Diabetes and Pregnancy

June Fowler Brill, RN, CDE
UC San Diego
Diabetes and Pregnancy Program
Objectives

- Describe the different types of diabetes in pregnancy
- Review the incidence and screening for diagnosis of Gestational Diabetes (GDM).
- Discuss potential risks and complications of diabetes during pregnancy.
- Discuss the goals and treatment of diabetes in pregnancy
- Discuss postpartum follow-up
The Diabetes Epidemic

A killer disease—and how diet and lifestyle can help beat it
Diabetes Statistics

(ADA website/ CDC)

- **25.8 Million** people are affected (8%)
- Type 2 Diabetes in children has increased **by 20%** in the past decade – these are our future patients
- **79 million** people are estimated to have Pre-diabetes
- **7th leading cause of death** in the US
- **$245 billion**: Total costs of diagnosed diabetes in the United States in 2012
Diabetes Trends in the US 1994-2010

Age-Adjusted Prevalence of Diagnosed Diabetes Among U.S. Adults

1994

2000

2005

2010
Types of Diabetes

- **Type 1 DM** (*not IDDM*)
- **Type 2 DM** (*not NIDDM*)
- **GDMa₁** - diet controlled
- **GDMa₂** - requiring medication

**Pre-diabetes**
- Impaired Fasting Glucose (IFG): 100-125 mg/dl
- Impaired glucose tolerance (IGT): 140-199 mg/dl after 2 hrs of 75 gm OGTT.
- A₁c: 5.7-6.4
Type 1 Diabetes

- Auto-immune disorder that attacks the insulin-producing (islet) cells in the pancreas.
- Dx in childhood or young adulthood (usually)
- Approx 1% of diabetics
- Must take insulin injections daily
Type 2 DM

- Most common type of DM (~90%)
- The islet cells are still functioning, but the body becomes resistant to insulin, or the pancreas doesn't produce enough insulin or both.
- Diet controlled?
- Oral medication or insulin or both
Gestational Diabetes Mellitus

- Glucose intolerance of various degrees of severity diagnosed during pregnancy

- **Cause:** Placental hormones that block insulin and cause worsening insulin resistance
Pregnancy Diabetes Statistics

- *6% of all US pregnancies in 2006 (~200,000/year)
- Type 1 (4%)
- Type 2 (8%)
- Gestational diabetes (88%)
Risk Factors for GDM

- **Age > 25.**
- **Family or personal health history.**
  - Family history of diabetes
  - Prior history of gestational diabetes
  - Hx of delivery of a baby who weighed more than 9 pounds
  - History of an unexplained stillbirth
  - BMI ≥ 30
  - Other medical conditions (ex. PCOS)
- **Race:**
  - American Indian
  - Hispanic
  - African-American
  - Asian
  - Pacific Islander
Standard Screening & Diagnosis of GDM in US
ACOG, NIH

- Screen at 24-28 wks with 1 hour/50 gm GCT. If 1 hour GCT glucose >130, 135 or 140 mg/dl*; refer for 3 hour OGTT
- High risk women screened at first prenatal visit

<table>
<thead>
<tr>
<th></th>
<th>1 hour/50 gram GCT at 24-28 wks</th>
<th>3 hour/100 gram OGTT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting</td>
<td>Pt does not need to be fasting</td>
<td>Diagnostic criteria is 2 values equal to or greater than:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>95 mg/dL</td>
</tr>
<tr>
<td>1 hour</td>
<td>&gt; 140: refer for 3 hour GTT. Cutoff of 130, 135 used also</td>
<td>180 mg/dL</td>
</tr>
<tr>
<td>2 hour</td>
<td></td>
<td>155 mg/dL</td>
</tr>
<tr>
<td>3 hour</td>
<td></td>
<td>140 mg/dL</td>
</tr>
</tbody>
</table>
IADPSG, ADA, AACE Recommendations

- All women screened in 1st Trimester to determine undiagnosed diabetes or overt diabetes in pregnancy with:
  - A1C ≥6.5%. (Pre-Diabetes A1c 5.7-6.4%, Fasting 100-125)
  - Fasting ≥126 or Random ≥200 mg/dL
  - 2 hour OGTT not recommended before 24 weeks

<table>
<thead>
<tr>
<th>Screen at 24-28 weeks</th>
<th>IADPSG, ADA, AACE 1-step process</th>
</tr>
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<tbody>
<tr>
<td>OGT</td>
<td>75 gram 2 hour GTT</td>
</tr>
<tr>
<td>Diagnostic criteria</td>
<td>1 value equal to or greater than:</td>
</tr>
<tr>
<td>Fasting</td>
<td>92 mg/dL</td>
</tr>
<tr>
<td>1 hour</td>
<td>180 mg/dL</td>
</tr>
<tr>
<td>2 hour</td>
<td>153 mg/dL</td>
</tr>
<tr>
<td>3 hour</td>
<td></td>
</tr>
</tbody>
</table>
Diagnosing GDM CDAPP 2011

