

# PREGNANCY WITH DIABETES MELLITUS

## DEFINITION

### **Gestational Diabetes Mellitus (GDM):**

- Carbohydrate intolerance resulting in hyperglycaemia of varying severity with onset or first recognition during pregnancy.
- The definition applies irrespective of whether insulin is used for treatment or the condition persists after pregnancy.

### **Pre-Gestational Diabetes Mellitus:**

- When the woman is a known diabetic diagnosed before pregnancy.

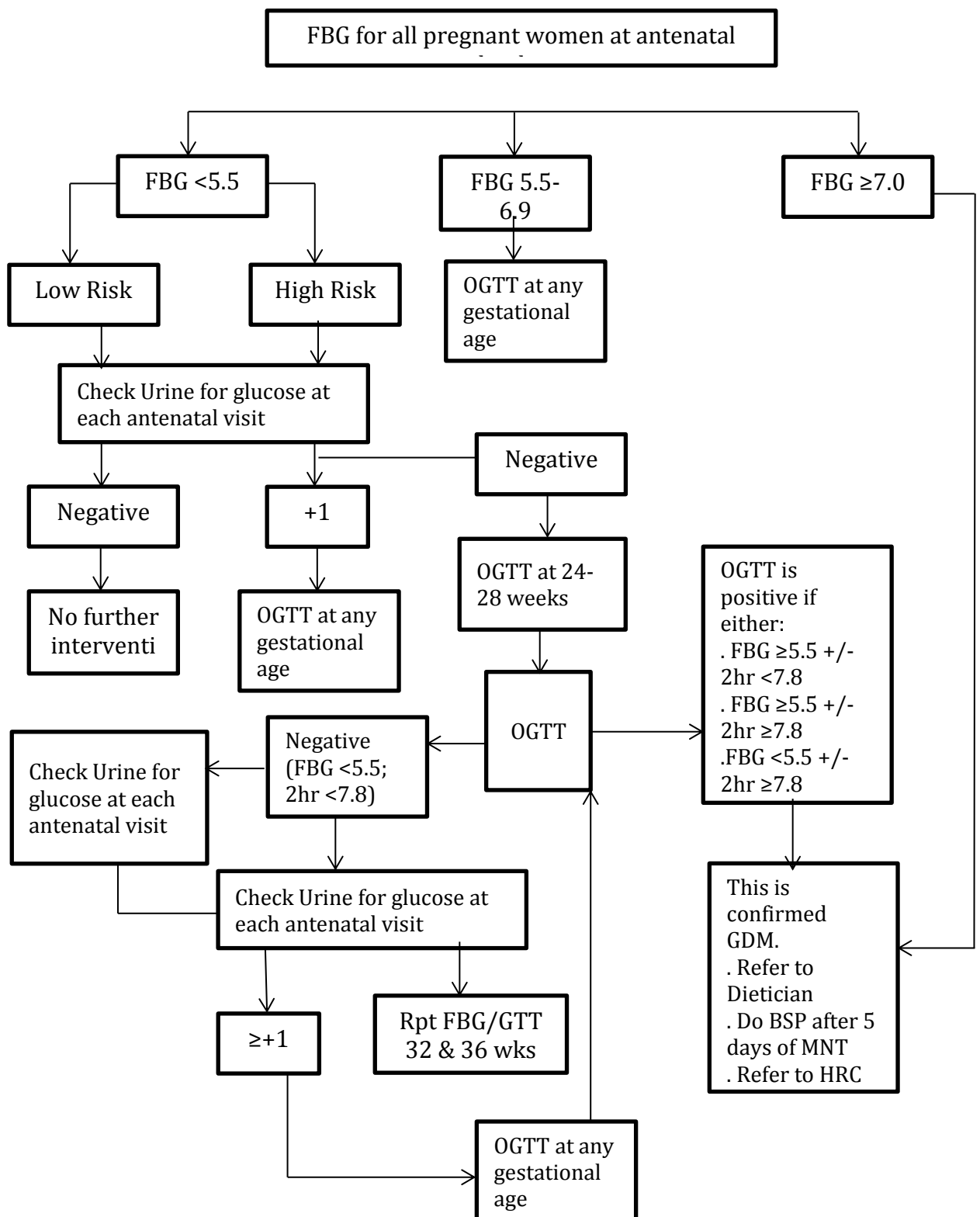
## TERMINOLOGY

(After results of Oral Glucose Tolerance Test)

