Updates in Gestational Diabetes
HIPP Clinic
(Hyperglycemia in Pregnancy Program)
Northern Navajo Medical Center

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Objectives

• Present diagnostic criteria for diagnosis of Pre-existing Diabetes and Gestational Diabetes
• Present SRSU protocols for GDM/DM Screening in pregnancy
• Review pearls of therapeutic interventions in Diabetic Pregnancy
• Update on HIPP (Hyperglycemia in Pregnancy Program) Clinic and resources
• Review preconception goals
Old Protocol at NNMC

• First prenatal visit
  • Screen for pre-existing diabetes: HbA1C
    • $\geq 6.5\%$ at $\leq 20$ weeks
  • Screen for gestational diabetes: 1Hour GCT
    • 3Hour GTT for diagnosis if elevated

• 24-28 wks
  • Re-screen for gestational diabetes: 1Hour GCT
    • 3H GTT for diagnosis if elevated
Before the HIPP Days........

Our 2005 NNMC statistics ......

- LGA rate 45% in GDM patients
- Dx to intervention lag time = 30+ days
- ‘Intervention’ was not unified or coordinated.
- Case Manager program established..............

Fast forward........ One step (sorta) testing began....in 2011........
Case Management Effects

NNMC LGA Rates

% HIPP Delivers

Year

Initial Prenatal Intake (<24 Weeks)

- **< 5.7** (Next PNV within 4 wks)
  - Normal
    - 2H GTT at 24-28 weeks
    - All values normal

- **5.7-6.4** (Next PNV within 1-2 wks)
  - OB 2H GTT
    - FPG < 92
      - 75g GTT given
    - FPG ≥ 92
      - 1-3 values abnormal

- **≥ 6.5**
  - Lab A1C to confirm new diagnosis
  - Same-day intake with DM Case Manager
  - Type 2 DM

- GDM Diagnosis:
  - FPG ≥ 92
  - 1H ≥ 180
  - 2H ≥ 153
Goal of intake A1C: Early Intervention

<table>
<thead>
<tr>
<th>HbA1C*</th>
<th>% Malformations</th>
<th>RR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;6</td>
<td>3.0%</td>
<td>1.0</td>
</tr>
<tr>
<td>6.1-9.0</td>
<td>5.2%</td>
<td>1.7 (0.4-1.7)</td>
</tr>
<tr>
<td>9.1-12.0</td>
<td>4.3%</td>
<td>1.4 (0.3-8.3)</td>
</tr>
<tr>
<td>12.1-15.0</td>
<td>38.9%</td>
<td>12.8 (4.7-35.0)</td>
</tr>
<tr>
<td>&gt;15.0</td>
<td>40.0%</td>
<td>13.2 (4.3-40.4)</td>
</tr>
</tbody>
</table>

Glucose Control and Malformations

*1st trimester HbA1c in 303 insulin-requiring diabetics

GDM 2H Glucose Tolerance Test

• 75 mg glucose tolerance beverage
• Patient must fast overnight for at least 8 hours prior to test, remain seated, and no smoking
• Abnormal venous plasma values during pregnancy:
  • FBG > 92 mg/d
  • 1 hour > 180 mg/dl
  • 2 hour > 153 mg/dl
• If one or more values are met or exceeded treat for gestational diabetes
24-28 Week GDM Screening

- 75 gram OGTT: fasting, 1Hour, 2Hour levels

Patient comes to prenatal visit or lab appointment *fasting*.

- **FPG ≥ 92**
  - GDM Diagnosis:
    - FPG ≥ 92
    - 1 Hour ≥ 180
    - 2 Hour ≥ 153
  - GDM

- **FPG < 92**
  - 75g OGTT given
  - 1-3 values abnormal

All values normal

Normal
HIPP Days are Ahead! ....

Hip (ˈhɪp) :

a. Keenly aware of or knowledgeable about the latest trends or developments ...

b. Usually used to begin a cheer ...
Hyperglycemia in Pregnancy Program (HIPP)

- Multidisciplinary patient-centered
- One-stop shopping
- Comprehensive Prenatal & Diabetes Care
  - DM Standards of Care Assessments
  - Frequent glycemic control assessments
  - Insulin Titration
    - Various methods of communication
  - MD/CNM/CDE/RD/PT/MSW
Prenatal visit at HIPP

GDM Nurse Case Manager
• Glucometer review
• Insulin titration
• Antenatal Monitoring

Dietitian
• Nutrition counseling and follow-up

MD or CNM consultation
• BP check, Urine dip
• Fetal heart tones, Fundal height measurement
• Management of co-morbidities (CHTN, etc)
• Growth ultrasound

Other
• Lab testing: A1C, PEC labs, 24H urine collection
• Case Management, Social Work
Antenatal Management Best Practices

• Self Care Education & Support
• Home glucose monitoring:
  • Fasting (60-89), 1-hour post-prandial (100-129)
  • Controlled: ≥ 80% of levels within goal
• Medical Nutrition Therapy Counseling
• Physical Activity Support
• Care Coordination
• Creative Services & Scheduling
Medical Nutrition Therapy

- Determine weight goals
- Develop individualized, nutritionally balanced meal plan
- Provide nutrition education
- Achieve and maintain optimal glycemic control
  - Limit hypo/hyperglycemia
  - Prevent excessive weight loss or gain
Basic GDM Meal-planning Guidelines

• Carbohydrates (CHO) Focus
  • milk, starches, fruit & starchy vegetables
• CHO 40-45% of kcal/day (about 200-250 grams of CHO/day)
• Minimum CHO/day = 180 grams (12 servings)
• Eat 3 meals and 3 snacks per day
  • Bedtime snack is important
• Space meals evenly 2-3 hours apart
• No more than 10 hour between bedtime snack and morning breakfast
Initiating Therapy

