Diabetic Women: Preparing for Pregnancy

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Objectives

- Discuss the potential risks of diabetes complicating pregnancy
- Evaluate the patient with diabetes prior to conception
- Discuss the role of diabetes technology for optimizing preconception care
- Identify which diabetes related complications are most likely to worsen with pregnancy
Epidemiology

• In 2019, the US population is estimated to be over 320 million.

• US child bearing age population: 15 – 45 yrs

• Pregestational diabetes affects 1-2% of pregnancies

• Accounts for 13-21 % of diabetes in pregnancies
• Rate of pregestational diabetes is increasing
Predicted rate by age of pregnancies with GDM and pre-GDM in Ontario from 1996 to 2010.

Denice S. Feig et al. Dia Care 2014;37:1590-1596
Case: Type 1 diabetes

- 19 yo college student with Type 1 diabetes diagnosed 3 years ago who presents to clinic for follow up of a respiratory infection.

She takes insulin injections – lispro and glargine

PE is unremarkable. The A1c today is 9.3%

1. Would you talk to her about pregnancy?
Fetal/Neonatal Risks

Congenital Malformations (diabetic embryopathy)
- Risk increases with rising A1C
- Types of anomalies
  - Congenital heart disease (Tetralogy of Fallot, transposition of the great vessels, septal agenesis, anomalous pulmonary venous return)
  - CNS defects (anencephaly, spina bifida, encephalocele, hydrocephaly, anotia/ microtia)
  - Urogenital
  - Sacral agenesis/ caudal dyplasia (highly associated with DM)

Prematurity

Macrosomia
- Shoulder dystocia
- Birth trauma (brachial plexus fracture)
- Higher body fat, ↑ shoulders, extremity circumference, lower head: shoulder ratio

C-Section (elective or abnormal labor progression)

Growth restriction ↑ mortality; short and long term morbidity

Neonatal
- hypoglycemia,
- erythrocytosis,
- jaundice,
- hypocalcemia,
- respiratory distress,
- cardiomyopathy

Perinatal mortality (3 -4 %)
Macrosomia or Growth Restriction?
Unintended Pregnancies

- More likely to have adverse outcomes
  - Inadequate or a delayed initiation of prenatal care, to smoke and drink during pregnancy, and to have premature and low-birth-weight infants
  - Less likely to breast-feed.
  - Increased risks of physical and mental health problems have also been reported in children of women who have unplanned pregnancies.

- The goal of prepregnancy care
  - Reduce the risk of adverse health effects for mother and baby
    - Optimizing health
    - Modifying risk factors
    - Education
Introduction: Question to ask patients

The American College of Gynecologists recommend that we ask patients:

Would you like to become pregnant in the next year?
24 yo woman with type 1 diabetes since age 13 presents to the clinic for preconception care. She has a long history of poorly controlled diabetes. She has mild nonproliferative diabetic retinopathy.

- Meds: Lisinopril, Lispro insulin via pump
- Physical Exam: BP 120/60  Wt 135 lbs  
  Neuropathy: diminished monofilament
- Lab: A1c 10.2%  microalbumin: negative

1. What are the risks to the mother?
2. What advice would you provide this patient?
Maternal Risks

• Progression of microvascular disease
  – Retinopathy
  – Diabetic kidney disease
    • Low risk permanent kidney damage
    • Cr>3 or Cr Cl <50 → 40% permanent renal damage
    • Microalbumin → preterm birth (2% preeclampsia)
    • Overt nephropathy
  – Peripheral and autonomic neuropathy
    • Hyperemesis gravidarum,
    • Hypoglycemia unawareness
    • Orthostasis

• Cardiovascular disease
  • CAD, CHF, stroke, microvascular angiopathy, cardiac autonomic neuropathy

• Diabetic ketoacidosis
  – May be fatal
  – 9-35% risk of fetal demise
Obstetric Risks

- Miscarriage
- Preeclampsia, Gestational HTN
- HTN
- Microvascular Complications
- Vascular disease,
- Renal
- Polyhydramnios
- Preterm delivery
- Cesarean delivery
Predicted rate of serious outcomes between women with GDM and pre-GDM compared with women without diabetes in pregnancy in Ontario, Canada, from 1996 to 2010.