- **Diabetes Mellitus (DM):**  
FBS  $\geq 7$  mmol/L  
2-Hr  $\geq 11.1$  mmol/L
- **Impaired Glucose Tolerance (IGT):**  
FBS  $< 5.5$  mmol/L  
2-Hr  $\geq 7.8$  mmol/L  $< 11.1$  mmol/L
- **Impaired Fasting Glycaemia (IFG):**  
FBS  $\geq 5.5$  mmol/L  
2-Hr  $< 7.8$  mmol/L

Gestational Diabetes includes all 3 categories of glucose intolerance: DM, IGT and IFG

Categorisation will be made later with an OGTT at 6 weeks post-natal.



## SCREENING

Clinical characteristics consistent with a high risk of GDM:

- Family history of DM in 1<sup>st</sup> degree relatives
- Age >35 years
- Past history of GDM
- BMI >30
- Bad Obstetric History- macrosomia, unexplained stillbirth, congenital malformations
- Persistent glycosuria
- Polyhydramnios in current pregnancy

## DIAGNOSIS

GDM is diagnosed with 75 gm oral glucose load.

Diagnostic criteria of GDM with OGTT

FBS  $\geq$  5.5 mmol/L

2-Hr  $\geq$  7.8 mmol/L

**DO NOT** make diagnosis of GDM on Blood Sugar Profile (BSP).

State clearly the gestational age at which diagnosis is made.

## MANAGEMENT AND PATIENT CARE

### Patient Education:

- The importance of educating the woman and her partner about her condition cannot be over emphasized.
- Patient's understanding of the treatment plan is mandatory for compliance.
- Why should you be concerned with DM and GDM?

### Objectives of Care:

1. Control of the diabetes by:

- Controlling Diet
- Monitoring of blood glucose levels
- Insulin therapy

2. Monitoring for maternal complications.
3. Prevention of fetal/neonatal complications.

#### **Upon diagnosis of GDM:**

- Refer to Dietician for initiation of Medical Nutrition Therapy (MNT) for 5-7 days
- DO a BSP following MNT
- Refer to High-risk antenatal clinic at the hospital.

#### **MEDICAL NUTRITION THERAPY (MNT)**

- MNT is the primary therapeutic strategy for the achievement of acceptable glycaemic control in GDM
- It should be culturally appropriate and individualized for each patient to meet the nutritional requirements of pregnancy depending on her weight and BMI.
- All women should receive nutritional advice from a trained dietician/nutritionist.

Medical nutritional therapy: Calorie intake 30-35 kcal/kg

*Jovanovic and Peterson* found the following diet to result in euglycaemia:

- |   |                   |
|---|-------------------|
| • Normal weight in present pregnancy:             | 30 kcal/kg/24hr   |
| • Overweight women (120-150% ideal body weight):  | 24 kcal/kg/24 hr  |
| • Morbidly obese women (>150% ideal body weight): | 12-15kcal/kg/24hr |
| • Underweight women (< 80% ideal body weight):    | 40 kcal/kg/24hr   |

Diet recommended should contain:

- 40-50% carbohydrate, 20-25% protein, 30-40% polyunsaturated fats
- It is important to avoid a severe calorie-restricted diet as this can predispose to ketonuria and also to infants that are small for their gestational age, which carries an increased risk of diabetes in later life.

#### **BLOOD SUGAR PROFILE (BSP):**

→ 4-point plasma glucose , including (2-hour post meal ) values are monitored.

