

PROTOCOL #1 – Maternal Fetal Medicine, University of New Mexico

Diabetes Mellitus Complicating Pregnancy

1. CLASSIFICATION

A. GESTATIONAL DIABETES

- I. Glucose intolerance: 1 abnormal value on GTT or hgbA1c between 5.7 to 6.4%. Consider re-test in 4 weeks. Give dietary counseling.
- II. A1 Gestational diabetes: Diagnosis of gestational diabetes. Euglycemia achieved with diet and exercise.
- III. A2 Gestational diabetes: Diagnosis of gestational diabetes. Requirement for medication to achieve euglycemia.

B. PREEXISTING DIABETES

- I. Type I. No endogenous insulin, ketosis prone
- II. Type II. Late onset, associated with obesity, insulin resistant
- III. Whites Classification
 - a. Class B: onset > age 20; duration < 10 years. No vascular complications
 - b. Class C: onset 10-19 years of age; duration 10-19 yrs no vascular complications
 - c. Class D: onset < age 10; duration > 20 yrs. Benign retinopathy present
 - d. Class F: nephropathy present
 - e. Class H: ischemic heart disease present
 - f. Class R: Proliferative retinopathy present
 - g. Class T: renal transplant

2. SCREENING

- A. At the first prenatal visit <20 weeks all patients receive a Hgb A1C as part of the prenatal labs

A1C = 5.7 – 6.4% glucose intolerance - give dietary counseling

A1C ≥ 6.5% overt diabetes during pregnancy

- B. At 24 – 28 weeks Standard 2 step testing or 1 step testing may be offered.

- I. 2-Step Testing
 - a. Random glucose challenge test after 50g glucose load (1 hr GCT) normal value is <130
 - b. If abnormal, after 3 days of a high carbohydrate diet, administer 3 hr glucose. Check fasting blood glucose then give 100g glucose load and check plasma glucose at 1, 2, and 3 hour intervals.
 - c. Use Carpenter and Coustan criteria 2 or more abnormal values are diagnostic
 - Fasting ≤ 95 mg/dl
 - 1 hr ≤ 180 mg/dl
 - 2 hr ≤ 155 mg/dl
 - 3 hr ≤ 140 mg/dl

- d. If 1 hour GCT > 200 mg/dl check fasting prior to the 3 hour GTT ; if fasting > 95mg/dl patient may be considered GDM.

II. 1-Step Testing

- a. After 3 days of a high carbohydrate diet, check fasting glucose then administer a 75g glucose load and check blood glucose at 1 and 2 hours.
- b. 2 or more abnormal values are diagnostic of GDM
- Fasting \leq 95 mg/dl
- 1 hr \leq 180 mg/dl
- 2 hr \leq 155 mg/dl

- III. Patients presenting for late prenatal care should be screened up to 37 weeks.

3. PRENATAL MANAGEMENT

A. Patients with pre-existing diabetes (Type 1 or Type II; Class B-T)

I. First visit

- Hgb A1C
- collect 24 hr urine (protein, creatinine clearance, creatinine)
- schedule EKG
- Schedule eye exam
- Whites Class D-T need eye exam and renal evaluation each trimester
- Schedule ultrasound appointment (dating)

II. Ultrasound

- Dating scan at 8 – 12 weeks
- Targeted scan including fetal echo at 18-20 weeks
- Growth scan at 26 weeks and every 4 weeks thereafter
- NST + AFI twice weekly starting at 32 weeks; start at 28 -weeks if poorly controlled or class D- T.

B. Gestational Diabetes

I. A1 (Diet controlled)

- Targeted scan at 16-18 weeks (fetal echo not required)
- Follow fasting and 2 hr postprandial plasma glucose
- Growth scan at 34-36 weeks to evaluate growth

II. A2 (not controlled with diet alone)

- Targeted scan at 16-18 weeks (fetal echo not required)
- Follow fasting and 2 hr postprandial plasma glucose
- Growth scan every 4 weeks after insulin or oral medication started (but no earlier than 26 weeks)
- Initiate twice weekly antenatal testing at 28 - 32 weeks

4. MEDICATION MANAGEMENT

A. A1 Diabetes (Gestational)

No medication

- If AC > 70 percentile at 28 weeks consider prophylactic insulin.

B. A2 Diabetes (Gestational)

Glyburide

- Usual starting dose is 2.5mg BID
- If plasma glucose not controlled increase dose in increments of 2.5mg to 5mg each week to achieve control
- Maximum 20mg/day
- Patients not controlled at maximum dose will require insulin

C. Type II or A2 not controlled by glyburide

Insulin (Humalog and NPH)

Current body wt in kg x (.2-1.0 units) = Total daily dose

Total daily dose (TDD) is only a starting point. Insulin
Should be adjusted PRN to control blood glucose.

