Diabetes in pregnancy

Pre-existing diabetes

- IDDM (Type I)
- NIDDM (Type 2)
- complications of preexisting DM on pregnancy
  - Maternal
    - Increased insulin requirement
    - Hypoglycemia
    - DKA (more with type I diabetes)
    - Deterioration in diabetic retinopathy
    - increase risk of pre-eclampsia
    - increase risk of infection
      - vaginal candidiasis, UTI, endometrial or wound infection
    - increase LSCS rate
  - Fetal
    - Miscarriage
      - (risk increases with increase of the duration of the disease and the poor glycemic control)
    - Birth defects
      - (periconceptional glycemic control is the main determinant ,the incidence is about 22% if the HbAIc >8.5%)
      - Two-thirds involve the cardiovascular and central nervous systems.
        - Neural tube defects occur 13-20 times more frequently
      - VSD
        - Most common anomaly
      - sacral agenesis
        - Pathognomic anomaly
    - Growth restriction
      - more in women with preexisting type I diabetes
      - The most important predictor is underlying maternal vascular disease(Specifically, patients with retinal or renal vasculopathies and/or chronic hypertension)
    - Increased neonatal and perinatal mortality
    - Macrosomia
    - IUFD
    - Polyhydramnios
    - Shoulder dystocia
    - Neonatal hypoglycemia
    - Polycythemia
    - Jaundice
- Pre-conception Counselling
  - Allows for optimization of diabetic control prior to conception, and assessment of the presence of complications like hypertension, nephropathy, and retinopathy
  - Should counsel that good control and lower HBAIc lower the risk of congenital abnormalities and improve outcome
  - If necessary, proliferative retinopathy may be treated with photocoagulation prior to conception
  - only Contraindications to pregnancy
    - Ischemic heart dx
    - Untreated proliferative retinopathy
    - Severe renal impairment(creatinine> 250 mmol/L)
  - Target blood glucose and HbA1c levels before pregnancy
    - HbAIc should be kept below 6.5 %
    - if HbAIc level is above 86 mmol/mol (10%)
      - advise strongly against pregnancy until their HbAIc level is lower, because of the associated risks
    - any reduction toward this target will reduce the risk of congenital malformations
  - Dietary supplements and body weight
    - folic acid
      - (5 mg/day) until 12 weeks of gestation to reduce the risk of having a baby with a neural tube defect.
    - For women with diabetes who are planning a pregnancy and who have a body mass index (BMI) above 27 kg/m2 , advice for weight loss
  - Antenatal care for women with preexisting DM
    - Monitoring blood glucose
      - for pregnant women with type I diabetes or type 2 diabetes or gestational diabetes who are on a multiple daily insulin injections :
        - advise to test fasting, pre-meal, 1-hour post-meal and bedtime blood glucose levels daily
      - advise pregnant women with type 2 diabetes or gestational diabetes to test their fasting and 1-hour post-meal blood glucose levels daily if they are:
        - managing their diabetes with diet and exercise changes alone
        - taking oral therapy (with or without diet and exercise changes)
        - taking single-dose intermediate-acting or long-acting insulin.
    - Preventing pre-eclampsia :
      - For pregnant women with diabetes type I & type 2
        - 75–150 mg of aspirin daily from 12 weeks until the birth is advised
    - Detecting congenital malformations :
      - an ultrasound scan at 18–21 weeks to detect fetal structural, including examination of the fetal heart (4 chambers, outflow tracts and 3 vessels) should be offered
    - Renal assessment
      - At first contact during the pregnancy for women with pre-existing diabetes, if they have not had one in the last 3 months.
      - Consider referring pregnant women with diabetes to a nephrologist if:
        - their serum creatinine is 120 micromol/litre or more or
        - the urinary albumin:creatinine ratio is greater than 30 mg/mmol or
        - total protein excretion exceeds 0.5 g/day.
      - Consider thromboprophylaxis for pregnant women with nephrotic range proteinuria above 5 g/day (albumin:creatinine ratio greater than 220 mg/mmol).
    - Retinal assessment
      - for women with pre-existing diabetes offer retinal assessment after the first antenatal clinic appointment (unless they have had a retinal assessment in the last 3 months)
      - if they have diabetic retinopathy, offer an additional retinal assessment at 16 to 20 weeks and another retinal assessment at 28 weeks.
      - Diabetic retinopathy should not be considered a contraindication to vaginal birth.
    - Treatment
      - Goal
        - Achieve maternal near normoglycemic level to prevent adverse perinatal outcomes
      - Target blood glucose:
        - fasting < 5mmol/L
        - 2 hr <7 mmol/L
      - Options
        - Life style modification
        - Oral hypoglycemic agents :
          - 2nd generation sulphonylurea (glyburide)
          - biguanides (metformin)
        - Insulin