Glycaemic targets in pregnancy:

- |                         |                              |
|-------------------------|------------------------------|
| • Fasting blood glucose | <5.3 mmol/L (3.8-5.2 mmol/L) |
| • 1-hour post meals     | <7.8 mmol/L                  |

If glycaemic targets are met on MNT alone, continue diet.

Frequency of monitoring may be individually adjusted according to risk factors, glucose levels, period of gestation, presence of complications e.g. macrosomia, polyhydramnios, FAC >90<sup>th</sup> centile, etc.

## **MATERNAL SURVEILLANCE**

- Pre-Gestational Diabetes with pregnancy;
- Gestational Diabetes Mellitus in 1<sup>st</sup> Trimester

Women found to have fasting hyperglycaemia or abnormal carbohydrate intolerance in the 1<sup>st</sup> trimester may have pre-existing diabetes.

They should be treated as women who are known to have glucose intolerance before pregnancy.

- **Eye Care:**

A detailed retinal examination is needed on all pre-gestational diabetics during the 1<sup>st</sup> trimester.

Repeat retinal examinations in each trimester is needed for those with retinopathy to detect and treat any accelerated retinopathy.

Retinopathy should be optimally treated with laser therapy before pregnancy.

- **Obstetric Care:**

Antepartum complications more common in women with GDM are:

- Pregnancy induced Hypertension (Gestational Hypertension) and Pre-eclampsia
- Preterm labour- dexamethasone for lung maturity need to be considered if early labour is anticipated.
- Polyhydramnios, especially in uncontrolled blood glucose.

Monitoring for the development of pre-eclampsia:

- BP, body weight, urine (protein, glucose, ketones) to be checked at every AN visit.
- Weekly BP and urine protein measurements as part of routine antenatal care- provide early indications suggestive of Gestational hypertension and Pre-eclampsia.
- PE Screening: Urea, electrolytes and creatinine; Liver function test; Full blood count, coagulation profile; Plasma Urate; Urinary Protein: creatinine ratio.

All medications should be written clearly (Bru HIMS) and not on single prescription sheets. Document clearly any changes in medications after review or discharge from admissions.

**Frequency of testing maternal status during pregnancy:**

TESTS	PREGESTATIONAL DIABETES	GESTATIONAL DIABETES
HbA1c	Beginning of pregnancy and every 4 -6 wkly	Beginning of pregnancy and every 4-6 wkly
Glucose	BSP - weekly or fortnightly	BSP - weekly or fortnightly
Urine ketones	Glucose >11 mmol/L	Glucose > 11 mmol/L
Urinalysis	Every visit. Culture if significant pyuria present.	Every visit. Culture if significant pyuria present.
Renal function	Each trimester	Each trimester
Eye Status	Retinal screening 1 <sup>st</sup> trimester and as necessary per Ophthalmologist	Only if diagnosis is made in 1 <sup>st</sup> trimester
Cardiac status	ECG 1 <sup>st</sup> trimester	Only if diagnosis is made in 1 <sup>st</sup> trimester

**FETAL SURVEILLANCE**

NO single reliable test for assessment of fetal well-being exists for Diabetes in pregnancy.

**1. Fetal monitoring by Ultrasound:**

- At the onset of amenorrhoea, patient should have a pregnancy test.
- Pregnancy must be confirmed with ultrasound scan and viability established.
- A dating scan must be done.
- Ultrasound scan at 18-20 weeks for congenital anomalies in pre-gestational diabetic women and when GDM is diagnosed in the 1<sup>st</sup> trimester.
- Measure FAC (fetal abdominal circumference) for development of macrosomia in early 3<sup>rd</sup> trimester (29-33 weeks). FAC > 90<sup>th</sup> centile defines macrosomia.
- Adjust for individual cases and repeat scans at 28, 32, 36 weeks to detect abnormalities of fetal growth and polyhydramnios.
- Fortnightly growth scans when indicated and a growth chart plotted.
- If previous history of macrosomia or maternal obesity present, measure FAC from 24 weeks.
- Measure AFI for development of polyhydramnios.
- Estimate fetal weight.
- Doppler blood flow studies are indicated in the presence of maternal microvascular disease (Gestational Hypertension/Pre-eclampsia, retinopathy, nephropathy) where there is additional risk of intrauterine growth restriction.