Use Lispro to cover meals, NPH to cover overnight

Lispro should be taken 15 minutes before or immediately after each meal

Units of Lispro

TDD x .25	pre-breakfast
TDD x .25	pre - lunch
TDD x .25	pre – dinner
TDD x .25	NPH at bedtime

Give NPH at bedtime to cover morning fasting.

NPH dose must be adjusted based on fasting blood sugars.

D. Type I DM

Insulin (Humalog and Lantus)

Current body wt in kg x (.6 to 1.0 units) =TDD

TDD x .5 = basal dose of Lantus (give either HS or in am)

Do not mix with other insulin

Determine premeal insulin using rule of 1500

Premeal correction

1500/TDD = mg/dl that 1 unit of insulin will decrease blood glucose

Insulin/CHO Ratio

(1500/TDD) x .33 = grams of CHO covered by 1 unit of insulin

5. WHEN TO DELIVER

- A. Class A1
 - Labor spontaneously or induce 40-42 weeks
 - Start antenatal testing at 40 weeks.
- B. Class A2 -C (good control with nl antepartum testing)
 - induce at 39 – 40 weeks
- C. Class D - T or class A2 - C with poor control
 - dating scan \leq 20 weeks deliver at 37-38 weeks
 - dating scan $>$ 20 weeks tap and deliver 37-38 weeks

6. LABOR AND DELIVERY

INDUCTION

- Patient should take usual medication (insulin or glyburide) at bedtime.
- Eat nothing after midnight.
- Do not take morning medication.
- On arrival, check blood glucose and start insulin drip as described below

SPONTANEOUS LABOR

- On Arrival check blood glucose
- Ask when last took insulin or oral medication
- Start insulin drip as described below

SCHEDULED CESAREAN SECTION

- Patient should take usual medication (insulin or glyburide) at bedtime
- Eat nothing after midnight
- Do not take morning medication
- On arrival check blood glucose (patient should be fasting so should be normal if sugars have been well controlled)
- Perform cesarean section within 2 hours
- If unable to perform surgery immediately or patient in poor control, start insulin drip as described below.
- Perform cesarean section after 4-6 hrs euglycemia.

REMEMBER INSULIN REQUIREMENTS ARE DRAMATICALLY REDUCED DURING LABOR SIMILAR TO EXERCISE.

- A. A1 - No insulin required in labor
- B. A2 - Usually require no insulin in labor. However, some type II patients are misdiagnosed as A2, this is especially true of patients diagnosed with GDM before 24 weeks.
- C. Class B-T will require insulin drip during labor
 - Check blood glucose q hour

- Keep blood glucose between 70 – 100mg/dl by adjusting insulin infusion rate

D. Insulin Pump

Patients on the pump should discontinue the pump and are managed with an insulin drip.

E. Protocol for Insulin Drip

If initial blood glucose >150 give 3 or more units of IV Humalog or IV Regular and start insulin drip at 2u/hr

If initial blood glucose 125-150 give 2 units of IV Humalog or IV Regular and start insulin drip at 1u/hr

If initial blood glucose 100 – 124 give 1 unit of IV Humalog or IV Regular and start insulin drip at 1u/hr

If initial blood glucose ≤ 100 and >65 start insulin drip at 1u/hr

If blood glucose < 65 , start insulin drip at 0.5u/hr and D5NS at 125cc/hr at the same time. Check blood glucose in 30 minutes.

Start D5LR or D5NS at 125cc/hr when blood glucose = 100

1. 125 units of humalog in 250cc NS =
1 unit of insulin/2cc
(or)
50 units of Regular insulin in 500cc NS or LR = 1 unit of insulin/10cc
2. ALTERNATE:
10 units of Regular insulin in 1000cc D5NS at 100 to 125cc/ hr (1 -1.25 unit/hr)

7. POSTPARTUM

A. Insulin and Diet

A1 GDM :

Regular diet. No need to check blood glucose.

A2 GDM:

Regular diet. Check postprandial blood glucose. If <150 no need for medication.

Type I DM:

Vaginal delivery: ADA diet and $\frac{1}{2}$ of total insulin dose used in pregnancy

Cesarean delivery: D5NS at 125 cc/hr. Check blood glucose every 4 hrs.

Use regular insulin sliding scale to control blood glucose.

When tolerating PO, ADA diet and $\frac{1}{2}$ total pregnancy insulin.

Type II DM:

ADA diet. Check postprandial blood glucose. If > 150 mg% start glucotrol XL.

B. Breastfeeding

Breastfeeding mothers will require more calories

C. Contraception

Depo Provera

Triphasics

Consider IUD

D. Follow Up

Refer all Type I and Type II patients to general medicine clinic.

Gestational diabetes patients should have 75g glucose challenge at 6 weeks postpartum.

CONSULTATION

Twenty-four hour consultation is available by calling the Maternal Fetal Medicine service at the University of New Mexico Hospital. 1-888-866-7257.