefit of Maternal Cardiac echo for myopathy?
- Sleep study? OSA may worsen during pregnancy
- Continued counseling of risks (especially SAB)
- Testing for pre-existing DM at initial visit
- Dietary counseling on appropriate pregnancy weight gain, (excessive weight gain correlated with macrosomia, operative vaginal delivery, C-sections, neonatal consequences) and avoidance of weight loss.
- 2009 recs Obese women should gain 11-20lbs.
2nd Trimester Care

- Prenatal diagnosis of congenital anomalies
- Greater risk of cardiac, neural tube defects, and recent study of >1 million infants suggested greater risk for additional malformations such as diaphragmatic hernia, hydrocephaly, hypospadias, cystic kidney, omphalocele, and orofacial clefts
- Obese African American population has been shown to have 6 fold greater likelihood of congenital cardiac malformations than nonobese population
- Anatomy scan (difficult exam due to habitus)
- Additional fetal echo between 22-24 weeks?
- Amniocentesis or Chorionic villi if appropriate, Increased complications of these procedures in this population has yet to be studied.
3rd Trimester Care

- Increased risk of preterm labor vs. increased risk of postdates induction
- Increased IUFD
- Macrosomia/IUGR with difficult office exam, requiring more frequent ultrasound evaluation (every 4-6 weeks during 3rd trimester?)
- Follow closely for preeclampsia (appropriate cuff size)
- Repeat GCT/GTT between 24-28 weeks
- Delivery planning
VBAC

• Unfortunately the successful rates of VBAC in the obese population have also been shown to be dismal.


• In 1 prospective multicentered study with >4000 VBACs the likelihood of VBAC success was inversely related to BMI. Nonobese had failure rate of 15% while overweight (BMI 25-30) failed 30% and obese (BMI >30) failed 39% of the time. A higher uterine scar dihiscence was also seen between obese, overweight, and normal BMI patients. (2.1%,1.4%,0.9% respectively)
Labor and Delivery

- Increased risk of operative vaginal delivery and c-section (complicated by greater inherent perioperative risks of surgery)
- Shoulder dystocia, birth trauma
- Failure of medical induction
- Labor less likely to progress according to the standard labor curve.
Abstract

- **Aim:** To determine whether maternal obesity is associated with dysfunctional labor patterns.
- **Methods:** In a case-control design we compared the graphic labor patterns of a group of 105 very obese subjects [body mass index (BMI) >35 kg/m²] with those of 113 lean controls (BMI<26 kg/m²). All entered spontaneous labor at term. Cases with birth weights >4 kg, diabetes mellitus, hypertension and prior cesarean delivery were excluded.
- **Results:** The obese group had a significantly higher frequency of arrest of dilatation (17.6 vs. 5.2%; P=0.005).
- **Conclusions:** Maternal obesity is associated with active phase labor dysfunction, specifically arrest of dilatation.
Labor and Delivery

impaired contractility?


Prospective study of 509 nulliparous patients who underwent induction.

As Maternal weight increased the rate of dilation decreased, and the induction to delivery interval increased.

Findings here suggest slower rate of labor progress in the active phase. After adjusting for factors including AROM, induction tactics, pitocin use, epidural use, fetal size the median duration of labor from 4-10 cm was significantly longer for obese and overweight women.

6.2 hours for normal weight
7.5 for overweight
7.9 for obese
# Peripartum Complications

<table>
<thead>
<tr>
<th>Problem/risk</th>
<th>Potential Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased Resp work and Myocardial Oxygen requirement</td>
<td>Epidural, O2, left lateral position</td>
</tr>
<tr>
<td>Peripheral IV access</td>
<td>Central line</td>
</tr>
<tr>
<td>Inaccurate blood pressure monitoring</td>
<td>Appropriate cuff size, A-line</td>
</tr>
<tr>
<td>Increased risk of general anesthesia epidural</td>
<td>Anesthesia consultation, early</td>
</tr>
<tr>
<td>Enhanced risk of C-section delivery labor curve,</td>
<td>Informed consent, monitoring intervention for labor dystocia</td>
</tr>
<tr>
<td>Enhanced risk of shoulder dystocia weight,</td>
<td>Near term sonographic fetal caution with operative delivery</td>
</tr>
</tbody>
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Post Partum Care

- Increased risk of endomyometritis, wound infection, and venous thromboembolism after c-section.
- Postpartum weight retention which carries risk of CV disease and metabolic syndrome.
- Encourage Breastfeeding! Improve weight loss.
- Screen for postpartum depression using Edinburgh Depression Scale. One study showed a positive correlation with BMI and PP depression and in class III obesity it is thought to be as high as 40%!
- Counseling on weight loss and Family planning (hormonal IUD more effective), the real impact can be made prior to pregnancy!
Thanks Dr. Williams!

References