GDM: Gestational Diabetes Mellitus

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Description of Patient

- Veronica Delgado
- Age: 31
- 22\textsuperscript{nd} week of pregnancy
- Family hx of diabetes
- Hispanic decent
- Wt. 175lbs - pre pregnancy 165lbs
- Taking prenatal vitamins
- Patient states increased appetite and thirst
Lab Values

- High Osmolality (296, normal 285-295mmol/kg/H2O)
- High Glucose (186, normal 70-110mg/dL)
- High TG (155, normal 35-135mg/dL)
- High HbA1c (8.5, normal 3.9-5.2%)
- Low HTC (36.5, normal 37-47%)
- Low Ferritin (12, normal 20-120mg/mL)
- High Urine Glucose (+2mg/dL)
Etiology/Disease Measures

- Cause is unknown

- Affects approx. 14% of all pregnancies in the US

- During pregnancy the placenta produces high amount of hormones, that impair the action of insulin

- As baby grows, placenta produces high amounts of insulin-interfering hormones, not allowing insulin in to your cells, provoking a rise in blood sugar that can affect the growth and development of the baby

- Usually develops during last half of pregnancy, rarely though can occur as early as the 20th week
Risk Factors

- Being older than 25
- Overweight; BMI of 30 or above
- Race
  - For unclear reasons, women who are black, Hispanic, American Indian, or Asian, have a higher likelihood
- Family or personal health history
  - Prediabetes—a precursor to type 2 diabetes
  - More likely to develop GDM if had it during previous pregnancy
  - Or if previous baby weighed more than 9 lbs
  - Or if had an unexplained stillbirth
Complications that Can affect your baby if you have GDM

- **Developmental Problems**
  - Increased risk w/ motor skill development with balance and coordination
  - Increased risk of attention problems of hyperactivity disorders
- **Jaundice**
- **Type 2 Diabetes later in life**
  - Babies born to mothers with GDM have a higher risk of being obese and developing type 2 diabetes later in life
- **Respiratory Distress Syndrome**
  - Babies born to women with GDM have a higher rate of respiratory problems than do those born to women w/o GDM even at same gestational age
- **Low Blood Sugar: hypoglycemia**
  - Babies of mothers with GDM can develop hypoglycemia shortly after birth because their own insulin production is high.
- **Excessive growth**
  - Extra glucose can cross the placenta, which triggers the baby’s pancreas to make extra insulin, causing the baby to grow too large, know as macrosomia.
Complications for the Mother

- Future Diabetes
  - More likely to have GDM with future pregnancies
  - More likely to develop type 2 diabetes when older
  - Women who reach their ideal body weight after delivery have less than a 25% chance of developing type 2 diabetes

- Urinary Tract Infections
  - Experience 2x the number of UTI’s during pregnancy than other pregnant women, caused by excess glucose in the urine

- Preeclampsia
  - High Bp and excess protein in the urine after the 20th week of pregnancy
    - Only cure is delivery of the baby
Screening

- **2 Step System**
- **Initial Glucose Challenge Test**
  - **50-g oral glucose test (GCT)**
    - 24-28 weeks of gestation
    - Drink glucose solution
    - 1 hr glucose level >140mg/dL referred for OGTT
- **100-g oral glucose test (OGTT)**
  - Fast overnight of 8-14 hours
  - Carb loading 3 days including more than 150g carbs
  - Higher concentration of glucose solution
  - Blood glucose checked every hour, 3x
  - If at least 2 of the 3 readings are higher than normal, you will be diagnosed with GDM
<table>
<thead>
<tr>
<th>Time</th>
<th>100 g Glucose Load, mg/dL (mmol/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting</td>
<td>95 (5.3)</td>
</tr>
<tr>
<td>1-h</td>
<td>180 (10.0)</td>
</tr>
<tr>
<td>2-h</td>
<td>155 (8.6)</td>
</tr>
<tr>
<td>3-h</td>
<td>140 (7.8)</td>
</tr>
</tbody>
</table>
Treatment

