



DIABETES MELLITUS PRENATAL MANAGEMENT

Dr Maryam Hashemnejad

Perinataloogist

Alborz University of Medical Sciences

CLASSIFICATION

- Type 1 DM or insulin dependent : beta cell destruction & insulin deficiency, 0.2 % prevalence in pregnancy
- Type 2 DM or noninsulin dependent : defect in action & secretion of insulin, 0.3 % prevalence in pregnancy
- Gestational DM : carbohydrate intolerance with onset in pregnancy, 6% prevalence in pregnancy
- Other types

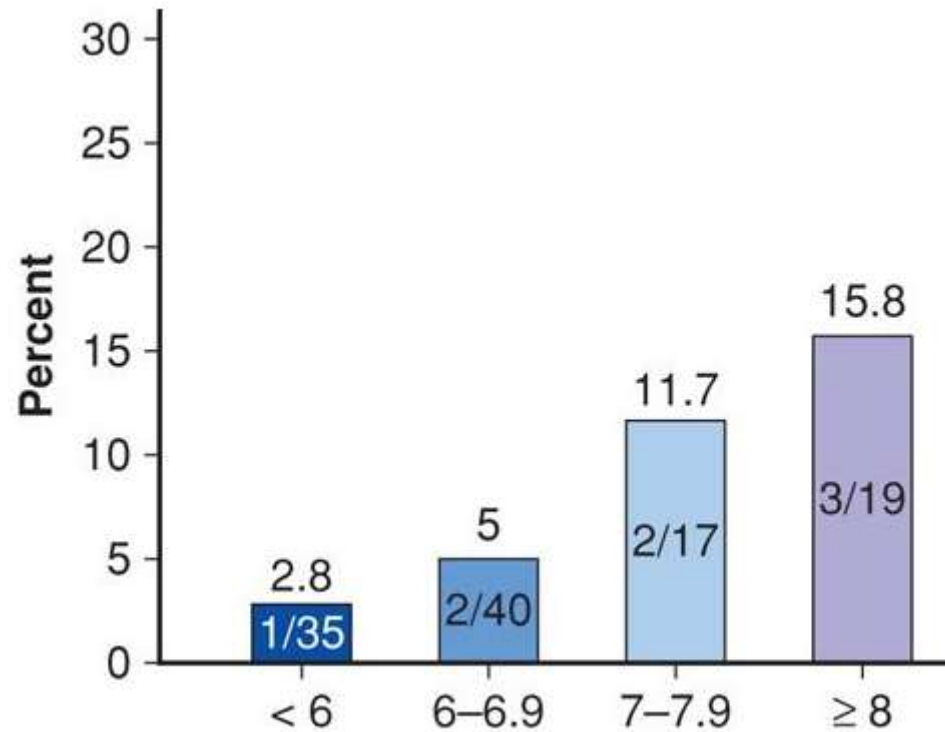
Class	Onset	Plasma Glucose Level		Therapy
		Fasting	2-Hour Postprandial	
A ₁	Gestational	< 105 mg/dL	< 120 mg/dL	Diet
A ₂	Gestational	> 105 mg/dL	> 120 mg/dL	Insulin
Class	Age of Onset (yr)	Duration (yr)	Vascular Disease	Therapy
B	Over 20	< 10	None	Insulin
C	10 to 19	10 to 19	None	Insulin
D	Before 10	> 20	Benign retinopathy	Insulin
F	Any	Any	Nephropathy ^a	Insulin
R	Any	Any	Proliferative retinopathy	Insulin
H	Any	Any	Heart	Insulin

^aWhen diagnosed during pregnancy: proteinuria \geq 500 mg/24 hr before 20 weeks' gestation.

PRECONSEPTION CARE

- History
- Physical exam of vascular status : ECG, ophthalmologic consultation
- Lab data : clearance of creatinine, HbA1C, proteinuria, urine analysis, Thyroid tests, lipid profile
- Optimal blood glucose control 2-3 months prepregnancy to reduce the risk of fetal anomalies (Hb A1c < 6%)
- Life style change : 20 minute 3 times in week
- Diabetic diet
- Folic acid supplement (5 mg)

FREQUENCY OF CONGENITAL MALFORMATIONS IN PREGESTATIONAL DM



GDM RISK FACTORS

- Positive family history of type 2 DM
- Previous history of GDM, impaired glucose metabolism, glucosuria & macrosomia
- Advancing maternal age > 25
- Obesity
- PCOS
- Race : South or East Asian, African American, Native American
- Multiple gestation
- Life style (diet, exercise, smoking)

SCREENING & DIAGNOSIS

- FBS in first trimester
- 50 gr glucose challenge test : 24 – 28 W , 1 hour later BS > 140
- 3-hour 100 gr oral glucose tolerance test (OGTT) : 2 abnormal
- 2-hour 75 gr OGTT : 1 abnormal

