

Obstetrics & Gynecology TEAM



Diabetes Mellitus (DM) in pregnancy

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▶ very important ◆ mentioned by doctor ◆ team notes ◆ not important

Diabetes Mellitus (DM)

- What's diabetes ? Its metabolic disease characterized by
- The main effect of diabetes is the absence of insulin
- Pregnant ladies are young generation , they usually present with no diabetes OR if they are in forties they will present with late onset or gestational diabetes
- Minority of them present with type 1 DM (juvenile-onset)
- Its important to differentiate between these types : DM 1(juvenile-onset) , Gestational and DM 2 (late onset)
- To be pregnant in young age is better than in forties , so don't delay the pregnancy because after forties they have (DM ,HTN , chromosomal anomaly e.g. down syndrome)

Types:

Type1 D.M:

- formerly known as juvenile-onset or IDDM
- Absolute insulin deficiency
- increased risk of chronic micro vascular disease at an early age.

- *DM 1 happened due insulin deficiency so blood sugar will be high and these patients may suffer from micro vascular diseases (cardiac , renal ,retinopathy)
- *so if a women came to your clinic with DM1 , then she is at high risk of developing complication during her pregnancy for her and her baby.
- you must to differentiate between DM1 and gestational in the exam , type 1 DM you have risk of chronic vascular disease at early stage**

Type2 D.M:

- formerly known adult onset or NIDDM
- Tissue resistance to insulin
- lower incidence of micro vascular disease during reproductive age range .

- NIDDM : non insulin dependent DM
- e.g. lady in forties has DM will be on oral hypoglycemic agents (metformin) , once she is pregnant she will shift to insulin
- when a pregnant women (24 weeks) come to your clinic un-booked and you find her blood glucose is high , what are you going to say gestational ,late onset DM or DM1 ????? Its gestational DM because its discovered in pregnancy regardless if she have DM before her pregnancy or not .

Gestational DM: (GDM):

- Carbohydrate intolerance first occurs during pregnancy or first detected during pregnancy
- 4-5% of pregnancies are complicated by DM
- 90% of DM in pregnancy , the cause GDM
- GDM will increase seven fold risk of type 2 DM .

- DM is very common here in Ksa
- 40% of general population have DM
- More than 45% of pregnant ladies they will have DM
- Usually the cause of diabetes in pregnancy is due to gestational (90%) and if the lady have DM in pregnancy she is at high risk to be diabetic later in life
- Almost half of these ladies develop diabetes later on, even their babies

Pathogenesis of GDM:

-Increased insulin resistance in second trimester and progresses as pregnancy advances due hormones (estrogen,progestrone ,cortisol, prolactin and human placental lactogen)

- placental degradation of insulin .

- A Lady in her 1st trimester(12-13 weeks) came to your clinic with high blood sugar and you start giving her insulin , are you going to keep her in the same dose in her 2nd and 3rd trimesters ??? No you must to increase the dose of insulin because of insulin resistance
- Hormones of pregnancy (progesterone , estrogen , cortisol , HPL ..etc) resist the insulin , so as pregnancy advances you have to increase the dose
- In normal lady (not diabetic) there is automatic increase of insulin level to resist these hormones

Historical classification of White:

it is still used by some experts :

A- Asymptomatic but abnormal GTT

B- onset \geq 20 y duration < 10 y. no vascular complications

C- onset 10-19 y duration 10-19 y .no vascular complications

D- onset < 10 y duration \geq 20 y vascular disease ,benign retinopathy, and leg artery calcification.

- White classification = the relationship between the duration of time of having DM and its complications
- You don't need to know them in details only to know: if you have DM earlier you going to have more complication (retinopathy ...)
- In other word : as years increase as complications increase

Gestational DM risk group:

-Obese

H/O GDM

family /h D.M

-age > 25 Y

-Previous macrosomic baby

- PCO

- twin pregnancy

-Racial (Asians , Hispanic , African – Caribbean)

1 -UK: (nice)

Whom: selective if +ve risk factors without regard to age. 10%

-missed

-How: at 24-28 weeks , 2 hours , 75 gm OGTT

-It is a Screening and diagnostic ,

-Fasting (5.1to6.90) , 2h(8.5to11)

- One reading is required to be abnormal.

2-ACOG:

Universal, more practical , sensitive , no screening if <25 y if no risk factor

2 steps approach :

1st step :

50 gm oral glucose challenge → check serum glucose at 1 hour(no fasting required)

≥130mg/dl(7.2) → discover 90% of D.M

Do 3 hour.GTT glucose tolerance test or 75 gm.