Screen all at first appointment using FPG and A1C – Include in Prenatal Labs

- A1C 5.7-6.4 or FPG 92-125mg/dl → Pre-Diabetes
- A1C ≤ 5.6 or FPG ≤ 91 NML
- A1C ≥ 6.5 or FPG ≥ 126 → Type 2

24-28 wks

2 hr 75 gm OGTT
If one or more values meet or exceed: Fasting 92; 1hr 180; 2hr 153

IADPSG does not Recommend OGTT < 24 wks

Refer to Sweet Success, CDAPP
Maternal complications

- Miscarriage
- Hypertensive disorders
- Polyhydramnios
- Preterm delivery
- Increased incidence of Cesarean delivery
- Anxiety/Depression
Gestational Diabetes

High blood glucose levels in mother

Brings extra glucose to baby

Causes baby to put on extra weight
Fetal/Neonatal complications

- Birth defects
- Miscarriage
- Macrosomia (>4000gms)
- Shoulder dystocia
- Stillbirth
- Neonatal Hypoglycemia
- RDS-Respiratory Distress Syndrome
- Jaundice
- Increased risk of obesity and diabetes later in life
Macrosomic newborn weighing 14.7 lbs, twice the size of average newborn.
Shoulder Dystocia

**SHOULDER DYSTOCIA**

- Intrarabine pressure is caused by maternal contractions
- Anterior shoulder impacted on symphysis pubis
- Trachial plexus stretching

**BRACHIAL PLEXUS**

- Normal
- Stretching

**DANGERS OF SHOULDER DYSTOCIA**

- Umbilical cord entrapment
- Inability of child’s chest to expand properly
- Severe brain damage or death due to hypoxia or acidosis if delay in delivery
- Brachial plexus damage
Fetal Tests

- 1st Trimester screening/nuchal translucency
- 2nd Trimester screen (16-18) weeks
- Anatomy Ultrasound at 18-20 weeks
- Fetal Cardiac Echocardiogram at 18-20 wks
- Fetal movement counts at 28 weeks
- Antepartum testing (NST/AFI) starting at 34-36 wks
- Ultrasound fetal growth at 28-30 wks and 36 weeks
- Amniocentesis for fetal lung maturity only if planning delivery before 38 1/2 weeks.
Blood Glucose Monitoring

DIET

EXERCISE

Medication
Nutrition Guidelines

- Eat 3 smaller meals with 3 snacks. 2-3 hrs apart
- Avoid simple sugars: sugar, fruit juice, candy, cakes, cookies
- Eat Protein with ALL meals and snacks
- Eat More vegetables
- Eat smaller amounts of Carbohydrates (bread, rice, pasta, potatoes)
Eat “Real” Foods not “Fake” Foods
Nutrition Labels
Breakfast

- Avoid cereal or oatmeal for breakfast.
- Limit to 15 gms carbohydrate
- Make sure there is **Protein** in the morning meal
Better Breakfast
Lunch and Dinner

- 3-4 oz Protein minimum
- 30-45 grams Carbohydrate
- 2 servings of veggies
- No fruit with meals (fruit with protein for snacks okay)
- 1-2 servings fat
The Plate Method
Snacks

15 grams of Carb plus a Protein serving always!

Bedtime snack may have 15-30 gms of Carb plus protein
Eat this..........Not this
Refer back to Nutrition

- Inadequate Weight Gain or Dietary Intake
- Continuous Weight Loss
- Excess Weight Gain
- Nausea/ Hyperemesis
- Special diets
Exercise

- Check with healthcare provider before starting to exercise
- Aim for 30 minutes a day - 10 minutes after each meal.
- Slow and steady wins the race!
- Educate for Preterm Labor symptoms
Blood Glucose Monitoring
Fingerstick Glucose Monitoring

- **GDM**: test 4 times a day - Fasting and 1 hour after start of breakfast, lunch and dinner
- **Type 1 and 2**: test 6-8 times a day - Before and 1 hour after meals, bedtime, 3-4 am
- Food Diary and Glucose log
<table>
<thead>
<tr>
<th>DAILY RECORDS:</th>
<th>NAME:</th>
<th>WEIGHT:</th>
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</thead>
<tbody>
<tr>
<td>*Range: Fasting &lt; 90&lt;br&gt;*1 Hour after START of Meal &lt; 130</td>
<td>Date:</td>
<td>Date:</td>
</tr>
<tr>
<td>FASTING Blood Sugar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS 1 hr. after start of BREAKFAST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS 1 hr. after start of LUNCH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BS 1 hr. after start of DINNER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bedtime</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-4am Blood Sugar</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you had or did ANY of the following, write it in the box:

- Exercise:
- Illness:
- Fetal Movement Record:
- Problems / Concerns / Stressors:
## Pregnancy Target Blood Glucose Goals:

