GESTATIONAL DIABETES:
CURRENT MANAGEMENT
What's new and why does it matter?

Chase Caeryer, MD, MBA | Fellow/Instructor
Division of Maternal-Fetal Medicine
UAB | The University of Alabama at Birmingham

DISCLOSURES
• I have no conflicts of interest to report regarding this presentation.

OBJECTIVES
Upon completion of this educational activity, participants will understand…
1. Participants will be able to describe when women should be screened for gestational diabetes mellitus
2. Participants will be able to distinguish different screenings techniques for gestational diabetes
3. Participants will be able to recognize different treatment options for gestational diabetes
4. Participants will be able to identify management plans for women with gestational diabetes mellitus
WHY THIS TOPIC MATTERS?

- High (and increasing) incidence
  - Complicates 6% of all pregnancies
  - Directly proportional to type 2 DM in a given population
  - Incidence of type 2 DM continues to increase
  - GDM is a problem that is NOT GOING AWAY

WHY THIS TOPIC MATTERS?

- Maternal Risk:
  - Preeclampsia
  - Cesarean section
- Fetal Risk
  - Macrosomia
  - Shoulder dystocia
  - Birth Trauma
  - Stillbirth
  - Neonatal hypoglycemia
  - Hyperbilirubinemia

DETECTION
WHO SHOULD BE SCREEN?

- Historical screening
  - Family history of diabetes
  - Obstetrical outcome consistent with diabetes (i.e. macrosomia)
- Problem with historical screen – 50% GDM were missed
- Expanded the definition of screening to “High-Risk of DM”
  - This makes up a great majority of ALL pregnant women

WHO SHOULD BE SCREEN?

All pregnant women
>24 weeks
(Generally performed between 24-28 weeks)

WHEN SHOULD WE SCREEN THEM?

Consider testing in all women with a BMI >25 (BMI >23 if Asian) and have at least one of the following risk factors.
- Physical inactivity
- DM in first-degree relative
- High risk race/ethnicity (anyone but caucasian)
- Given birth to child >4000g
- History of GDM
- Chronic hypertension
- HDL <35mg/dL
- History of PCOS
- History of an A1C >5.7%
- History of cardiovascular disease
**WHEN SHOULD WE SCREEN THEM?**

Consider testing in all women with a BMI >25 (BMI >23 if Asian) and have at least one of the following risk factors:

- Physical inactivity
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- Given birth to child >4000g
- History of GDM
- Chronic hypertension
- HDL <35mg/dl
- Male
- History of an A1C >5.7%
- History of cardiovascular disease

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**EGGO STUDY**

### Outcomes in Early GDM Screening (entire cohort)

<table>
<thead>
<tr>
<th></th>
<th>Early Screening (n=454)</th>
<th>Routine Screening (n=458)</th>
<th>Relative Risk (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDM diagnosed</td>
<td>15.2%</td>
<td>12.2%</td>
<td>1.13 (0.95 – 1.34)</td>
</tr>
<tr>
<td>Primary Composite Outcome</td>
<td>59.0%</td>
<td>53.3%</td>
<td>1.13 (0.98 – 1.29)</td>
</tr>
<tr>
<td>Any Diabetic Medication</td>
<td>7.1%</td>
<td>4.6%</td>
<td>1.23 (0.98 – 1.54)</td>
</tr>
<tr>
<td>Insulin</td>
<td>2.6%</td>
<td>0.7%</td>
<td>1.62 (1.25 – 2.11)</td>
</tr>
</tbody>
</table>

*Composite to include: macrosomia (>4kg), primary cesarean, hypertensive disease of pregnancy, shoulder dystocia, neonatal hyperbilirubinemia or hypoglycemia*


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### Outcomes in those with GDM

<table>
<thead>
<tr>
<th></th>
<th>Early Screening (n=69)</th>
<th>Routine Screening (n=56)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Composite Outcome</td>
<td>73.9%</td>
<td>71.4%</td>
<td>0.76</td>
</tr>
<tr>
<td>Any Diabetic Medication</td>
<td>45.0%</td>
<td>33.9%</td>
<td>0.21</td>
</tr>
<tr>
<td>Insulin</td>
<td>17.4%</td>
<td>5.4%</td>
<td>0.04</td>
</tr>
<tr>
<td>Gestational Age at Delivery</td>
<td>36.7wks</td>
<td>38.1wks</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

*Composite to include: macrosomia (>4kg), primary cesarean, hypertensive disease of pregnancy, shoulder dystocia, neonatal hyperbilirubinemia or hypoglycemia*

SO REALLY WHO & WHEN SHOULD WE SCREEN?

All pregnant women
**ONE TIME >24 weeks**
(Generally performed between 24-28 weeks)

HOW SHOULD WE SCREEN?

- IADPSG recommends: Universal 75g 2hr OGTT
- NICHD/ACOG recommends: Two step screening process
- Absence of clear evidence that supports one approach over the other
  - 2 step approach would lead to increased prevalence (estimated >10%)
  - RCTs mixed results on outcomes
  - Meta-analysis showed trends, but significant difference between incidence and outcomes
  - Kaiser implementation of one-step screen showed increased incidence with no change in maternal or neonatal outcomes

WHAT THRESHOLDS SHOULD WE USE?

