HEALTH HOLDING

HAFER ALBATIN HEALTH CLUSTER
MATERNITY AND CHILDREN HOSPITAL

Department:	Obstetrics and Gynecology (Ambulatory Care)		
Document:	Departmental Policy and Procedure		
Title:	Antenatal Management of Pregnancy with Diabetes		
Applies To:	All Obstetrics and Gynecology Staff		
Preparation Date:	January 08, 2025	**Index No:**	L&D-DPP-056
Approval Date:	January 22, 2025	**Version :**	2
Effective Date:	February 22, 2025	**Replacement No.:**	L&D-DPP-056(1)
Review Date:	February 22, 2028	**No. of Pages:**	7

1. PURPOSE:

1.1 To ensure that all patients with diabetes in pregnancy are identified, diagnosed and treated according to accurate evidence - based practice.

2. DEFINITIONS:

2.1 **Gestational Diabetes**- is a condition in which a patient without diabetes develops high blood sugar levels during pregnancy. Gestational diabetes generally results in few symptoms.

3. POLICY:

3.1 Women with diabetes who are planning to become pregnant should be informed that establishing good glycemic control before conception and continuing this throughout pregnancy will help to reduce the risks of adverse pregnancy outcomes for mother and newborn.

3.2 All health care professionals in contact with women with diabetes of child-bearing age should be aware of the importance of pre-pregnancy, pregnancy care and local arrangements for its delivery, and should share this information with the woman.

3.3 Women with gestational diabetes should be instructed in self- monitoring of blood glucose. Targets for blood glucose control should be determined in the same way as for women with pre-existing diabetes.

3.4 Pre-conception care for women with diabetes should be given in a supportive environment and the woman's partner or other family member should be encouraged to attend.

3.5 Effort to establish combined antenatal/ diabetic clinics with day care and home glucose monitoring should be made. Daily self- blood glucose monitoring with fasting and pre-meal blood sugars for the remainder of the pregnancy.

3.6 Routine monitoring of fetal wellbeing before 38 weeks is not recommended in pregnant women with diabetes, unless there is a risk of fetal compromise.

3.7 Twice a week non stress tests (fetal monitoring) should be started at around 38 weeks till delivery depending on the severity of vascular complications form the diabetes.

3.8 Once women is diagnosed with diabetes, she should be seen every other week until 36 weeks then weekly.

4. PROCEDURE:

4.1 Preconception counselling aim for joint review by the woman's physician.

- 4.1.1 Explain:
  - 4.1.1.1 Control of blood glucose reasons for and benefits of optimal blood glucose and glycosylated haemoglobin levels in pregnancy.
  - 4.1.1.2 Risk associated with poor control.
    - 4.1.1.2.1 Congenital malformations.
    - 4.1.1.2.2 Pregnancy complications.
    - 4.1.1.2.3 Operative delivery or caesarean section.

4.1.1.2.4 Care of the newborn including risk of hypoglycaemia and need for monitoring blood glucose levels.

4.1.2 Outline preconceptual management plan:

4.1.2.1 Advice against pregnancy and offer contraception advice for interim period until good control obtained.

4.1.2.2 Aim for HbA1c <7.0% and ideally <6.0%.

4.1.2.3 Advise on diet, body mass index and exercise, including weight loss for women with a body mass index (BMI) over 27kg/m^2.

4.1.2.4 If the woman is taking any medication that is not recommended in pregnancy- e.g. ACE inhibitors, stains, diuretics or beta-blockers steps should be taken to remedy this before conception.

4.1.2.5 Review/ identify complications of diabetes e.g. retinopathy or nephropathy.

4.1.2.6 Advice folic acid supplements (5mg/day) from pre-conception until 12 weeks of gestation.

4.1.2.7 Smoking cessation advice.

4.1.2.8 Oral hypoglycemic agents should be ceased.

4.1.2.9 Cardiovascular disease is associated with a high mortality and should be excluded.

4.1.2.10 Consider need for consultation e.g. ophthalmological opinion.

4.1.2.11 Instruct on the use of menstrual calendar.

4.1.3 Before or as soon as pregnancy is confirmed:

4.1.3.1 Stop oral hypoglycemic agents, apart from Metformin 2, and commence insulin if required.

4.1.3.2 Stop angiotensin-converting enzyme inhibitors and angiotensin II receptors antagonists and consider alternative antihypertensive.

