

Updates in Gestational Diabetes

HIPP Clinic

(Hyperglycemia in Pregnancy Program)

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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 ≤ 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

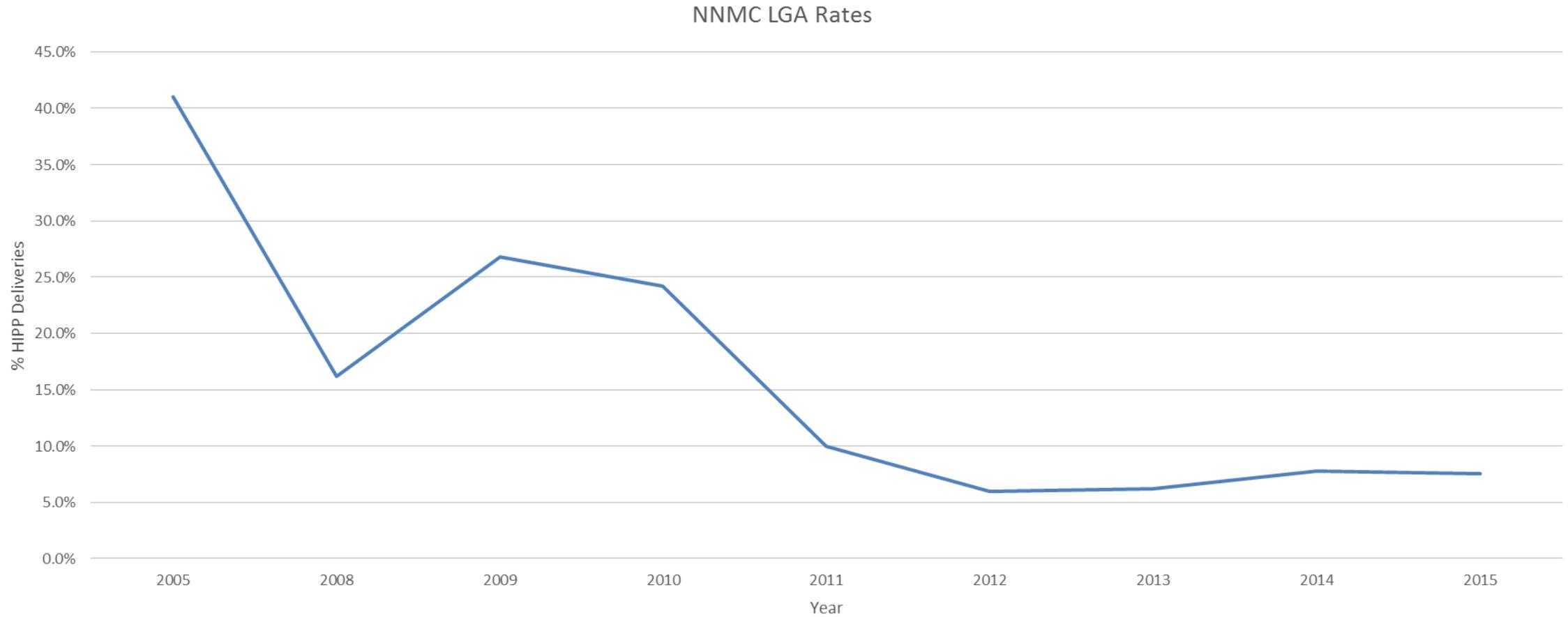
Before the HIPP Days.....