<table>
<thead>
<tr>
<th>1 hr cutoffs</th>
<th>130</th>
<th>135</th>
<th>140</th>
</tr>
</thead>
<tbody>
<tr>
<td>False positives</td>
<td>3hr GTTs done</td>
<td>Abnormal screen without GDM at increased risk of worse maternal or neonatal outcomes.</td>
<td></td>
</tr>
</tbody>
</table>
**What thresholds should we use?**

<table>
<thead>
<tr>
<th>Test</th>
<th>Carpenter</th>
<th>Coustan</th>
<th>NDDG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting</td>
<td>95</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>One Hour</td>
<td>180</td>
<td>190</td>
<td></td>
</tr>
<tr>
<td>Two Hour</td>
<td>155</td>
<td>165</td>
<td></td>
</tr>
<tr>
<td>Three Hour</td>
<td>140</td>
<td>145</td>
<td></td>
</tr>
</tbody>
</table>

- Abnormal screen without GDM at increased risk of worse maternal or neonatal outcomes.
- Further research needed on the risk of adverse outcomes for those with 1 abnormal value.

**False positives 3hr GTTs done**

- Abnormal screen without GDM at increased risk of worse maternal or neonatal outcomes.
- Further research needed on the risk of adverse outcomes for those with 1 abnormal value.

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**So really how should we screen?**

A two step screen with **consistent cutoffs** decided by your groups practice guidelines.

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**Consistent cutoffs is the key**
TREATMENT

WHAT IS FIRST STEP IN TREATMENT?

- Glucose monitoring and lifestyle modifications (diet & exercise)
- Exact dietary composition and exercise routines are less well studied
- Dietary guidelines: 3 meals with 2-3 snacks a day
  - 30-40% complex carbs
- Exercise guidelines: mirrors recommendations outside of pregnancy
  - 30 minutes, 5 days/week of moderate intensity
  - Simple exercise: 15 minutes after most meals, if unwilling to do moderate intensity

WHAT IF NUTRITION AND EXERCISE FAIL?

- No specific threshold value demonstrating nonpharmacological failure
- Insulin is PREFERRED treatment for GDM
  - Does not cross the placenta
  - Tight metabolic control
  - Long-term safety
- Many patients (and providers) don’t want to use insulin as first line
  - Inconvenient (teaching, uncomfortable)
  - Hypoglycemia risk
  - Expensive
HOW BEST TO GIVE INSULIN?

- Isolated abnormal values at specific times of day
  - Abnormal AM fasting – NPH at night
  - Abnormal fasting all day – Lantus at night
  - Abnormal postprandial – Novolog with meals

- Globally elevated
  - Both a long/intermittent-acting and ultra short-acting insulin
  - Total insulin 0.7-1.0 units/kg daily
  - Consider referral (MFM, endocrine, experienced obstetrician)

WHAT IF INSULIN ISN’T A GOOD OPTION?

- FIRST THING: Glyburide should ALMOST NEVER BE USED FIRST LINE FOR ORAL THERAPY
  - Higher rates of macrosomia and neonatal hypoglycemia
  - Crosses the placenta
  - Lacks long term safety data

- Metformin concerns
  - Not FDA approved for treatment of GDM
  - Long-term neonatal outcomes and metabolic influences unknown
  - Does not produce superior outcomes compared to insulin

SO REALLY WHAT SHOULD I USE?

Per ACOG:
“In women who decline insulin or who the obstetrical care providers believe will be unable to safely administer or cannot afford insulin, metformin (and rarely Glyburide) is a reasonable alternative choice in the context of discussing with the patient the limitations of the safety data and a high rate of treatment failure that requires insulin supplementation.”
SO REALLY WHAT SHOULD I USE?

Per ACOG:
"In women who decline insulin or who the obstetrical care providers believe will be unable to safely administer or cannot afford insulin, metformin (and rarely Glyburide) is a reasonable alternative choice in the context of discussing with the patient the limitations of the safety data and a high rate of treatment failure that requires insulin supplementation."

Insulin is the **preferred** treatment for diabetes in pregnancy, but **not the only** suitable one.

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MANAGEMENT

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ANTENATAL TESTING

- Suboptimal glycemic control is associated with stillbirth
- If treated medically (insulin or oral agents) is a candidate for antenatal testing
- No consensus regarding testing on well-controlled GDM not on medication
DELIVERY TIMING

• Controlled without medication 39w0d to 40w6d
• Controlled with medication 39w0d to 39w6d
  • Poorly controlled individualized

DELIVERY ROUTE

• If EFW>4,500g risk/benefits discussion of scheduled cesarean section
  • Around 588 CD are needed to prevent one permanent brachial plexus palsy

• A single ultrasound for fetal growth after 36 weeks to assess for macrosomia
  • Only 22% of those with LGA on U/S were confirmed LGA at birth

POSTPARTUM

• Perform a 75g, 2hr oral glucose test at 4-12 weeks postpartum
• Impaired values: Fasting (>100mg/dL), 2hr (>140mg/dL)
  • If confirmed impaired
    • refer to primary care physician
  • If normal testing
    • continue physical activity
    • additional glycemic assessment within 1-3 years
• Over 50% of women will maintain glucose intolerance or develop diabetes within 10 years of last pregnancy.
SUMMARY

- Preferred one time screening of all women between 24-28 weeks with a 1 hour 50g glucose load.
- If above the predetermined cutoff, a subsequent 3 hour 100g glucose should be performed to confirm diagnosis.
- Diet and exercise are preferred first line treatments.
- If >50% of blood sugars are outside prespecified range insulin is the preferred treatment for diabetes in pregnancy, but not always the most suitable one.
- Antenatal testing and a fetal growth scan should be performed in the later part of the third trimester for women on medication.
- Delivery should occur at full term (>39wks) unless poorly controlled.
- Postpartum screening with appropriate referral should occur for increased risk of overt diabetes mellitus.

REFERENCES