- Medical Nutrition Therapy (MNT)
  - 50-90% can be managed with this alone
- Exercise
  - Level I data to show that this lowers fasting and postprandial glucose levels
  - Aerobic, 20 minutes, 3x/week (10 min post meal daily)
- Insulin: The Gold Standard
  - Preferred regimen: long-acting insulin BID
  - with rapid-acting insulin analogue
  - Detemir/NPH/Novolog
Pearls of Insulin Titration

• When to start insulin?
  • 2-3 day trend of elevated FBS
    • FBS most predictive of neonatal outcome
  • 2 post meal values above target
    • Especially if there were no choice excursions
    • 150 is usually the trigger point
  • US eval  BPD:AC Ratio
    • ABD fat suggestive of hyperglycemia
Pearls of Insulin Titration (cont.)

- Evaluation & Titration Successes
  - Twice weekly eval until 80% in target
  - Titration Q 72 hours to prevent stacking
Insulin Pumps

- Ideal Candidate – High dose user (^100 units per meal) or
  - Dedicated to SBGM and repeated titration with minimal effect
  - Simple dose calc – ½ TDD = basal rate
  - 500 rule for Insulin to Carb Ratio Divide 500 by TDD = ICR
- Cost – PDA $700 Pods $300/month
- Funding source SDPI Grant
Oral Medications

- **Metformin** (crosses placenta)
  - Reduces insulin resistance
  - Improves insulin action
  - Add to insulin regimen if repeated titration shows minimal effect
  - Slow titration to reduce GI side effects (500 mg po BID x 7 days)

- **Glyburide** (crosses placenta)
  - Secretagogue – targets pancreatic release of insulin
  - Use to target elevated data – start low 2.5 mg/max dose 20 mg/day
Antenatal Management Best Practices (cont.)

• Detailed anatomy U/S with fetal echo for T2 DM
  • Increased risk of congenital anomalies
• Periodic growth U/S
• Antenatal testing 32-34 wks
• Monitor closely for preeclampsia
• Term U/S for estimated fetal weight
  • Delivery plan discussion
  • C-Section offered if >4500 grams
• Deliver by 39 wks
  • 38 wks if uncontrolled
Role of A1C in Prenatal Care

- Q30 day A1C – HIPP Clinic Routine
  - “When maternal glycemia is elevated and rapidly brought toward normal in pregnancy, A1c has been reported to show significant decrease within 2 weeks compared with the baseline elevation; thus measurement of A1c every 2-6 weeks confirms SBGM measurements.”
  - Perform A1c test at initial prenatal visit and then monthly until target levels < 6.0% are achieved. Conduct tests every 2-3 months thereafter.

2008 ADA Managing Preexisting Diabetes and Pregnancy
Antenatal monitoring

• Twice weekly nonstress test (NST)
  • Marker of acute hypoxia or acidosis
• Once weekly amniotic fluid index (AFI)
  • Marker of placental insufficiency

• A1GDM: generally not needed
• A2GDM
  • Start at 32-34 weeks
• Type 2 DM
  • Class C and above: start at 28-30 weeks
Breastfeeding

- Prevention of neonatal hypoglycemia
  - Colostrum does not stimulate insulin production the way formula does
- Prevention of maternal type 2 diabetes
  - Weight loss
    - >10 lb associated with 50% ↓ risk of developing type 2*
  - Glycemic control
- Prevention of childhood obesity
  - Children who are breastfed for at least 6 months have half the rate of obesity
- Prevention of childhood onset diabetes

Preconception Counseling

• “Standard care for all women with diabetes ... beginning at the onset of puberty or at diagnosis:
  1) education about the risk of malformations associated with unplanned pregnancies and poor metabolic control
  2) use of effective contraception at all times, unless the patient has good metabolic control and is actively trying to conceive”*

*ADA, Standards of Medical Care in Diabetes - 2011
Preconception Counseling (cont.)

- Meta-analysis: comparing diabetic women who had received preconception care/counseling to those who didn’t
  - lower 1\textsuperscript{st} trimester A1C (mean difference 2.3%)
  - decreased major congenital anomalies (2.1% vs. 6.5%, RR 0.36 CI 0.22-0.59)

Ray et al., QJM 2001; 94:435.
NNMC Statistics 2015

- Current LGA Rate 8%
  - 100% receive MNT
  - 98% show rate
  - FVRx Program pilot
  - Program Sweet Success accreditation continues
Preconception Recommendations

- Folic acid – 4 mg daily
- Optimal glycemic control: A1C < 6%
  - Effective contraception until this is achieved
  - Optimal A1C prior to discontinuation of contraception is the marker associated with the lowest rate of adverse pregnancy outcomes (OR 0.2, CI 0.06-0.67)*
- Optimal blood pressure control
- Assessment for retinopathy, nephropathy
- Screen for hypothyroidism
- Smoking cessation
- Counsel on glycemic goals during pregnancy

*Pearson et al. BJOG 2007; 114:104.
Preconception: Adjust medications

• Adjustment of medications for pregnancy
  • ACE-I, diuretics → Labetolol, Nifedipine, Methyldopa
  • Statins → stop

• **Switch to insulin**
  • Based on expert opinion and extensive research in pregnancy
  • Glyburide potentiates weight gain in pregnancy
  • Avoid jeopardizing glycemic control in 1st trimester when switching agents
References

References (cont.)

• Sacks. AJOG 1989;161;642


• Indian Health Diabetes Best Practice, Diabetes in Pregnancy, 2011; 13-39 http://www.ihs.gov/MedicalPrograms/Diabetes/