



GDM EPIDEMIOLOGY & SCREENING

FLAME LECTURE: 26A

LO 3.24.19

LEARNING OBJECTIVES

- ▶ To describe the different diabetic classifications
- ▶ To understand how gestational diabetes complicates a pregnancy
- ▶ To describe the epidemiology and diagnosis of gestational diabetes
- ▶ Prerequisites:
 - ▶ NONE
- ▶ See also – for closely related topics
 - ▶ FLAME LECTURE 26B: DM Epidemiology & Screening
 - ▶ FLAME LECTURE 29A/B: GDM & DM Antepartum/partum/Postpartum Mgmt

DIABETES IN PREGNANCY

▶ **Epidemiology:**

- ▶ 6-9% of pregnancies are complicated by GDM or DM

▶ **Diabetes Mellitus:**

- ▶ **Type I:** autoimmune-mediated destruction of pancreatic beta-cells, leading to absolute insulin deficiency
- ▶ **Type II:** progressive decrease in insulin secretion in the setting of insulin resistance
- ▶ **LADA** (Latent Autoimmune Diabetes in Adults): similarly to Type 1 DM, there is late-onset autoimmune attack of the pancreas

▶ **Gestational Diabetes Mellitus (GDM):**

- ▶ Diabetes that is diagnosed in the 2nd or 3rd trimester of pregnancy that is not clearly overt diabetes
- ▶ Accounts for 85-90% of diabetes in pregnancy

WHITE CLASSIFICATION OF DM

Gestational Class				
A1	Diet controlled, no medications to control blood sugar			
A2	Requires medication (oral or injected insulin) for control			
Pre-Gestational Class	Onset Age (years)	Duration (years)	Complications	
B	≥ 20	< 10	None	
C	10-19	10-19	None	
D	< 10	> 20	± benign retinopathy, or other vascular complications	
F	Any	Any	Nephropathy	
H	Any	Any	Heart	
R	Any	Any	Proliferative retinopathy	
T	Any	Any	Renal transplant	

PATHOPHYSIOLOGY

- ▶ During pregnancy, placental secretion of diabetogenic hormones lead to insulin resistance
 - ▶ Growth Hormone
 - ▶ Corticotropin-Releasing Hormone
 - ▶ Placental Lactogen
 - ▶ Progesterone
- ▶ If the patient's pancreas cannot compensate for the insulin resistance associated with pregnancy, then the patient develops Gestational Diabetes

RISK FACTORS FOR GDM

Risk further increases when multiple risk factors are present

- ▶ Personal hx of impaired glucose tolerance or gestational diabetes
- ▶ Excessive gestational weight gain in first 18-24 weeks
- ▶ Hispanic-American, African-American, Native American, South or East Asian, Pacific Islander
- ▶ Maternal age >25 years old
- ▶ Family hx of diabetes
- ▶ Previous unexplained perinatal loss or birth of a malformed infant
- ▶ Pre-pregnancy weight of $\geq 110\%$ of ideal body weight or BMI >30
- ▶ Glycosuria at first prenatal visit
- ▶ Metabolic Syndrome, PCOS, use of glucocorticoids, hypertension
- ▶ Multiple Gestation

MATERNAL COMPLICATIONS OF GDM

- ▶ Higher risk of developing multiple pregnancy-related complications:
 - ▶ Pre-eclampsia (10-20% chance)
 - ▶ Cesarean section (17-25% chance)
 - ▶ Infection (pyelonephritis, influenza, etc)
 - ▶ Venous Thromboembolism
 - ▶ Cardiovascular Disease
 - ▶ ~70% risk of developing future DM
 - ▶ Diabetic Ketoacidosis

FETAL COMPLICATIONS OF GDM

- ▶ 3-fold increase in the rate of spontaneous abortion
- ▶ 5-fold increase in preterm delivery
- ▶ 4-fold increase in intrauterine fetal demise
- ▶ 3-8 fold increase in fetal malformations (neural tube defects and congenital heart diseases are most common)
- ▶ Macrosomia
- ▶ Polyhydramnios
- ▶ Fetal Growth Restriction