4.1.3.3 Stop stains.

4.2 Antenatal care should ensure immediate referral to a joint diabetes and antenatal clinic and plan birth in a hospital with at least a level 2 nursery facility:

4.2.1 First appointment (joint diabetes and antenatal clinic):

4.2.1.1 The attending physician should take a clinical history and record all the following in the patient record:

4.2.1.1.1 Personal history , significant factors (overweight patient, Family history of Diabetes Mellitus, Age over 30 years, prior history of Gestational Diabetes, Prior pregnancy complication such as Fetal Macrosomia, Intrauterine Fetal Demise (Stillborn), pregnancy Induced Hypertension (PIH) Polyhydramnios, Congenital Defect) and last menstrual period (LMP) cycle.

4.2.1.1.2 Note any allergies and document in relevant areas of case notes.

4.2.1.1.3 Calculate and document estimated date of delivery (EDD)

4.2.1.1.4 Medical examination, including date, age, parity, booking blood pressure, weight and height, cervical smear (if greater than two years since previous normal smear), pelvic, heart and lungs assessment, and breast examination.

4.2.1.2 Offer available birthing options in accordance with the woman's needs.

4.2.1.3 Provide explanations of antenatal hand-outs.

4.2.1.4 Discuss education classes.

4.2.1.5 Discuss any general health issues.

4.2.1.6 Assess the need for referral to any other services e.g. Physiotherapy, Social Worker, Anesthetists, Physician, Obstetric physician.

4.2.1.7 Provide the opportunity for the woman to voice out any questions or concerns.

4.2.1.8 Organize booking bloods and screening where appropriate.

4.2.1.9 Ensure the woman has her antenatal record with her and organize time for next appointment.

4.2.1.10 Arrange for ultrasound at 7 – 9 weeks to confirm viability of pregnancy and gestational age.

4.2.1.11 Booking appointment (ideally by 10 weeks)

4.2.1.12 Booking bloods.

4.2.1.12.1 Following appropriate explanation and verbal consent blood for the following tests should be obtained:

4.2.1.12.1.1 Complete blood picture.

4.2.1.12.1.2 Blood group and antibody screen.

4.2.1.12.1.3 Rubella screen.

4.2.1.12.1.4 Treponemapallidum screening assay (syphilis).

4.2.1.12.1.5 TFT T3 T4

4.2.1.12.1.6 Hepatitis B screen.

4.2.1.12.1.7 Hepatitis C screen.

4.2.1.12.1.8 HIV test.

4.2.2 Screening of Gestational Diabetics:

4.2.2.1 Universal Screening is recommended as KSA has been considered to be independent risk factors for gestational diabetes.

4.2.2.2 One hour 50g glucose challenge test (GCT) is best method of screening, patient usually not fasting prescribe oral 50 grams glucose. Blood sugar then measured, if <7.8mmol (<140gms) considered normal.

4.2.2.3 If GCT is normal, repeat at 24 – 28 weeks.

4.2.2.4 If abnormal screening results >140mg, the patient is to have the diagnostic test is oral glucose tolerance test.

4.2.3 Diagnosis:

4.2.3.1 A fasting plasma glucose level >126mg/dl (7.0mmol/l) or a casual plasma glucose >200mg/dl (11.1mmol/l) meets the threshold for the diagnosis of diabetes.

4.2.3.2 Diabetes OGTT can be done either with 100g and 3 hours test or with 75g and 2 hours test.

4.2.3.3 Women who have had gestational diabetes in a previous pregnancy should be offered early self-monitoring of blood glucose or an OGTT at 16 – 18 weeks, and a further OGTT at 28 weeks if the result are normal.