Gestational DM

- preexisting but previously unrecognized diabetes (diagnosed for the 1st time during pregnancy)
- True GDM (arises during pregnancy)
- Glucose intolerance of variable degree with onset or first recognition during pregnancy
- complications
  - Maternal
    - Increased risk of
      - Hypertensive disorders
      - Caesarean and instrumental deliveries
      - (40–60%) of developing type 2 DM within10-15 yr
  - Fetal
    - Fetal macrosomia
      - Fetal weight above the 90th centile for the gestational age with uniqe central deposition of subcutaneous fat in the abdominal and interscapular areas.
      - Birth weight is largely determined by
        - Maternal obesity (BMI)
        - Maternal Hyperglycemia
        - Gestational age at delivery
        - Pregnancy weight gain
        - Presence of hypertension
        - Smoking
    - Birth injuries
      - shoulder dystocia
      - Brachial plexus trauma
    - IUFD
    - perinatal mortality and postnatal adaptation problems (such as Respiratory distress syndrome , hypoglycaemia , hypocalcemia and polycythemia ,hyperbilirubinemia and jaundice)
    - Children are at risk of type 2 DM and obesity in life
- Risk factors for gestational diabetes
  - BMI above 30 kg/m2
  - previous macrosomic baby weighing 4.5 kg or more
  - previous gestational diabetes
  - family history of diabetes (first-degree relative with diabetes)
  - An ethnicity with a high prevalence of diabetes
- Testing
  - in women with any risk factor at 24 to 28 weeks
    - 75-g 2-hour oral glucose tolerance test (OGTT)
      - (at this point in gestation the diabetogenic effect of pregnancy is manifest and there is sufficient time remaining in pregnancy for therapy to exert its)
  - For women who have had gestational diabetes in a previous pregnancy, offer:
    - Early self-monitoring of blood glucose
    - 75-g 2-hour OGTT
      - as soon as possible after booking (whether in the first or second trimester)
      - At 24 to 28 weeks if the results of the first OGTT are normal
  - Interpretation

Test	Threshold
Fasting plasma glucose	≥92 mg/dl
1-hour plasma glucose	≥180 mg/dl
2-hour plasma glucose	≥153 mg/dl

Gestational diabetes is diagnosed if one or more of these values is met or exceeded

- Interventions
  - life style changes
    - Refer all women with gestational diabetes to a dietitian
    - Eat a healthy diet during pregnancy, and to switch from high to low glycaemic index food
    - Avoid single large meals and foods with a large percentage of simple carbohydrates
    - Frequent small snacks may be needed between meals
    - Encourage high fiber diet
    - Avoid starvation
    - Exercise regularly (for example, walking for 30 minutes after a meal)
  - If
    - blood glucose targets are not met with diet and exercise changes within 1 to 2 weeks
      - offer metformin
    - Metformin is contraindicated or unacceptable to the woman
      - offer insulin
    - blood glucose targets are not met with diet and exercise changes plus metformin
      - offer insulin
    - women with GDM who have a fasting plasma glucose level of 7.0 mmol/litre or above at diagnosis
      - offer insulin+- metformin +diet ,exercise changes

Timing and mode of birth

- pregnant women with type 1 or type 2 diabetes with
  - no other complications
    - Elective birth by induced labour or (if indicated) caesarean section, between 37 weeks and 38 weeks plus 6 days of pregnancy
  - complications
    - Elective birth before 37 weeks
- women with gestational diabetes
  - Offer elective birth by induced labour or (if indicated) by caesarean section no later than 40 weeks plus 6 days
  - for women with gestational diabetes who have maternal or fetal complications :
    - Consider elective birth before 40 weeks plus 6 days

Monitoring fetal growth and wellbeing

- ultrasound monitoring of fetal growth and amniotic fluid volume every 4 weeks from 28 to 36 weeks
- Routine monitoring of fetal wellbeing before 38 weeks is not recommended unless there is a risk of fetal growth restriction
- Fetal umbilical artery doppler recording testing
- Fetal heart rate recording
- Biophysical profile

Blood glucose control during labour and birth

- capillary plasma glucose every hour
- Should be maintained between 4 mmol/litre and 7 mmol/ litre
- intravenous dextrose and insulin infusion may be considered

Postnatal care

- Blood glucose control, medicines
  - Women with insulin-treated pre-existing diabetes should reduce their insulin immediately after birth and monitor their blood glucose levels to find the appropriate dose
  - Women with pre-existing type 2 diabetes who are breastfeeding can resume or continue metformin immediately after birth, but should avoid other oral blood glucose-lowering therapy while breastfeeding
  - Women who have been diagnosed with gestational diabetes should stop blood glucose-lowering therapy immediately after birth
- follow-up
  - fasting plasma glucose test 6 to 13 weeks after the birth to exclude diabetes
    - fasting plasma glucose level below 6.0 mmol/ litre :
      - Continue to follow the lifestyle advise (weight control, diet and exercise)
      - Annua l HbAIctest to check that their blood glucose levels are normal
    - fasting plasma glucose level between 6.0 mmol/litre and 6.9 mmol/litre :
      - high risk of developing type 2 diabetes
      - Should be advised for following measures to prevent type 2 diabetes
    - Advise women with a fasting plasma glucose level of 7.0 mmol/litre or above
      - that they are likely to have type 2 diabetes, and offer them a test to confirm
  - after 13 weeks :
    - fasting plasma glucose test if this has not been done earlier
    - HbAIc test
    - 75-g 2-hour OGTT (not routinely)