Our 2005 NNMC statistics

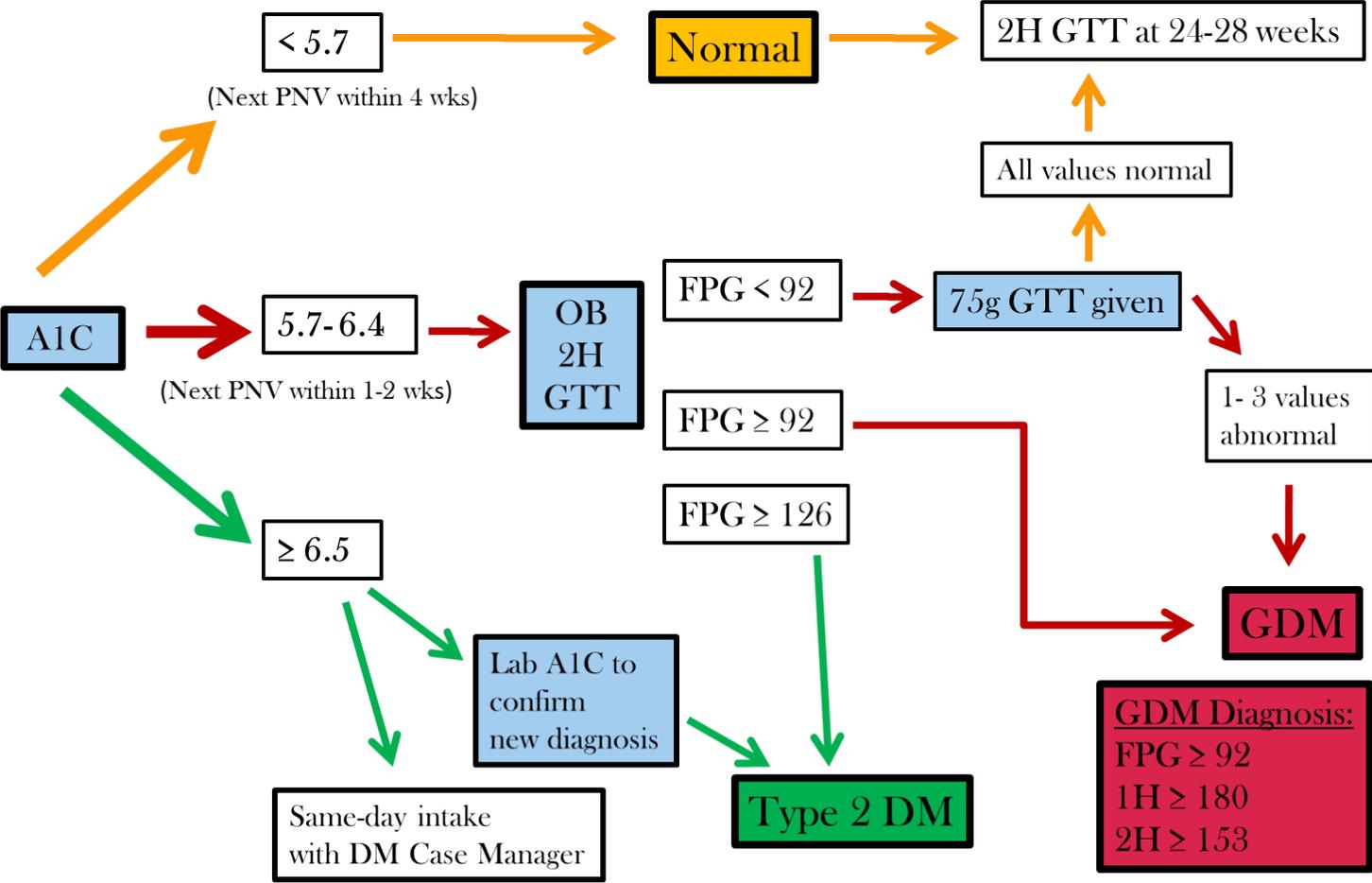
- LGA rate 45% in GDM patients
- Dx to intervention lag time = 30+ days
- 'Intervention' was not unified or coordinated.
- Case Manager program established.....

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

Case Management Effects



Initial Prenatal Intake (<24 Weeks)



Goal of intake A1C: Early Intervention

HbA1C*	% Malformations	RR (95% CI)
<6	3.0%	1.0
6.1-9.0	5.2%	1.7 (0.4-1.7)
9.1-12.0	4.3%	1.4 (0.3-8.3)
12.1-15.0	38.9%	12.8 (4.7-35.0)
>15.0	40.0%	13.2 (4.3-40.4)