4.2.3.4 All pregnant patients attending for GTT are instructed to fast from 12 midnight on the evening before their appointment.

4.4.4 Advice women to aim for a fasting blood glucose of between 3.5 and 5.9mmol/l and 1 hour postprandial blood glucose below 7.8mmol/l.

	Mg/dl	Mmol/l
100g glucose load		
Fasting	95	5.3
1 hour	180	10.0
2 hours	155	8.6
3 hours	140	7.8
75g glucose load		
Fasting	95	5.3
1 hour	180	10.0
2 hours	155	8.6

4.4.6 Two or more of the venous plasma concentrations must be met or exceeded for a positive diagnosis. The test should be done in the morning after an overnight fast of between 8 and 14 hours and after at least 3 days of unrestricted diet ($\geq$ 150g carbohydrate per day) and unlimited physical activity. The subject should remain seated and should not smoke throughout the test.

4.4.7 Insulin Therapy During Pregnancy:

4.4.7.1 A split/ mixed regimen (NPH and regular) of insulin given in the morning and evening is ideal.

4.4.7.2 Insulin per day (based on pre-pregnancy weight) the insulin dose in increased from 0.7U/kg/day in the first trimester to 0.8U/kg/day at week 18, 0.9U/kg/day at weeks 26 and 1.0U/kg/day at week 36 in women who maintained within 15% of ideal body weight.

4.4.7.3 Divide insulin dosing over course of day.

4.4.7.3.1 Morning: 2/3 of insulin.

4.4.7.3.1.1 NPH insulin: 2/3.

4.4.7.3.1.2 Regular insulin: 1/3.

4.4.7.3.2 Evening: 1/3 of insulin.

4.4.7.3.2.1 NPH insulin: 1/2.

4.4.7.3.2.2 Regular insulin: 1/2.

4.4.8 Subsequent specific visits:

4.4.8.1 At 16 weeks

4.4.8.1.1 Offer retinal assessment at 16 – 20 weeks to women with pre-existing diabetes who showed signs of diabetic retinopathy at the first antenatal appointment.

4.4.8.2 20 weeks

4.4.8.2.1 Offer four-chamber view of the fetal heart and outflow tracts plus scans that would be offered at 18 – 20 weeks as part of routine antenatal care.

4.4.8.3 28 weeks

4.4.8.3.1 Offer ultrasound monitoring of fetal growth and amniotic fluid volume.

4.4.8.3.1 Offer retinal assessment to women with pre-existing diabetes who showed no diabetic retinopathy at their first antenatal clinic visit.

4.4.8.4 32 weeks

4.4.8.4.1 Offer ultrasound monitoring of fetal growth and amniotic fluid volume.

4.4.8.4.2 Offer to nulliparous women all investigations that would be offered at 31 weeks as part of routine antenatal care.

4.4.8.5 36 weeks

4.4.8.5.1 Offer ultrasound monitoring of fetal growth and amniotic fluid volume.

4.4.8.5.2 Offer information and advice about:

4.4.8.5.2.1 Timing, mode and management of birth.

4.4.8.5.2.2 Analgesia and anaesthesia.

4.4.8.5.2.3 Changes to hypoglycemic therapy during and after birth.

4.4.8.5.2.4 Management of the newborn after birth.

4.4.8.5.2.5 Initiation of breastfeeding and the effect of breastfeeding on glycemic control.

4.4.8.5.2.6 Contraception and follow up.

4.4.8.6 38-39 weeks

4.4.8.6.1 Offer induction of labor, or caesarean section if indicated and start regular tests of fetal wellbeing for women with diabetes who are awaiting spontaneous labor.

4.4.8.6.2 Offer tests of fetal wellbeing.

4.4.8.7 Women with diabetes should also receive routine care according to the schedule of appointments in antenatal care at 25 weeks (for nulliparous women), 31 weeks and 34 weeks.