Denice S. Feig et al. Dia Care 2014;37:1590-1596
<table>
<thead>
<tr>
<th>Preconception Care Study</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuhrmann, 1999</td>
<td>1/128 (0.8%)</td>
<td>22/292 (7.5%)</td>
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<tr>
<td>Steel, 1990</td>
<td>2/143 (1.4%)</td>
<td>10/96 (10.4%)</td>
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<tr>
<td>Kitzmiller, 1991</td>
<td>1/84 (1.2%)</td>
<td>12/110 (10.9%)</td>
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<tr>
<td>Willhoite, 1993</td>
<td>1/62 (1.6%)</td>
<td>8/123 (6.5%)</td>
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Effects of Preconception Care

• Meta-analysis suggested that preconception care is effective in
  – reducing congenital malformation, RR 0.25 (95% CI 0.15-0.42), NNT 17 (95% CI 14-24),
  – preterm delivery, RR 0.70 (95% CI 0.55-0.90), NNT = 8 (95% CI 5-23) and
  – perinatal mortality RR 0.35 (95% CI 0.15-0.82), NNT = 32 (95% CI 19-109)

• Lowers HbA1C in the first trimester of pregnancy by an average of 2.43% (95% CI 2.27-2.58)

Wahabi et al, BMC Pregnancy Childbirth 2010; 10:63
Evaluation: History and Physical Exam

- Evaluate for comorbidities and diabetes related complications
- Review medication list for fetal safety
- Determine immunization status
- Obtain family history and genetic history
- Identify barriers to improving glycemic control
- Assess psychosocial situation
  - physical/sexual/emotional abuse
  - depression
- Screen for depression
- Assess social/behavior history:
  - etoh, tobacco, drug use, STI risk
  - reproductive planning and contraception
- Screen regarding diet and supplements including folic acid
- Assess attitudes regarding weight
Physical Exam and Labs

- Physical exam including PAP as needed

- Labs
  - A1c,
  - Cr, urine albumin/cr, gfr,
  - +/- tsh, TPO ab
  - Consider cardiovascular labs
Evaluation

- Counseling regarding impact of glycemic status on mom and baby pregnancy outcome
- Risk of development or progression of preexisting complications
- Assist patient to improve the glycemic control
- Initiate treatment of comorbidities and complications
- Begin folic acid supplementation
Management

- Counseling
- Adjust meds for fetal safety
- Start folic acid
- Initiate treatment for chronic health issues
- If overweight -
  - Optimize glycemic control and treatment for chronic health issues
- Discuss family planning
- Refer to specialist or other team members as needed
Optimizing Health

- BP <130/80 mm Hg
- D/C ACEI, ARB
- Alternate meds: methyldopa, labetalol, diltiazem, clonidine, prazosin
- Discontinue statin
- Referral to eye doctor for updated exam
Treatment

- A1c < 6.5%
  - Per American Diabetes Association, ACOG
  - Per Endocrine Society – as close to normal as possible without causing undue hypoglycemia
- Fasting glucose 80 – 110 mg/dl
- 2 hr postprandial <155 mg/dl
- Review hypoglycemia management regularly
- Implement diet, exercise and weight loss strategies as needed
- Obesity related complications
  - Preeclampsia, congenital anomalies, cesarean and macrosomia
Optimizing Glycemic Control

- Treat with insulin
- Insulin pump or multiple injections preferred
- Preferred insulins: insulin detemir, lispro, aspart, NPH; rarely Regular

Check sugars 3-7 times daily or use Continuous Glucose Monitor (CGM)
Diabetes Technology

1. Medtronic
2. Syringe/needle
3. V-Go
4. Omnipod
5. Tandem
6.
7. Timesulin
Monitoring glucose
Reduced Risk of Macrosomia With CGM

Pregnant Women With T1D or T2D (N=71)

<table>
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<tr>
<th>Weeks Gestation</th>
<th>A1C (%)</th>
<th>Infants with macrosomia (%)</th>
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<tr>
<td>8-28</td>
<td>6.1</td>
<td>CGM: 35, OR: 0.36 (0.13 to 0.98), P=0.05</td>
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<tr>
<td>28-32</td>
<td>5.8</td>
<td>No CGM: 60, P=0.1</td>
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<tr>
<td>32-36</td>
<td>5.8</td>
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CGM, continuous glucose monitoring; OR, odds ratio for reduced risk of macrosomia (95% confidence interval).

Crude cumulative incidence of type 2 diabetes by ethnicity and length of follow-up in all studies.

Catherine Kim et al. Dia Care 2002;25:1862-1868
• Increased health provider visits
  – physician (OB provider, specialists
  – nurse/diabetes educator
  – dietitian
  – social worker

• Frequent review of glucose readings

• Increased testing – labs, growth scans, biophysical profiles, amniotic fluid assessment

• Triage assessment
In summary, preconception care should include:

- Counseling regarding risks
- History and physical exam
- Obstetric and diabetes related labs
- Optimization of glycemic control and diabetes related complications/comorbidities
- Medication review
- Providing diabetes education for self care
- Management of expectations
THANK YOU FOR YOUR ATTENTION!

QUESTIONS?