Glucose Control and Malformations

*1st trimester HbA1c in 303 insulin-requiring diabetics

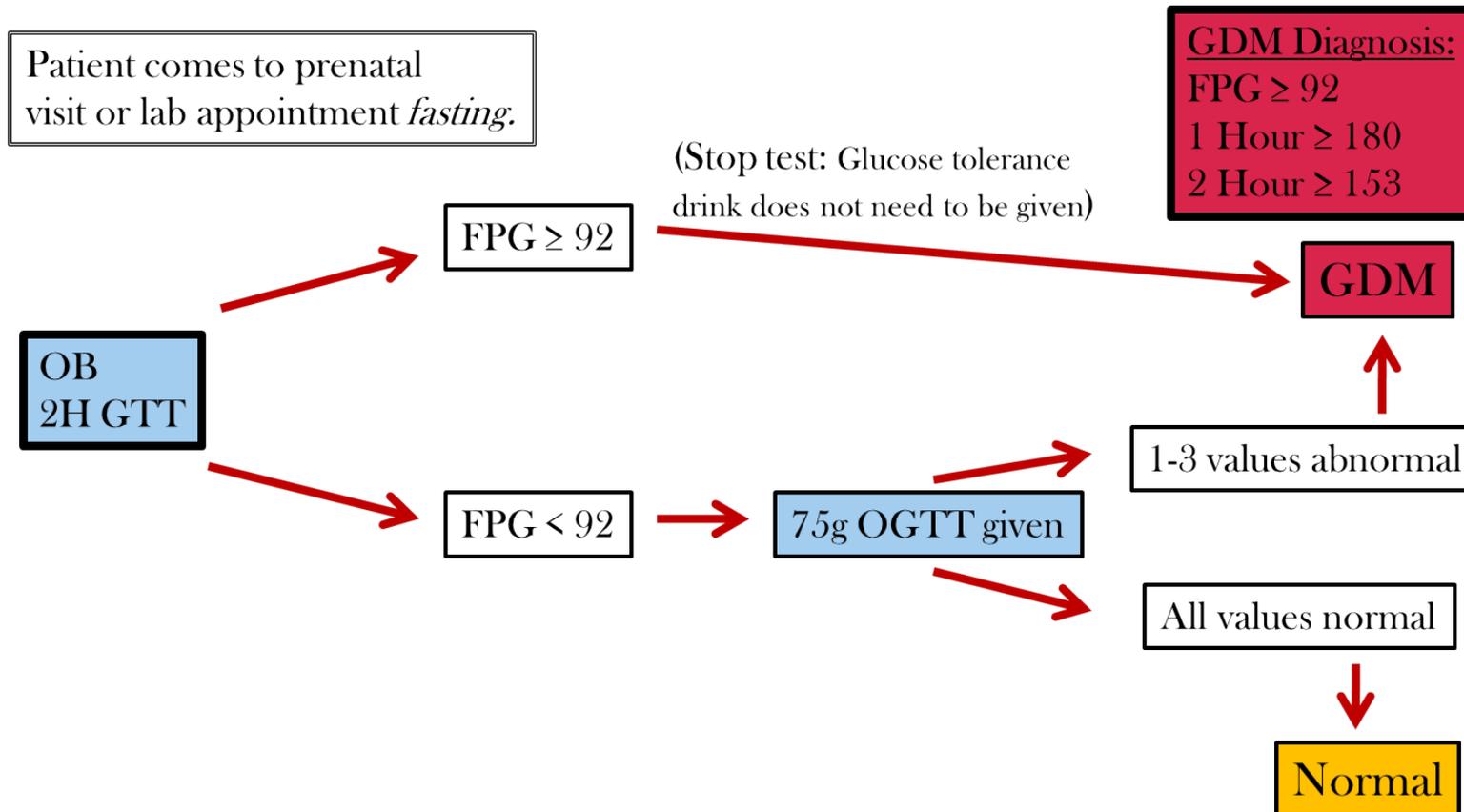
(Green et al. Teratology 39:224-231, 1989)

GDM 2H Glucose Tolerance Test

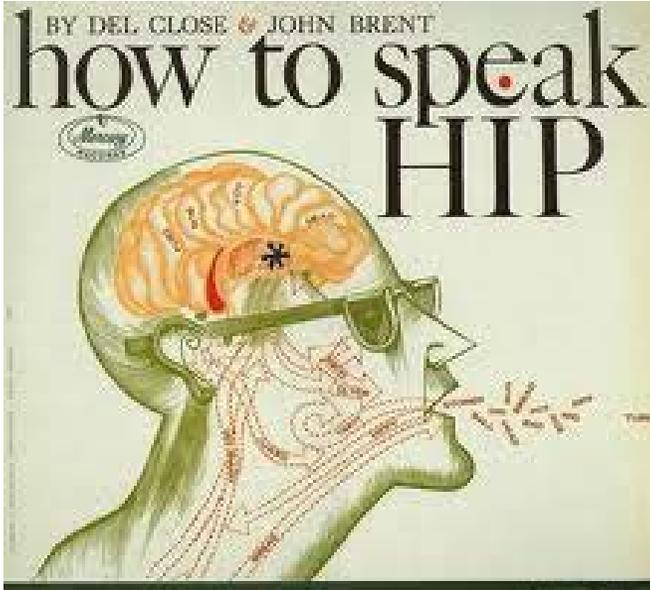
- 75 mg glucose tolerance beverage
- Patient must fast overnight for at least 8 hours prior to test, remain seated, and no smoking
- Abnormal venous plasma values during pregnancy:
 - FBG > 92 mg/d
 - 1 hour > 180 mg/dl
 - 2 hour > 153 mg/dl
- If one or more values are met or exceeded treat for gestational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

24-28 Week GDM Screening

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



HIPP Days are Ahead!