**2. Fetal Kick count (FKC):**

Count to 10 in 12 hours- initiate daily fetal movement determination by 28 weeks.

**3. CTG (non-stress test):**

As indicated starting from 28 weeks.

Guidelines: Department of O&G, RIPASH; 2014

## INSULIN TREATMENT

Patients previously on Biguanides may be tried on diet initially.

### Principles of Insulin therapy:

Venous plasma glucose or Dextrostix readings are all taken 2-hrs post prandial except fasting blood sugar (8-hrs fast).

#### AIM at:

Fasting plasma glucose value	$\leq 5.3$ mmol/L
1 hour plasma glucose value	$\leq 7.8$ mmol/L
2 hour plasma glucose value	$\leq 6.7$ mmol/L

**4 times daily regimen** is practiced. The first 3 doses are given before each meal with short-acting insulin and the 4<sup>th</sup> dose of intermediate acting insulin at bedtime.

Starting dose of insulin during the “honeymoon” period is usually around 10-15 iu/day.

Total daily requirements are 0.4-0.6 units/kg and it can be increased to 1.0-1.2 units/kg in obese women.

**Twice daily regimen:** the morning dose contains 2/3 of total daily insulin and afternoon dose contains 1/3 of total daily dose of insulin.

#### If FBS and Post-breakfast are high:

Start Humulin-N: 4iu at bedtime (10 pm) and **adjust dose.?**

#### If ALL values are high:

Start Humulin-N: 4iu at bedtime (10 pm)

And Humulin-R: 4iu half an hour before each meal (breakfast, lunch and dinner) and **adjust dose. ?**

#### If after adjustment only FBS is high:

Check for midnight or early morning hypoglycaemia by checking 3 am dextrostix.

If 3 am value is low ( $< 4$ mmol/L)- reduce Humulin-N at bedtime by 2 iu ( maybe due to rebound hyperglycaemia)

If post-meal values are high, increase Humulin-R by 2 iu half an hour before meals.

## DEXAMETHASONE

If Dexamethasone is to be prescribed for preterm delivery, anticipate increase in blood sugar 6-12 hours after the first dose and can last for up to 72 hours.

Dexamethasone 12mg x 2 doses may be started at any time of day depending on maternal condition.

Guidelines: Department of O&G,RIPASH; 2014

If given at 6 am- Increase subsequent doses of insulin by 4 iu for 72 hours.

e.g. Humulin-R @ 12 noon: increased by 4 iu

Humulin-R @ 6 pm: increased by 4 iu

Humulin-N @ 10 pm: increased by 4 iu

Monitor 4 point dextrostix.

Observe the FBS the following day. If still high, increase Humulin-N further by 2-4 iu.

On Day 2, increase Humulin-R by 2 iu before each meal and monitor dextrostix.

Return to original dose after 72 hours when blood sugar has settled.

### **MONITORING OF GLYCAEMIC CONTROL**

- Self-glucose monitoring is considered superior to intermittent office monitoring of plasma glucose. Those who are admitted for glucose stabilization need not undergo a repeat BSP if self home-glucose monitoring is done regularly.
- First week: Dextrostix 4 times a day- FBS, 1-hour post-prandial
- Frequency of monitoring may however be reduced at the discretion of the Endocrinologist or Obstetrician in well-controlled and compliant patients.
- Patients should report results of home glucose monitoring.
- If optimal control is not achieved in 2 weeks, reassess by joint care at the High Risk Clinic.
- If non-compliant, consider twice daily regimen

Test for Ketones if:

- Patient experiences weight loss
- Patient is obese
- Insulin is started
- Patient has other illnesses e.g. Diarrhoea, vomiting, loss of appetite, infections.

To ensure no ketosis occurs due to severe calorie restriction, ketone test with 1<sup>st</sup> morning urine following initiation of MNT and again after initiation of insulin therapy.