4.4.8.8 Hypoglycemic therapy should be considered for women with gestational diabetes if diet and exercise fail to maintain blood glucose targets during a period of 1 – 2 weeks. The normal ranges for blood sugars on diet therapy are:

4.4.8.8.1 Fasting blood sugar of less than 105mg%.

4.4.8.8.2 Blood sugar values two hours after meals of less that 120mg%.

4.4.9 Patient education:

4.4.9.1 Refer the apatient to appropriate skilled dietician, diabetic educator.

4.4.9.2 Diabetic educator need to educate the patient regarding the importance of:

4.4.9.2.1 Strict compliance with treatment and its application on her baby and herself.
4.4.9.2.2 Diet and exercise.
4.4.9.2.3 Self-monitoring blood glucose level.
4.4.9.2.4 Knowing how to draw and inject insulin.
4.4.9.2.5 Taking food after injection of insulin.
4.4.9.2.6 Recognizing signs of hyper/ hypoglycemia and how to manage such events.
4.4.9.2.7 Accepting physician's advice and regular follow up.
4.4.9.2.8 Sharing the family members in the education and awareness of DM to help during emergencies.

4.4.9.3 Women with gestational diabetes should be offered information covering:
4.4.9.3.1 The increased risk of having a newborn that is large for gestational age, which increases the likelihood of birth trauma, induction of labor and caesarean section.
4.4.9.3.2 The possibility of transient morbidity in the newborn during the neonatal period, which may require admission to the neonatal unit.
4.4.9.3.3 The risk of the fetal developing obesity and/or diabetes in later life.

4.4.10 Nutrional Status:
4.4.10.1 Diet should be individualized depending on HT and WT.
4.4.10.2 Diet should be monitored weakly with ketonuria.
4.4.10.3 Calories in the diet are calculated as 30 – 35 calories per kilogram of ideal body weight. Diabetic diet will be served in three meals and three snacks.

4.3 Timing and mode of birth:
4.3.1 Pregnant women with diabetes who have a normally grown fetus should be offere elective birth through induction of labor or by elective caesarean section if indicated, after 38 completed weeks.
4.3.2 Diabetes should not in itself be considered a contraindication to attempting vaginal birth after a previous caesarean section.
4.3.3 Pregnant women with diabetes who have an ultrasound diagnosed macrosomic fetus should be informed of the risk and benefits of vaginal birth, induction of labor and caesarean section.
4.3.4 Offer diabetic patient caesarean delivery if the fetal weight is estimated to be 4500g or more.
4.3.5 Pregnant with well controlled GDM and normal fetal wellbeing to wait for spontaneous labor, not to be induced before 40 weeks but not to go beyond term.

4.4 Documentation:
4.4.1 At each visit the following details must be documented in the patient's record and hospital antenatal medical record where specified:
4.4.1.1 Date of attendance.
4.4.1.2 Gestation in completed weeks.
4.4.1.3 Symphysio-fundal height in centimeters.
4.4.1.4 Blood pressure (measured in the right arm with the woman seated).
4.4.1.5 After 30 weeks gestation, presentation and station.
4.4.1.6 Fetal heart and fetal movements. If the number of fetal movements (after 24 weeks) is reduced, especially if the woman has felt <10 movements in 12 hours, she should be referred for further assessment to a facility which has the capability of CTG monitoring and/ or ultrasound scanning.
4.4.1.7 Laboratory test results.
4.4.1.8 Time of next attendance.
4.4.1.9 Affix a copy of all results in the medical record and following adequate explanation of result with the pregnant woman.

4.4.1.10 Document in the medical record and patient's file any deviation from normal or concerns about the woman's clinical condition and arrange referral to the appropriate service or physician.

4.4.1.11 Refer the woman to physician for review if any abnormalities of blood pressure, growth or routine tests are identified.