Hip (hĩp) :

- 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 glycaemic 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: $\geq 80\%$ 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

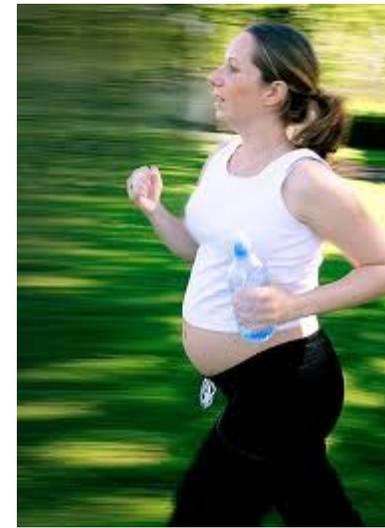
Basic GDM Meal-planning Guidelines

- 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**

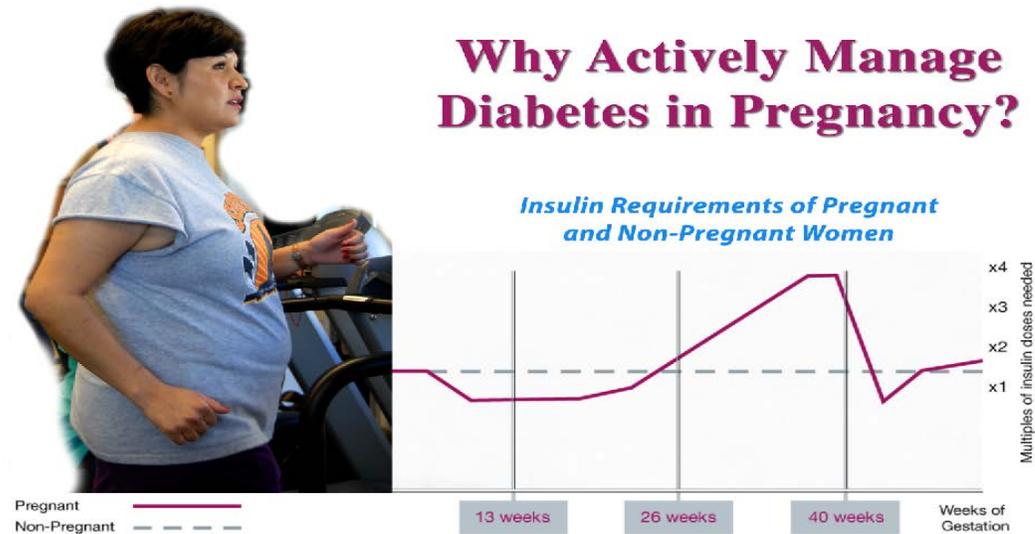


Pearls of Insulin Titration

- 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 ($\wedge 100$ units per meal) or
 - Dedicated to SBGM and repeated titration with minimal effect
 - Simple dose calc – $\frac{1}{2}$ 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

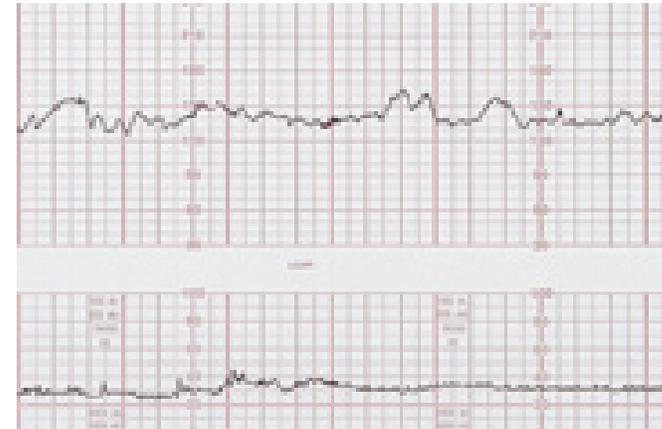


Role of A1C in Prenatal Care

- 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.

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



*Peters RK, Lancet 347: 227, 1996

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 1st 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

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