### **ROUTE AND TIMING OF DELIVERY**

Timing of delivery is determined by a combination of maternal and fetal risk factors.

- GDM may lead to increased intervention including IOL.
- With good glycaemic control and normal fetal surveillance, patient may await spontaneous onset of labour up to 40 weeks.
- It is reasonable to intensify fetal surveillance when pregnancy is allowed to continue beyond 40 weeks gestation. Specialist input on date of delivery is important.



- Delivery before 38-39 weeks is not indicated unless there is evidence of macrosomia, polyhydramnios, poor metabolic control or other obstetric indications.
- In patients with known pre-gestational DM, consider induction of labour at 38 weeks.

#### Mode of Delivery:

- Aim for spontaneous vaginal delivery although this may not always be possible.
- Presence of diabetes is NOT an indication for elective caesarean delivery.

#### Estimation of fetal weight:

- If >4500 gm: Caesarean Section without trial of labour is reasonable
- 4000-4500 gm: Trial of labour vs Caesarean Section, and delivery based on clinical pelvimetry, Obstetric history and fetal growth pattern should be discussed with patient.
- If <4000 gm: Follow usual Obstetric standards.

### DAY OF DELIVERY

#### Induction of Labour:

- Reduce evening intermediate acting insulin by 2-4 iu
- Measure FBS
- Administer morning short acting insulin only with a light breakfast
- Do dextrostix reading pre and post lunch
- Give usual short acting insulin if not in active labour
- **After assessment for 2<sup>nd</sup> dose of PGE2**
- When patient has been transferred to the labour ward, start dextrose and insulin infusion according to glucose levels.

#### Elective Caesarean Section:

- Reduce evening intermediate acting insulin by about 2-4 iu.
- Omit morning insulin
- Patient should be scheduled 1<sup>st</sup> on the list in the morning.
- If her glucose levels are maintained between 4-6 mmol/L, Dextrose-Insulin infusion is not required.
- Start Dextrose and Insulin infusion at breakfast time if patient is not 1<sup>st</sup> on the list.

\* If caesarean section follows a failed induction of labour, follow protocol for PGDM.

## **INTRAPARTUM MANAGEMENT**

- The aim during labour or Caesarean section is to maintain maternal blood glucose between 4.0-6.0 mmol/L.
- Capillary blood glucose levels are checked frequently from onset of labour (hourly)
- Insulin may be required if maternal blood glucose exceeds 4.0-6.0 mmol/L.
- Maternal hyperglycaemia can lead to hyperinsulinaemia with consequent risk of hypoglycaemia in the baby after delivery.
- Women with established diabetes need insulin to prevent ketoacidosis.

## **Gestational Diabetes Mellitus**

GDM treated on diet only:

- Managed similar to non-diabetic women
- Normally no blood glucose evaluation is required

GDM treated with diet and insulin:

- Admit in early labour
- If dextrostix >4.0 mmol/L and <6.0 mmol/L- NO action required
- Measure dextrostix hourly
- If dextrostix < 4.0 mmol/L- start dextrose infusion
- If dextrostix >6.0 mmol/L- start infusion of dextrose and insulin

## **Pre-gestational Diabetes Mellitus**

- Admit in early labour
- If dextrostix >4.0 mmol/L and <6.0 mmol/L- NO action required
- Measure dextrostix hourly
- If dextrostix < 4.0 mmol/L- start dextrose infusion
- If dextrostix >6.0 mmol/L- start infusion of dextrose and insulin

## **Protocol for IV Dextrose and Insulin Infusion**

- **Aim for blood glucose level between 4-6 mmol/L during labour**
- Dextrose- Infuse 10% Dextrose IV at 83 ml/hr or 5% Dextrose at 100ml/hr.
- Insulin- Make up a solution of insulin at 1 u/ml (49.5 mls of 0.9% Normal Saline with 50 units Humulin R/ Actrapid in a 50ml syringe pump)
- Insulin infusion rate depends on the total dose the patient was receiving in the previous 24 hours.