5. MATERIALS AND EQUIPMENT:

5.1 CTG

6. RESPONSIBILITIES:

6.1 Obstetrician and Gynecologist
6.2 Intensivist and endocrinologist
6.3 Nurse
6.4 Pharmacist

7. APPENDICES:

N/A

8. REFERENCES:

8.1 NICE Clinical Guidelines 63. Diabetes in Pregnancy: Management of Diabetes and Its Complications from Preconception to the Postnatal Period, 2008

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8.4 American College of Obstetricians and Gynecologists. Clinical Management Guidelines for Obstetrician-Gynecologist: Gestational Diabetes. ACOG Practice Bull 2001; 30:525-538. July, 2012.

8.5 Guidelines for Obstetrics & Gynecology, Ministry of Health, 2013.

Kingdom of Saudi Arabia
Hafar Al Batin Health Cluster
Maternity and Children Hospital

المملكة العربية السعودية
التجمع الصحي بحفر الباطن
مستشفى الولادة والأطفال

INSULIN INFUSION PROTOCOL

The following insulin infusion protocol is intended for use in hyperglycemic adult patients in an ICU setting, but is not specifically tailored for those individuals with diabetic ketoacidosis (DKA) or hyperglycemic hyperosmolar states (HHS). When these diagnoses are being considered, or if BG≥ 500mg/dl, an MD should be consulted for specific orders. Also, please notify an MD if the response to the insulin infusion is unusual or unexpected, or if any situation arises that is not adequately addressed by these guidelines.

INITIATING AN INSULIN INFUSION

1.) INSULIN INFUSION: Mix 1U regular human insulin per 1cc 0.9% NaCl. Administer via infusion pump (in increments of 0.5 U/hr)

2.) PRIMING: Flush 50 cc of infusion through all IV tubing before infusion begins (to saturate the insulin binding sites in all tubing)

3.) TARGET BLOOD GLUCOSE (BG) LEVELS: **100-139 mg/dl**

4.) BOLUS & INITIAL INSULIN INFUSION RATE: Divide initial BG level by 100, then round to nearest 0.5 for bolus AND initial infusion rate.
Examples: 1). Initial BG = 325 mg/dL: 325 + 100= 3.25 round ↑ to 3.5: IV bolus 3.5 U + start infusion @ 3.5 U/hr
2). Initial BG = 174 mg/dL: 174 + 100= 1.74, round ↓to 1.5: IV bolus 1.5 U + start infusion @ 1.5 U/hr

BLOOD GLUCOSE (BG) MONITORING

1.) Check BG hourly until stable (3 consecutive values within target range). In hypotensive patients, capillary blood glucose (i.e., finger sticks) may be inaccurate and obtaining the blood sample from an indwelling vascular catheter is acceptable.
2.) Then check BG q 2 hours; once stable x 12-24 hours. BG checks can then be spaced to q 4 hours IF:
a.) No significant change in clinical condition AND b.) no significant change in nutritional intake.
3.) If any of the following occur, consider the temporary resumption of hourly BG monitoring, until BG is agin stable (2-3 consecutive BG values within target range)
a.) Any change in insulin infusion rate (i.e.,BG out of target range)
b.) Significant changes in clinical condition
c.) Initiation or cessation of pressor or steroid therapy
d.) Initiation or cessation of renal replacement therapy (hemodialysis, CVVH, ect)
e.) Initiation, cessation, or rate change of nutritional support (TPN, PPN, tube feedings, ect)

Changing the Insulin Infusion Rate

If BG< 50 mg/dl:
D/C INSULIN INFUSION Give 1 amp (25g)D50 IV: recheck BG q 15 minutes
→ when BG ≥ 100mg/dl, wait 1 hour, then restart insulin infusion at 50% of original rate.

If BG 50-74 mg/dl:
D/C INSULIN INFUSION **if symptomatic (or unable to assess), give 1 amp (25g) D50 IV; recheck BG q 15 minutes.**
if asymptomatic give 1/2amp (12.5g) D50 IV or 8ounces juice; recheck BG q 15-30 minutes
→ when BG ≥ 100mg/dl, wait 1 hour, then restart infusion at 75% of original rate.