PARTUM COMPLICATIONS OF GDM

- ▶ Birth Injury in 4% of pregnancies, commonly in the setting of shoulder dystocia and/or operative vaginal delivery
 - ▶ Brachial plexus injury
 - ▶ Facial nerve injury
 - ▶ Humerus or clavicle fracture
 - ▶ Cephalohematoma
- ▶ Neonatal hypoglycemia
- ▶ Neonatal hyperbilirubinemia

GDM SCREENING

- ▶ All pregnant pts are routinely screened *between 24 and 28 weeks*
- ▶ Pts who have BMI ≥ 25 (or ≥ 23 in Asian Americans) and have ≥ 1 of the following risk factors, should be screened in the 1st trimester
 - ▶ High-risk race/ethnicity (African American, Latino, Native American, Asian American, Pacific Islander)
 - ▶ Physical inactivity
 - ▶ Obesity w/ BMI >40 / HTN / CVD / PCOS / acanthosis nigricans
 - ▶ HbA1c $\geq 5.7\%$ / previous or current impaired glucose tolerance
 - ▶ HDL < 35 mg/dL / Triglycerides > 250 mg/dL
 - ▶ Previous pregnancy complicated by GDM or Macrosomia (≥ 4000 g)
 - ▶ First-degree relative with diabetes

GDM SCREENING CONT'D

- ▶ Initial screening is via a 1-hour oral glucose tolerance test (OGTT)
 - ▶ A 50 gram load of glucose is given to a *non-fasting* patient
 - ▶ If patient screens positive (threshold serum glucose level of ≥ 130 -140 mg/dL), a diagnostic 3-hour OGTT will be performed
 - ▶ Threshold of 140 mg/dL will detect 80% of patients with GDM
 - ▶ Threshold of 130 mg/dL will detect 90%, but has higher false positive rate
 - ▶ A glucose > 200 mg/dL at 1-hr may be indicative of pre-existing DM

Initial Screening

- 24-28 weeks
- 1st trimester if high risk
- 1-hour OGTT



If 1-hour OGTT ≥ 130 -140 mg/dL

- Diagnostic 3-hour OGTT
- If 1-hour OGTT ≥ 200 mg/dL further testing is not needed

GDM DIAGNOSIS

- ▶ Patients are diagnosed using the 3-hour Oral Glucose Tolerance Test (3-hr OGTT)
 - ▶ If ≥ 1 of the blood glucose (BG) values is abnormal, a diagnosis of gestational diabetes may be considered

Time since 100 gram glucose load	Carpenter and Coustan Criteria	Modified O'Sullivan Criteria
Fasting	≥ 95 mg/dL	≥ 105 mg/dL
1 Hour	≥ 180 mg/dL	≥ 190 mg/dL
2 Hours	≥ 155 mg/dL	≥ 165 mg/dL
3 Hours	≥ 140 mg/dL	≥ 145 mg/dL

GDM DIAGNOSIS CONT'D

- ▶ Some organizations may recommend a 75g 2-hr OGTT
 - ▶ If ≥ 1 of the blood glucose (BG) values is abnormal, a diagnosis of gestational diabetes may be considered

Time since 75 gram glucose load	Thresholds
Fasting	≥ 92 mg/dL
1 Hour	≥ 180 mg/dL
2 Hours	≥ 153 mg/dL

- ▶ However, it has a much higher false positive rate
 - ▶ In fact, 18% of all pregnant women would test positive

BENEFITS OF TREATMENT INITIATION

- ▶ Reduction in composite newborn complication rate
 - ▶ Death, shoulder dystocia, birth trauma
- ▶ Reduction in rate of preE from 18%-12%
- ▶ Reduces macrosomia from 21%-10%
- ▶ Reduction in cesarean delivery rate

RESOURCES



- ▶ [ACOG Practice Bulletin #190: Gestational Diabetes Mellitus](#)