**The Dextrose and Insulin syringe pump should be given using the same cannula site via a three-way tap.**

## CALCULATION OF INTRAPARTUM SLIDING SCALE:

1. Calculate total units of insulin needed for control before delivery
2. Subtract 25% of the dose
3. Divide the result by 24 to get the dose of insulin required per hour to maintain the blood glucose level between 4-6 mmol/L

### Example:

Patient on: HR 10-10-10 units

HN 0-18 units

Total units received = 48 units

25% of total = 12 units

Total units /24 hrs = 36 units

Therefore, per hour =  $36 \div 24 = 1.5$  units/hr

Adjust the infusion according to the blood sugar by dextrostix which is done 1-2 hourly.

Blood Glucose (mmol/L)	Insulin Dose (units/hr)
0-2.0	0
2.1-4.0	1
4.1-6.0	1.5
6.1-8.0	2
8.1-10.0	2.5
10.1-12.0	3
12.1-14.0	4
14.1-16.0	5
16.1-20.0	6
>20.1	Inform dr

## POSTPARTUM CARE

### Immediate Postpartum:

- Insulin infusion is stopped soon after delivery for both GDM and PGDM.
- Insulin requirements in known diabetic patients are decreased by 50% after delivery and insulin infusion rates should alter accordingly.

### Immediate Postpartum sliding scale:

- **GDM:** Subcutaneous HR if already on full diet. Monitor dextrostix 6 hourly .
- **PGDM:** Subcutaneous HR if already on full diet. Monitor dextrostix 4 hourly.

Blood glucose (mmol/L)	Insulin Dose (units)
0-6.0	0
6.1-10.0	4
10.1-14.0	6
14.1-18.0	8
18.1-22.0	10
>22.0	12

- **Postnatal LSCS and Nil orally:**
- 10% Dextrose saline at 83 mls/hr or 5% Dextrose saline or 5% Dextrose at 100mls/hr.
- Monitor dextrostix:   6 hourly for GDM for 24 hours  
                                  2 hourly for PGDM for 24 hours.
- Subcutaneous insulin according to sliding scale.

Blood glucose (mmol/L)	Insulin Dose (units)
< 10.0	0
10.1-12.0	4
12.1-16.0	6
16.1-18.0	8
18.1-20.0	10
>20.0	12

## MANAGEMENT OF INFANT OF DIABETIC MOTHER

- Neonatologist/Paediatrician need to be informed of deliveries of infants of diabetic mothers.
- Screening abnormalities performed soon after birth.
- Close monitoring of blood glucose necessary within the first 48 hours of baby's life.
- **Infants of diabetic mothers should be fed early.**
- The neonates of GDM mothers are at risk of all the complications of infants born to mothers with overt diabetes particularly those born macrosomic (>4000 gm).
- The potential sequelae of shoulder dystocia are **Erb's Palsy** which usually resolves in the first few days to weeks but occasionally is lifelong.
- **Intrapartum fetal hypoxia** with the possibility of a hypoxic ischaemic event or death if the hypoxia is extreme or prolonged.
- **Hypoglycaemia** secondary to maternal hyperglycaemia and fetal hyperinsulinaemia. Capillary blood glucose should be monitored at 1 hour of age and before the first four feeds and up to 24 hours in high-risk neonates.
- A neonatal blood values of <2.0 mmol/L needs to be verified and is considered abnormal and should be treated. A value of <1.0 mmol/L needs IV infusion of glucose and neonatologist must be informed.
- **Polycythaemia** is a result of chronic intrauterine hypoxaemia and placental insufficiency secondary to poor glycaemic control. Hypoxaemia causes increased fetal erythropoietin release and subsequent polycythaemia. When these extra red blood cells break down, there is increased incidence of **hyperbilirubinaemia** at days to weeks after birth.
- **Respiratory Distress Syndrome (RDS):** the neonates should be observed closely as fetuses affected by GDM have a five to six- fold increased risk and it is the most serious complication for the neonate. Oxygen supplementation, ventilatory support and surfactant replacement are among the treatments available.