If BG≥75 mg/dl:
STEP 1: Determine the CURRENT BG LEVEL – identifies a COLUMN in the table:

BG 75-99 mg/dL	BG 100-139 mg/dL	BG 140-199 mg/dL	BG≥ 200mg/dL

STEP 2: Determine the RATE OF CHANGE from the prior BG level – identifies a CELL in the table – Then move right for **INSTRUCTIONS.**
(Note: if the last BG was measured 2-4hrs before the current BG, calculate the hourly rate of change. Example/: if the BG at 2PM was 150 mg/dL and the BG at 4PM is now 120 mg/dL the total change over 2 hours id -30 mg/dL; however the hourly change is 30 mg/dL + 2 hours = -15mg/dL/hr)

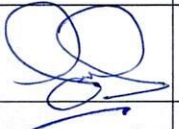
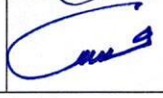
BG 75-99 mg/dL	BG 100-139 mg/dL	BG 140-199 mg/dL	BG≥ mg/dL	INSTRUCTIONS*
		BG ↑ by > 50mg/dL	BG↑	↑ INFUSION BY "2Δ"
	BG ↑ by > 25 mg/dl/hr	BG ↑ by 1-50 mg/dl/hr Or BG UNCHANGED	BG UNCHANGED OR BG↓ by 1-25 mg/dL/hr	↑ INFUSION BY "Δ"
BG↑	BG↓ by 1-25 mg/dL/hr, BG UNCHANGED, OR BG↓ by 1-25 mg/dL/hr	BG↓ by 1-50 mg/dL/hr	BG↓ by 1-50 mg/dL/hr	NO INFUSION CHANGE
BG UNCHANGED OR BG↓ by 1-25 mg/dL/hr	BG↓ by 26-50 mg/dL/hr	BG↓ by 51-75 mg/dL/hr	BG↓ by 76-100 mg/dL/hr	↓ INFUSION BY "Δ"
BG ↓ by > 25 mg/dl/hr see below	BG ↓ by > 50 mg/dl/hr	BG ↓ by > 75 mg/dl/hr	BG ↓ by > 100 mg/dl/hr	HOLD X 30 min, then ↓ INFUSION by "2Δ"

*** D/C INSULIN INFUSION;**
✓BG q 30mns when BG≥ 100 Mg/dL, restart infusion@75% of Most recent rate.

*CHANGE IN INFUSION RATE("Δ") ARE DETERMINED BY THE CURRENT RATE:

CURRENT RATE (U/hr)	Δ = Rate Chnge (U/hr)	2Δ =2x Rate Change (U/hr)
< 3.0	0.5	1
3.0-6.0	1	2
6.5-9.5	1.5	3
10-14.5	2	4
15-19.5	3	6
20-24.5	4	8
≥25	≥5	10 (consult MD)

9. APPROVALS:

	Name	Title	Signature	Date
Prepared by:	Ms. Hema Robi	Nurse Specialist		January 08, 2025
Prepared by:	Dr. Abdalla Mohamed Albasha	Obstetrician and Gynecologist		January 08, 2025
Reviewed by:	Dr. Mohannad Yaghmour	Head of the Department		January 09, 2025
Reviewed by:	Dr. Mogahid Mahmoud Ali	Maternal Intensive Care Unit Quality Coordinator		January 12, 2025
Reviewed by:	Mr. Mutlaq Khelaif Aldhafeeri	Pharmacy Director		January 12, 2025
Reviewed by:	Mr. Sabah Turayhib Al - Harbi	Director of Nursing		January 13, 2025
Reviewed by:	Dr. Thamer Naguib	Medical Director		January 14, 2025
Reviewed by:	Mr. Abdulellah Ayed Al - Mutairi	QM&PS Director		January 15, 2025
Approved by:	Mr. Fahad Hazam Al - Shammari	Hospital Director		January 22, 2025