- Controlling blood sugar level is essential to the health of the baby, and avoiding complications during delivery!
- Blood Sugar Monitoring
  - Check 4x-5x/day
  - 1\textsuperscript{st} thing in the morning, and after meals
- Diet
- Exercise
- Medication
Nutrition Therapy

- Eating the right kind and the right amount of food is the best way to control blood sugar level!
  - Fruits and vegetables
  - Whole grains
  - High nutritional value, low in fat and calories
  - Limit carbs and sweets
    - Avoid large meals
    - Total of 6 feedings/day, 3 major meals, 3 snacks
      - Carbs 35-40% of diet
      - Protein 20-25 %
      - Fat 35-40%
      - 36 kcal/kg actual weight
        - Shown to reduce hyperglycemia and plasma triglycerides
Behavioral Therapy

- Exercise!
- Lowers blood sugar level
  - Transports sugar to cells to be used for energy
- Increases sensitivity to insulin
  - Therefore body needs less insulin to transport sugar to cells
- Prevent discomforts of pregnancy
  - Back pain, muscle cramps, swelling, constipation, and difficulty sleeping
- Helps prepare you for labor and delivery
- With doctors ok....
  - Moderate aerobic exercise
  - Most days of the week
  - Start slowly if haven’t been active
  - Walking, cycling, swimming
Medication Therapy

- If diet and exercise aren’t enough:
  - Insulin injections
  - Currently Recommended:
    - Fasting Plasma glucose: 90-99mg/dL
    - One hr. postprandial plasma glucose <140mg/dL
    - Two hr. postprandial plasma glucose <120-127mg/dL
      - Lower blood sugar levels
      - About 15% of women w/ GDM need insulin therapy
      - Some women need an oral medication
Oral Hypoglycemic Agents

- **Metformin**
  - Decreasing hepatic glucose output
  - Crosses placenta and cord levels can be higher than maternal levels
  - Increased rates of preeclampsia, and perinatal mortality when used in 3rd trimester

- **Glyburide**
  - Equally as safe and effective as insulin
  - Safe in breastfeeding, with no transfer to milk
## Periodic Fetal Biophysical Testing

<table>
<thead>
<tr>
<th>Test</th>
<th>Frequency</th>
<th>Reassuring Result</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fetal Movement counting</td>
<td>Every night starting 28(^{th}) week</td>
<td>10 movements in &lt;60 min</td>
<td>Performed in all patients</td>
</tr>
<tr>
<td>Nonstress Test (NST)</td>
<td>Twice weekly</td>
<td>2 heart rate accelerations in 20 min</td>
<td>Begin at 28-34 wk with insulin-dependent diabetes, and begin at 36 wk in diet-controlled GDM</td>
</tr>
<tr>
<td>Contraction Stress Test</td>
<td>Weekly</td>
<td>No heart rate decelerations in response to 3 contractions in 10 min</td>
<td>Same as for NST</td>
</tr>
<tr>
<td>Ultrasonographic Biophysical profile</td>
<td>Weekly</td>
<td>Score of 8 in 30 min</td>
<td>3 movements=2, 1 flexion=2, 30 s breathing=2, 2 cm amniotic fluid=2</td>
</tr>
</tbody>
</table>
Mrs. Delgado’s Prognosis

- GDM
- 3-4 units of Aspart prior to each meal
- 10 units Lantus at bedtime
- 2700 kcal/day
- At least 169 grams of protein
- 270 grams of carbs
- 105 grams of fat
- Postprandial glucose level should be less than 140 mg/dL
Bibliography

- www.webmd.com/baby/guide/preeclampsia-eclampsia
- www.fpnotebook.com/endo/pharm/insln.htm
- www.mypyramid.gov
- www.diabetes-blood-blood-sugar-solutions.com/2/hr/post/prandial.html