



Diabetes in pregnancy

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Diabetes in Pregnancy: 2 Categories

Pregestational diabetes	Gestational diabetes
<p data-bbox="338 671 811 806">Pregnancy in pre-existing diabetes</p> <ul data-bbox="376 885 772 1021" style="list-style-type: none"><li data-bbox="376 885 772 949">• Type 1 diabetes<li data-bbox="376 956 772 1021">• Type 2 diabetes	<p data-bbox="1091 742 1593 878">Diabetes diagnosed in pregnancy</p>



Gestational Diabetes:

2018

Management during pregnancy

nutritional therapy

1-2 weeks

physical activity



Nutritional therapy

- Achieve normoglycemia
 - Prevent ketosis
 - Provide adequate gestational weight gain based on maternal body mass index (BMI)
- (70 to 85 percent) can achieve normoglycemia
- 40%fat,40%carbohydrate,20%protein
 - FBS: <95 mg/dL (5.3 mmol/L)
 - One-hour postprandial : <140 mg/dL (7.8 mmol/L)
 - Two-hour postprandial : <120 mg/dL



PHARMACOLOGIC THERAPY

- INSULIN
- ORAL: metformin
- glyburide



- **ACOG and ADA:**
- prefer use of insulin for treatment of diabetes during pregnancy
- FDA didn't approve oral drug
- **ACOG :**
- oral agent for women who decline insulin therapy recommends **metformin over glyburide** as the preferred oral antihyperglycemic agent



- Society of Maternal-Fetal Medicine
- concluded **metformin** is safe first-line pharmacologic alternative to insulin



- FIGO recommends
- insulin as the first-line
- before 20 weeks of gestation
- pharmacologic therapy is needed >30 weeks,
- fasting blood glucose is >110 mg/dL
- one hour postprandial glucose is >140 mg/dL
- pregnancy weight gain is >12 kg



Insulin Therapy

TABLE 57-8. Action Profiles of Commonly Used Insulins

Insulin Type	Onset	Peak (hr)	Duration (hr)
Short-acting (SC)			
Lispro	< 15 min	0.5–1.5	3–4
Glulisine	< 15 min	0.5–1.5	3–4
Aspart	< 15 min	0.5–1.5	3–4
Regular	30–60 min	2–3	4–6
Long-acting (SC)			
Detemir	1–4 hr	Minimal ^a	Up to 24
Glargine	1–4 hr	Minimal ^a	Up to 24
NPH	1–4 hr	6–10	10–16

^aMinimal peak activity



Insulin therapy

- four-times-per-day regimen
- Short-acting: 4 to 8 U before meals
- NPH before breakfast: 6 to 8 U (0.2 u/kg)
- If FBS > 90 to 95, NPH 4 to 6 U at 11 PM



Pharmacokinetics of the most commonly used insulin preparations

Insulin type	Approximate onset of action	Peak effect	Approximate duration of action*
Lispro, aspart, faster aspart, glulisine	3 to 15 minutes	45 to 75 minutes	2 to 4 hours
Regular	30 minutes	2 to 4 hours	5 to 8 hours
NPH	2 hours	4 to 12 hours	8 to 18 hours, with usual duration of action around 12 hours
Insulin glargine	2 hours	No peak	20 to >24 hours
Insulin detemir	2 hours	3 to 9 hours	6 to 24 hours [¶]
NPL	2 hours	6 hours	15 hours
Insulin degludec	2 hours	No peak	>40 hours

NPH: neutral protamine hagedorn: NPL: neutral protamine lispro.



Oral antihyperglycemic agents

- **Metformin** did have some benefits:
- Lower mean birth weight
Less gestational weight gain
- Less composite neonatal death or serious morbidity
- **Women should be informed that it crosses the placenta**
- Begins 500mg twice daily q 12 h to maximum of 2500mg/d



glyburide

- frequency of **treatment failure** (lack of glycemic control) is **similar for glyburide and metformin** in most trials .
- Failure rate: 16 to 17%
- 2.5 mg every 12 hours
- Maximum dose:20 mg/d
- peaked at 2 to 3 hours
- returned to baseline by 8 to 10 hours.