If abnormal fasting or any two abnormal → diagnostic DM

Follow up GTT can be done 32-34 w (to identify late onset DM)

•In KSA we screen all pregnant ladies because we are high risk population
•In US and UK they screen only high risk group :obese , unexplained intrauterine death , who have big baby before , shoulder dystocia , PCO , polyhydramnios (when mother blood glucose increase >> increase fetus blood glucose >>> increase fetus urination >> polyhydramnios .

•If you screen a lady in her 1st trimester and there wasn't DM this test not exclude DM ,you have to repeat at 24-28 weeks
•Why in 24-28 weeks ?? Because insulin resistance is increase

Uk vip

US and KSA vip

its Screening and diagnostic at the same time
75 gm OGTT

They do screening first if the level is high they do diagnostic (challenge test).

1- give 50 mg of oral glucose for all pregnant ladies either they are fasting or not >>> **screening**

2-after one hour if the result is higher than (7.2) do diagnostic test by giving 75 or 100 gm or 3hour GTT >>> **diagnostic**

*If high risk patient and you didn't discover DM at her 24 weeks you need to repeat the test at 34 week (because baby is growing at this time)
*Don't depend on one test

USA (ADA)

ADA

75

ADA (AMERICAN DIABETES ASSOCIATION)

f	75 gm	100 gm
	5.3	5.3
	10	10
	8.6	8.6
		7.8

Two abnormal readings are required to be abnormal

Pre pregnancy counseling (for types 1,2):

1- high dose folic acid 5 mg (400 Microgram) up to 12/52.

2-evaluate renal function (24 h urine collection for protein ,creatinine clearance)

3-full history and examination , advise for diet , body weight, and exercise.

4-ophthamology referral

5-Echo (> 30 y , smoker, hypertensive)

6- cardiologist referral if suspected cardiac illness

7-monitor medications : ACEI (cause oligo hydraminos , renal failure, skull defects

8-Asprin if risk of preeclampsia .

9-HBA1C<6.1 if decreased less congenital anomalies (HBA1c in preg not sensitive)

HBA1C \geq 9.5 % carries >20% fetal major anomalies (advice women HBA1C >10% to avoid pregnancy

10-stop OHA and start insulin if required (a part from metformin).

- Folic acid supplements to prevent neural tube defect
- The rule of pre-pregnancy counseling: any patient with medical disorder should be controlled before pregnancy
- Don't forget to do rubella test
- Preeclampsia =HTN +proteins in urine
- What's the best test to determine the control of diabetes ?
HB A1c
- What's the most common type of infection during pregnancy ?
1- candidiasis
2-UTI

- Why we are worried of diabetic women to get pregnant ?
Because of the complication that's may effect her and her baby :
Mother : increase the complication of retinopathy and nephropathy ...etc
Fetus : abortion, congenital anomalies (sacral agenesis, cardiac anomalies).

-FBS is low in pregnancy due increased renal clearance . in non diabetic increase in insulin to 50% to overcome the resistance.

-type 1 DM : insulin requirement 3 times the normal dose

-**Risks to the mother** : hypoglycemia random blood sugar <3.9 mmol/l , nephropathy 5-10% of DM , chronic hyper tension , pre eclampsia , preterm , rapid progression of microvascular and atherosclerotic disease (IHD,HF,Cerebral ischemia)

DKA (Diabetic ketoacidosis)

Life threatening , can occur at lower blood glucose <200

Fetal mortality 10-30%

Maternal mortality is rare due to proper Rx.

Tx: rehydration.insulin.k and antibiotics

You have to differentiate between the complication in DM1 and the complication in gestations diabetes ?

- *Gestational diabetes appears after 20-24 weeks of pregnancy so the first trimester wont be effected by diabetes
= no congenital anomalies in
- *Congenital anomalies happened in non controlled type1 DM

DKA pt come with :

- 1-abdominal pain
- 2-vomiting
- 3- acetone smell
- 4-infections

Rx :

- 1-rehydration
- 2-oxygnation
- 3-pottasuum and bicarbonate

Fetal complications:

1-Miscarriage when Hba1c due congenital Anomaly for DM 1

2-congenital malformation

A- 30-50% of pn mortality (Hyper glycaemia is principle factor hypoglycemia, and hyperketonemia is suspected)

B- 6-10% of diabetic mothers have major congenital anomaly

- **Cardiac** (transposition of great vessels VSD , ASD, hypoplastic left ventricle , aortic anomalies , complex cardiac anomaly)

- **CNS** anomalies increase 10 fold .(NTD)

- **GIT** malformation

- **genito urinary** anomalies (poly cystic kidneys)

- **sacral agenesis** (caudal regression) >>Rare: 400 times more frequent in DM

C-Macrosomia:

Causes of Macrosomia :

Glucose will pass to fetus by facilitated diffusion this will result in increased insulin production by fetus (act as growth f) growth of cells ↑

-wt 4-4.5 90th percentile

-25- 42% of diabetic

-Shoulder dystocia 3 ↑old

D-IUGR

E-IUFD 32-36 W in uncontrolled D.M.