## POSTNATAL CARE

Day	GDM	PGDM
Delivery day (D0)	<ul style="list-style-type: none"> <li>- Omit insulin infusion</li> <li>- 6-hrly dextrostix</li> <li>- Sliding scale insulin</li> <li>- Maintain glucose: FBS &lt;7 and post meal &lt;10 mmol/L</li> </ul>	<ul style="list-style-type: none"> <li>- Omit insulin infusion</li> <li>- 4-hrly dextrostix</li> <li>- Sliding scale insulin</li> <li>- Maintain glucose: FBS &lt;7 and 2-hr post meal &lt;10 mmol/L</li> </ul>
Day 1	<ul style="list-style-type: none"> <li>- Dextrostix at 6am, 2 pm, 8 pm.</li> <li>- Full diet</li> <li>- If all &lt;10 mmol/L, 24 hours postnatal &amp; no complications.</li> <li>- Inform endocrinologist and arrange appointment, if any.</li> <li>- May discharge,</li> <li>- OGTT at 6 weeks postnatal.</li> <li>- Postnatal care in RIPAS HRC.</li> <li>- Family planning advise before discharge</li> <li>- Advise to lose weight if &gt;120% ideal bodyweight.</li> </ul>	<ul style="list-style-type: none"> <li>- Dextrostix at 6 am, 2 pm, 8 pm</li> <li>- If &gt;10 mmol/L:</li> <li>- Contact endocrinologist</li> <li>- Start Mixtard Insulin 30/70</li> <li>- Dose: 0.3 units/kg post partum bodyweight. (2/3 dose a.m. and 1/3 dose p.m.)</li> </ul>
Day 2 & 3		<ul style="list-style-type: none"> <li>- BSP/dextrostix 3 point</li> <li>- Continue above treatment</li> <li>- Endocrinologist review prn</li> </ul>
Day 4		<ul style="list-style-type: none"> <li>- Stop monitoring if normal</li> <li>- On discharge, endocrinologist appointment at 6 weeks postnatal.</li> <li>- FBS, Post lunch and HbA1c</li> </ul>

### Postnatal management:

- Breastfeeding is encouraged. However formula feeds may be necessary to prevent neonatal hypoglycaemia
- Women with GDM rarely require insulin after delivery. Inform Endocrinologist if fasting dextrostix readings >7 mmol/L and random >11 mmol/L
- Insulin dose should be reduced to pre-pregnancy levels or to 0.3 units/kg of postpartum weight in women with PGDM who are breastfeeding.

**OGTT:**

- Perform OGTT on all GDM patients **6 weeks** after delivery to ascertain diagnosis and category of glucose intolerance.
- Arrange appointment to see Obstetrician/Endocrinologist at High Risk Clinic at **8 weeks**.
- **Do not** discharge patients to MCH clinic if they were previously under Endocrine review and on insulin.
- **Do not** perform OGTT on PGDM.

**POSTPARTUM FOLLOW-UP****GDM:**

- All cases of GDM must be reassessed with OGTT at 6-8 weeks postpartum.
- Review 1-2 weeks after OGTT
- Categorize type of glucose intolerance into: IFG, IGT, DM or whether normoglycaemic.
- Patients with GDM and normal glucose levels postpartum, should be reassessed 1-2 yearly at nearest clinic.
- Women with impaired glucose tolerance in the postpartum period should be tested 6 monthly after MNT and refer to respective local health centre.
- Women with GDM are at increased risk of developing diabetes and should be instructed in lifestyle modification to reduce risk of diabetes.
- Subsequent pregnancies carry a risk of diabetes.
- Early evaluation of glucose tolerance in future pregnancies should be stressed
- An individualised exercise programme is advised
- Dietary counseling to prevent obesity
- Child must be counseled that mother is a diabetic and childhood obesity prevented by diet control.