Pregestational diabetes

- 1-Women on medical nutritional therapy prior to pregnancy
- 2-Women on oral anti hyperglycemic agents prior to pregnancy
- **insulin therapy** is the only means of achieving the degree of glycemic control desirable
- Throughout pregnancy in women **with type 1 and type 2 diabetes**
- **Type 2 diabetes** have excellent glycemic control on an oral anti hyperglycemia
- Drug such as **metformin** at conception
- 3-on multiple daily injection therapy prior to pregnancy



Treatment

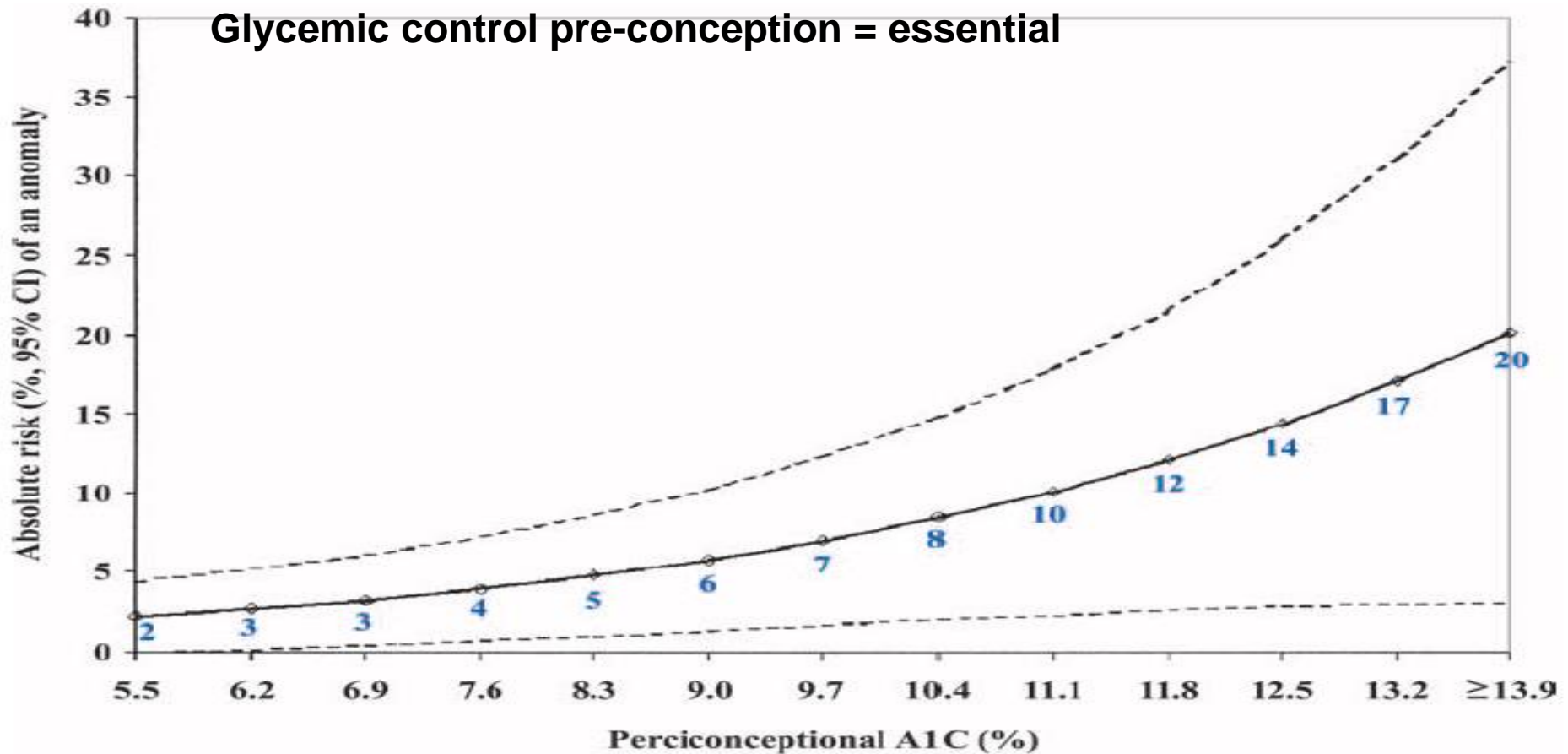
Target Plasma Glucose Levels in Pregnancy