	FBS	1h	2h	3h
75 g	92	180	153	
100 g	95	180	155	140

MANAGEMENT

- Good control of blood glucose
- First trimester ultrasound for dating
- Low dose ASA after 12 Ws
- Anomaly scan at 18 Ws
- Fetal echocardiography 20 – 22 Ws
- Biometry every 4 Ws
- BPP, AFI, NST
- Third trimester echocardiography

SELF MONITORING GOALS

Specimen	Level (mg/dL)
Fasting	≤ 95
Premeal	≤ 100
1-hr postprandial	≤ 140
2-hr postprandial	≤ 120
0200–0600	≥ 60
Mean (average)	100
Hemoglobin A _{1c}	$\leq 6\%$

FETAL WELLBEING ASSESSMENT

- GDM A1 good control with diet : as nondiabetic pregnant
- GDM good control with drug : AFI & NST after 32 Ws / weekly, biometry every 2-3 Ws after 32 Ws, preeclampsia screening after 28 Ws
- GDM poor control with drug : AFI weekly, NST twice weekly after 32 Ws, biometry every 2-3 Ws after 32 Ws, preeclampsia screening after 28 Ws

FETAL EFFECTS

- Spontaneous abortion
- Preterm delivery
- Malformations
- Altered fetal growth
- Unexplained fetal demise
- Hydramnious

MAJOR CONGENITAL ANOMALIES

Organ system	Type 1 DM N = 482	Type 2 DM N = 4166	GDM N = 31700
Total	55	454	2203
Cardiac	38	272	1129
Musculoskeletal	1	31	231
Urinary	3	28	260
CNS	1	13	64
GI	1	30	164
Other	11	80	355

NEONATAL EFFECTS

- Respiratory distress syndrome
- Hypoglycemia
- Hypocalcemia
- Hypomagnesiumia
- Hyperbilirubinemia
- Polycythemia
- Cardiomyopathy
- Birth trauma
- Long term cognitive development ?
- Inheritance of DM, metabolic syndrome & obesity

MATERNAL EFFECTS

- Preeclampsia
- Diabetic nephropathy
- Diabetic retinopathy
- Diabetic neuropathy
- Diabetic ketoacidosis
- Infections
- Operative delivery & birth canal trauma
- Type 2 DM, Vascular complications

DELIVERY

- Vaginal delivery except EFW $> 4000 - 4500$ gr to prevent shoulder dystocia
- Good blood glucose control during the labor : < 100
- Reduce insulin dose after delivery
- Breast feeding

PRETERM LABOR

- RR = 1.42 in DM pregnant
- Atosiban & Nifedipine can be used
- Beta 2-adrenergic agonists not recommended
- Corticosteroids recommend with caution : blood glucose measurement up to 48 – 72 h
- Hospitalization for close monitoring
- Insulin increased by 20% on days 1 & 4
- Insulin increased by 40% on days 2 & 3

TIMING OF DELIVERY

- Overt DM well controlled : full term (39 0/7 – 39 6/7)
- Overt DM with vascular complications, poor glucose control, or prior stillbirth : early term (37 0/7 – 38 6/7)
- Gestational DM well controlled on diet & exercise : full term (39 0/7 – 40 6/7)
- Gestational DM well controlled on medication : full term (39 0/7 – 39 6/7)
- Gestational DM poor controlled : late preterm / early term (individualized)

INSULIN MANAGEMENT IN LABOR

- Usual dose of intermediate acting insulin is given at bedtime.
- Morning dose of insulin is withheld.
- Intravenous infusion of normal saline is begun.
- Once active labor begins or glucose levels decrease to less than 70 mg/dl, the infusion is changed from saline to 5 % dextrose & delivered at a rate of 100 – 150 cc/h (2.5 mg/kg/min) to achieve a glucose level of approximately 100 mg/dl.
- Glucose levels are checked hourly using a bedside meter allowing for adjustment in the insulin or glucose infusion rate.
- Regular (short acting) insulin is administered by intravenous infusion at a rate of 1.25 U/h if glucose levels exceed 100 mg/dl

AFTER PREGNANCY OF GDM

Time	Test	Purpose
Postdelivery (1–3 d)	Fasting or random plasma glucose	Detect persistent, overt diabetes
Early postpartum (6–12 wk)	75-g, 2-hr OGTT	Postpartum classification of glucose metabolism
1-yr postpartum	75-g, 2-hr OGTT	Assess glucose metabolism
Annually	Fasting plasma glucose	Assess glucose metabolism
Triannually	75-g, 2-hr OGTT	Assess glucose metabolism
Prepregnancy	75-g, 2-hr OGTT	Classify glucose metabolism
Classification of the American Diabetes Association (2013)		
Normal Values	Impaired Fasting Glucose or Impaired Glucose Tolerance	Diabetes Mellitus
Fasting < 100 mg/dL	100–125 mg/dL	≥ 126 mg/dL
2 hr < 140 mg/dL	2 hr ≥ 140–199 mg/dL	2 hr ≥ 200 mg/dL
Hemoglobin A _{1c} < 5.7%	5.7–6.4%	≥ 6.5%