•In DM1 mothers they will have IUGR babies because of vascular involvements

•Usually diabetic mothers have macrocosmic babies

•What's the most common type of anomalies ???/ cardiac anomaly

•IUFD: intrauterine fetal death

•More visit of diabetic pregnant is inquire at this duration

General Complications of G.DM:

- Preterm labor , B.P , c/s rate .
- recurrent G.dm , type 2 DM
- Macrosomia , shoulder dystocia (fracture +palsy)
- Neonatal hypoglycemia , birubin Level , later on obesity ,impaired GTT , intellectual

Neonatal complications in infants of diabetic mothers:

- ↓ca ↓bloodsugar . Neonatal death

- ↓mg

-33% polycythemia : HCT > 65%

chronic intrauterine hypoxia : increases erythropoietin
-production

-hyperbilirubinemia : neonatal jaundice (delay in fetal liver
maturation in poor glycemic control)

-RDS: fetal hyperinsulinemia : suppress production of
surfactant.

-fetal cardiac septal hypertrophy and hypertrophic cardiomyopathy.

•RDS : respiratory distress syndrome
In diabetic mother there is delay
production of the fetus surfactant so
you give them dexamethasone
Once dexamethasone given you must
increase the insulin dose

Management:

-Multidisciplinary (physician, midwife,obstr.nurse, nutrition consultant)

-Referral urgently

-Diet: CHO 40% Of total calories , vegetables , fruits of high fibers

1800 kcal/day → 2400 kcal /d

-Exercises : walking, yoga , swimming, upper arm ex(30 min /day)

-glucose monitoring “glucometer” at home and to be reviewed every 1-2 weeks

-Fasting . 1 h or 2 h after each meal (4times)

Target:

The Target is 5-7

UK fasting: 3.5-5.9

1h.p.p <7.8

ACOG: F → 5.3

1h < 7.2

2 h <6.7

insulin:

4 injections: 3 fast acting insulin before meals

1 long acting at bed time

Fast acting :

-standard soluble insulin, Humulin S (act rapid)

-or fasting acting insulin analogue (novorapid,humalog)better onset 15 min ,peak 2-4 h,less hypoglycemia

NPH is insulin of choice (intermediate acting)

Neutral protamin Hagedorn , peak 6 h , last 12 h

2- 2 injections (mixed long +short) → ↑ neonatal complications

Calculation and dose of initial insulin management :

Don't more 60 u/day

0.7 u/kg (6-18 weeks)

0.8 u/kg (18-26)

0.9-1.1 (>26)

½ dose am (2/3 NPH , 1/3 novolog or humalog)

½ dose pm (1/2 NPH, ½ novolog)

e.g. 60

30 (20 NPH , 10 N)

30 (15, 15)

If steroids used (insulin)

Ante natal follow up :

1)1st trimester : control blood sugar, retinal, renal check up

2) 7-8 u/s for viability

3) 16 weeks : retinal Ex if abnormal 1st visit

4)20 W : U/S for heart and other structures

5)28 W : u/s for growth and A.F and retinal ex . If normal in 1st trimester

6) 32 U/S for growth

7) 36 u/s for growth

Discuss with pt mode of delivery and timing

8) 38 IOL Orc/s if wt > 4.5 kg

Maintain blood sugar 4-7 mmol/L during labor

- The most important time to do US ??? in 20-22 weeks of pregnancy < because of cardiac anomalies
- At 32 weeks: do US and biophysical profile:

Us : looking for fetus growth (abdominal circumferences)

Biophysical **vip** :1-fetal movement

2- fetal tone

3- fetal breathing

4- amniotic fluid

5- CTG

if the baby is big or abnormal biophysical profile then terminate the pregnancy

Post delivery:

½ dose insulin

Modify life style , breast feeding , wt reduction , diet

-GDM : risk of DM 20-50% Within 10 y

GTT 6/52 POST Partum

•During delivery blood glucose level rises because of stress