Time	Glucose Level (mg/dL)
Before breakfast	60-90
Before lunch, supper, bedtime snack	60-105
One hour after meals	≤ 140
Two hours after meals	≤ 120
2 AM to 6 AM	> 60



Risk of Fetal Anomaly Relative to Periconceptional A1C

Glycemic control pre-conception = essential





- ADA and CDA :Hb A1c< 7%
- NICE: HbA1c<6.5 %



macrosomia

Above 4000 ,4500 gram or greater than 90th or 95th centile

- 40-60%of pregnancies with pregestational diabet
- Around 26 weeks
- **Tight control in the first trimester**
- Correlation **between1-hour postprandial** glucose level and HbA1c
- Fasting glucose between 29 and 32 weeks



stillbirth

- Higher in type 1 and 2 rather than GDM
- Maternal obesity
- Higher in macrosomia
- Possible reasons is hypoxia due to
- acidosis, cardiac arrhythmias, hypokalemia
- **Higher** in woman with **moderate untreated GDM**



Fetal cardiomegaly

- Myocardial hypertrophy
- Hypertrophy of ventricular walls and septum
- Subaortic stenosis
- Secondary mitral insufficiency



polyhydramnios

- Higher in patient with poor glycemic control and LGA fetuses, with **higher A1c**
- Fetal hyperglycemia leading to polyuria
- Decreased fetal swallowing



Antepartum Fetal Surveillance in Low-Risk Insulin-Dependent Diabetes Mellitus*

Study	Indicated
Ultrasonography at 4- to 6-wk intervals	Yes
Maternal assessment of fetal activity, daily at 28 wk	Yes
NST at 32 wk; BPP or CST if NST is nonreactive	Yes
Amniocentesis for lung profile	Yes, if elective delivery is planned before 39 wk

BPP, biophysical profile; *CST*, contraction stress test; *NST*, nonstress test.

* Excellent control, no vasculopathy (classes B, C), no stillbirth.



Antepartum Fetal Surveillance in High-Risk Insulin-Dependent Diabetes Mellitus*

Study	Indicated
Ultrasonography at 4- to 6-wk intervals	Yes
Maternal assessment of fetal activity daily at 28 wk	Yes
NST; BPP or CST if NST is nonreactive	Initiate at 28-30 wk
Consider amniocentesis for lung profile prior to 38 wk	

BPP, biophysical profile; *CST*, contraction stress test; *NST*, nonstress test.

* Poor control (macrosomia, hydramnios), vasculopathy (classes D, F, R), prior stillbirth.



Labor and delivery

Timing of birth:

- Offer elective delivery at 37⁺⁰-38⁺⁶ weeks in women with preexisting diabetes
- Offer elective delivery at no later than 40⁺⁶ weeks in women with GDM with no complications and whose diabetes is well controlled
- Discuss the potential for shoulder dystocia with women before labor, consider elective CS if estimated fetal weight \geq 4500 g



TABLE 57-10. Insulin Management During Labor and Delivery

- 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 and 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.

Data from Coustan DR. Delivery: timing, mode, and management. In: Reece EA, Coustan DR, Gabbe SG, editors. Diabetes in women: adolescence, pregnancy, and menopause. 3rd ed. Philadelphia (PA): Lippincott Williams & Wilkins; 2004; and Jovanovic L, Peterson CM. Management of the pregnant, insulin-dependent diabetic woman. *Diabetes Care* 1980;3:63–8.