<table>
<thead>
<tr>
<th>Time</th>
<th>Goal</th>
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<tbody>
<tr>
<td>Fasting</td>
<td>70-89</td>
</tr>
<tr>
<td>1 hour after meals</td>
<td>100-129</td>
</tr>
<tr>
<td>(1 hr after 1\textsuperscript{st} bite)</td>
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</tr>
<tr>
<td>2 hours after meals</td>
<td>&lt; 120</td>
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<tr>
<td>(Not recommended)</td>
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</table>
Medications

- Metformin
- Glyburide
- Insulin
Metformin

- Increases insulin sensitivity
- Usual dose 500-1000 mg bid
- Does NOT cause hypoglycemia (when used alone)
- Side effects: GI mostly (Nausea, diarrhea at first but usually subsides within 1-2 wks of starting)
Glyburide

- Increases production of insulin and improves insulin sensitivity.
- May cause low blood sugar (HYPOGLYCEMIA)
- May be given up to 3-4 times a day
- If given to target postprandial glucose, take 1 hour before the meal.
- If given to target fasting, take AFTER 10pm with a snack.
Insulin

- Multiple Daily Injections (MDI), Insulin pump
- May cause low blood sugar (HYPOGLYCEMIA)
- Doses individualized! Once, twice, 3-4 x day
- Bolus/ Basal
- **Rapid acting:** (Lispro/Aspart) - control postprandial and corrections
- **Basal insulin:** (NPH, Glargine, Detemir)-control between meal and overnight glucose
- **Do not use premix insulin (70/30)**
Insulin Requirements During Pregnancy

- **DM 1 insulin needs**
- **GDM and Type 2 DM (no upper limit)**

![Graph showing insulin requirements during pregnancy.](image)

- **Triple Insulin**
- **Double Insulin**
- **Normal Insulin**

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Conception</th>
<th>Delivery</th>
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<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
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<tr>
<td>10</td>
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<td>25</td>
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<td>35</td>
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<tr>
<td>40</td>
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</table>

Breastfeed
Insulin Pens

Pen Needle Parts
(needles not included)

- Outer Needle Shield
- Inner Needle Shield
- Needle
- Paper Tab

KwikPen Parts

- Cap Clip
- Pen Cap
- Label
- Dose Indicator
- Dose Window
- Dose Knob
- Cartridge Holder
- Pen Body
- Rubber Seal
Insulin Pump and CGMS (Continuous Glucose Monitoring System)
Hypoglycemia (BG < 70)

- Can be mild to severe. **Untreated hypoglycemia can lead to LOC and death.** Teach pt how to treat low blood sugar.

- **Rule of 15:** 15 grams of fast acting carbohydrate every 15 minutes until blood glucose is above 80. (4 glucose tablets, 4 oz of juice, 8 oz milk)

- In hospital:
  - NO IV access: Glucagon 1 mg IM
  - IV access: 25 ml of D50 over 3-5 minutes
  - Notify MD-determine cause

- Prevention is Best!!
Hypoglycemia Sxs

1. Recognize Symptoms Early

No matter how carefully you manage diabetes with insulin, hypoglycemia (low blood sugar) may still develop very quickly. Symptoms include:

- Sweating
- Blurry Vision
- Dizziness
- Anxiety
- Hunger
- Irritability
- Shakiness
- Fast Heartbeat
- Headache
- Weakness, Fatigue
15 Grams of Carb
GLUCAGON EMERGENCY KIT

- All patients with Type 1 DM
- Train the FAMILY!
- Nausea and vomiting common side effect
Timing of Delivery

- Individualized
- Goal is term delivery $\geq 39$ wks
- Early intervention: poor control or non-adherent to regimen
- Medical or fetal complications
GDM/Type 2 on Labor & Delivery & Postpartum

- Discontinue oral medication on day of induction or labor. May need insulin if BG > 120
- Check BG’s ante- and postpartum, start meds if needed.
- Postpartum BG Target: fasting < 110, 2 hour after meals < 140
Type 1 DM Labor & Delivery and Postpartum

- Insulin drip during labor and delivery per hospital protocol
- Hourly fingerstick blood glucose monitoring
- Return to insulin pump or injections once patient is eating.
- **Postpartum insulin needs will be approximately 1/3 to ½ of final pregnancy dose. Relax glucose targets after delivery.**
- Watch for **hypoglycemia** postpartum especially after breastfeeding
BREASTFEEDING
It Rocks!
Postpartum Follow-up

GDM

- Postpartum 2 hr GTT
- Annual screening for diabetes
- Early screening in future pregnancies

Type 1 or 2 Diabetes

- Follow weekly for 6 wks
- Return to PCP or Endo every 3-6 months
- Family planning
- Pre-conception care
- Recommend A1c < 6.5 prior to conception
MANAGEMENT of DM in Pregnancy
It takes a TEAM!
The End