**PGDM:**

- Review 6 weeks postpartum with FBS, post-lunch glucose and HbA1C.
- **No OGTT must be done**
- **Continue Insulin Mixtard 30/70 until mixed feeding starts at 6 months.**

**Maternal risks and problems: Short term**

- Higher risk of developing hypertension, pre-eclampsia, urinary tract infection
- Increased rate of caesarean section
- Obesity associated with GDM
- Obese mothers tend to have overweight babies

**Maternal Risks of IGT: Long term**

- Increased future risk of Type 2 diabetes requiring lifelong management
- Increased rate of hypertension, cardiovascular disease and premature death
- About 2/3 of women who have GDM will go on to have it in future pregnancies and a few studies have shown that 50% of women who get GDM will develop Type 2 diabetes within the first 5 years of delivery.
- Risk is highest if: obese; have high levels of blood glucose during pregnancy (especially if insulin is required); diabetes was diagnosed early in pregnancy; result of post-partum OGTT showed borderline results in non-pregnant-state.
- If post-partum OGTT was normal, it is advisable to check blood glucose every 1-3 yearly.
- Keeping bodyweight within recommended ideal and eating a well-balanced healthy diet and exercising regularly is advised.
- Avoid using progesterone only pill as this has been associated with increased risk of developing Type 2 diabetes in women who are recently diagnosed with GDM.
- General health measures include smoking cessation and avoidance of drugs and alcohol.

**CONTRACEPTION**

- Patients should be counseled regarding preferred contraceptive methods and plans for future pregnancy during the antenatal visits or immediate postpartum.
- Considering many patients fail to comply with advice of pre-pregnant counseling (either from lack of or failure of communication), it is recommended that contraception starts with one dose of medroxy-progesterone acetate (Depo-provera) in high risk patients prior to discharge.
- Patient's informed choice should be obtained and understanding of the risk of pregnancy with uncontrolled diabetes should be ensured.



- Low-dose combined oral contraceptives and the intra-uterine contraceptive device are not contraindicated in women with previous GDM.
- Low-dose combined oral contraceptives should be avoided in women with complications of diabetes and those at risk for vascular disease.
- Sterilisation is the method of choice when family is complete.

## **PRE-PREGNANCY COUNSELLING**

- Pre-pregnancy counseling should be done jointly by healthcare physician, endocrinologist and obstetrician.

Aims are:

- To assess suitability for pregnancy
- To look for complications of diabetes, evaluate and treat complications prior to onset of pregnancy
- To achieve optimal control prior to and during very early pregnancy
- To provide an opportunity for pre-pregnancy advice and folate supplements at least 3 months prior to conception.
- Needs retinal screening prior to conception
- Screen for diabetic nephropathy
- Replace ACE inhibitors or ARB's to other anti-hypertensives that are safe in pregnancy
- Stop statins
- Check Rubella status
- Advise against and treat obesity.
- Discuss inheritance of diabetes if patient is a known diabetic.
- Discuss maternal, fetal and neonatal long term risks and inheritance of diabetes.
- If diabetes is treated with insulin, may need to change insulin doses or number of injections taken to improve overall control.
- If diabetes is treated with oral hypoglycaemics, it is generally advisable that these are replaced with insulin injections before planning for pregnancy or expecting to become pregnant.
- If on diet alone, may need to be started on insulin if glucose levels are not satisfactory at some stage before or during pregnancy.

- Before getting pregnant, blood glucose should be as near normal as possible for at least 3 months (4-6 mmol/L before meals; <8 mmol/L post meal).

**Types of control:**

- Excellent control:      FBS 4-6 mmol/L  
                                     RBS 7 mmol/L  
                                     HbA1C 4-6 %
- Good control:              FBS 5-7 mmol/L  
                                     RBS <10 mmol/L  
                                     HbA1C <7%
- Poor control                FBS >7 mmol/L  
                                     RBS >11 mmol/L  
                                     HbA1C >7 %

**Ref:**

1. NICE guidelines 2008- Diabetes in Pregnancy
2. Jovanovic L, ed in chief. Medical Management of Pregnancy Complicated by Diabetes, 3<sup>rd</sup> Edition. American Diabetes Association; 2000:133-149.