Diabetes during pregnancy

Diabetes during pregnancy

- Diabetes is a common complication of pregnancy.
- The prevalence of diabetes is about 15% in the pregnant women.
- The more and more attention was paid to diabetes during pregnancy.

Classification

- Pregestational or overt: be diagnosed before pregnancy.

- Gestational diabetes Mellitus(GDM) : be diagnosed during pregnancy.

- GDM is more common than the overt diabetes.

Gestational diabetes mellitus

- Definition: any degree carbohydrate intolerance with onset or first recognition during pregnancy.
- GDM is more common than the overt diabetes.
- The GDM account for more than 90% of the whole diabetes during pregnancy.
- GDM could contain some pregestaional diabetes.

The impacts between pregnancy and diabetes

- The pregnancy and diabetes can impact each other.
- On one hand, the pregnancy can aggravate the diabetes.
- On the other hand, diabetes can exert adverse effects on the pregnant effects.

The impact of pregnancy on diabetes

- The insulin sensitivity is lowered during pregnancy.

- We should adjust the dosage of insulin according to the placenta status.

The adverse effects of diabetes

- The overt diabetes has more adverse effects than the GDM.
- The adverse effects on the fetus
- The adverse effects on the pregnant women.

Pathophysiology –placenta(1)

- The placenta can secrete a variety of hormones.
- These hormones include estrogen, progesterone, cortisol, human placental lactogen, human chorionic gonadotropin, etc.
- The hormones produced by placenta antagonize the effects of insulin.
- It is estimated that the insulin sensitivity will be decreased by 40% in the 3rd trimester.

Pathophysiology-placenta

- The decreased insulin sensitivity is the key for the mechanism of GDM.

- For GDM, there are no placental hormones after delivery of placenta, so the insulin sensitivity and the blood glucose levels would be restored to the normal.

Complications of pregnancy in pre-existing DM

Maternal:

Increase insulin requirment'
Hypoglycemia
Infection
Ketoacidosis
Deterioration in retinopathy'
Increased proteinuria+edema
Miscarriage
Polyhydramnio
Shoulder dystocia
Preeclampsia
Increased caesarean rate

Fetal:

Congenital abnormalities
Increased neonatal and perinatal mortality
Macrosomia
Late stillbirth
Neonatal hypoglycemia
Polycythemia
jaundice

Screening

- The challenge of glucose tolerance must be done for most cases with GDM.

The fasting glucose level

- Normal:<5.1 mmol/l
- Suspected pregestational diabetes: >7.0mmol/l
- Suspected GDM: 5.1-7.0 mmol/l

GDM Screening

- All women should be screened for GDM between 24-28 weeks

- Women with multiple risk factors should be screened in the first trimester

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Risk Factors: for first trimester screening

- ≥ 35 yrs
- BMI ≥ 30
- Previous diagnosis of GDM
- Delivery of a mascrosomic baby
- Member of a high-risk population
- Acanthosis nigricans
- Corticosteroid use
- PCOS

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The diagnosis criteria

Glucose measure	Glucose level threshold
Fasting plasma glucose	5.1mmol/l
1h plasam glucose	10.0mmol/l
2h plasma glucose	8.5mmol/l

*One or more of these values from a 75-g OGTT must be equaled or exceeded for the diagnosis of GDM.

Antepartum Management

- There is a consensus that once diabetes is diagnosed, the treatment should be recommended for diabetes during pregnancy.

- The goals of treatment are to prevent macrosomia, avoid ketosis, and detect pregnancy complications (eg, hypertension, intrauterine growth restriction, and fetal distress).

- The management includes diet, exercise and insulin.

Diet

- Low-carbohydrate diet , high fibre with caloric restriction
- Frequent small snacks may be needed between meals
- Avoid starvation

Exercise

- Experts recommend that women with GDM should exercise regularly to control blood glucose levels.

- but an improvement in clinical outcomes has not been demonstrated from compliance with this recommendation.

Insulin therapy

- Traditionally, insulin is used if dietary management does not maintain blood glucose at normal levels.
- Insulin may be initiated at 0.7 U/kg actual body weight/d given in divided dosages: two-thirds of the daily dosage before breakfast and the remainder of the dosage before dinner.
- Insulin therapy require close monitoring and adjustment based on blood glucose levels, meal choices, and activity levels.

Insulin

- 3 pre-meal short acting insulin (actrapid) +/- intermediate-acting insulin (protophane) as it allows maximum flexibility
- Target blood glucose:

  fasting < 5mmol/L

  2 hr <7 mmol/L

Oral Hypoglycemic agents

- Implicated as teratogeneic in animal studies esp first generation sulfonyureas
- In humans, scattered case reports of congenital abnormality
- Risk of congenital abnormality related to maternal glycemic control rather than mode of the anti-DM agents

Oral agents

- Biguanides (metformin)
- Cat B drug
- Commonly used in Polycystic Ovarian Disease (PCOD) to treat insulin resistance and normalize reproductive function
- Not teratogeneic
- Reduce first trimester miscarriage

Oral hypoglycemic agents

Sulfonylureas

- 1st generation drug increase risk of neonatal hypoglycemia
- 2nd generation drug (Glyburide) no such effect and other morbidities .
- Cat C drug
- 4%-20% patients failed to achieve glucose control with maximum dose of drug
- Increase risk of preeclampsia and need for phototherapy

Insulin Analogues

- 1. rapid-acting insulin analogs
  (lispro) Cat B

  majority of evidence showed that it does not cross placenta, and has no adverse maternal or fetal effects

Insulin Analogues

2. Long acting analogs
   glargine

Cat C drug

Not well studied systemically

Monitoring

- Regular home glucose monitoring
- Insulin may be need to be adjusted as gestation advances
- HbA1c monitoring
- Fetal monitoring with USG
- Refer ophthamologist

Delivery

- Timing and mode of delivery individualised
- Intrapartum insulin infusion with glucose monitoring
- no contraindication for Breast feeding either with insulin or oral hypoglycemic agents

Obstetrics management

- The goal of intrapartum GDM management is to avoid operative delivery, shoulder dystocia, birth trauma, and neonatal hypoglycemia.

- For patients who have maintained excellent control of blood glucose levels with diet and exercise, delivery is recommended at 40 weeks.

- For patients with medication-requiring GDM, induction at 38 to 39 weeks' gestation is recommended

Obstetrics management

- In general, women with gestational diabetes who do not require insulin seldom require early delivery or other interventions.

- Elective cesarean delivery to avoid brachial plexus injuries in macrosomic infants is an important issue.

Postpartum management

- In most women with GDM, hyperglycemia rapidly resolves shortly after delivery.

- It is reasonable to measure a single random or fasting blood glucose level before discharge from the hospital.

Postpartum management

- Postpartum glucose tolerance testing is important for women who had GDM.
- Women with GDM have a 7-fold increased risk of developing type 2 diabetes mellitus compared with those who had a normoglycemic pregnancy.
- At 6 to 12 weeks postpartum, only one-third of women with persistent glucose intolerance have an abnormal fasting blood glucose level.
- Therefore, to detect all women with glucose intolerance, a 75-g, fasting, 2-hour, oral glucose tolerance test is recommended.