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Gestational diabetes mellitus

Introduction:

Diabetes is a major public health problem around the world. Characterized by a number of cases in continuous increase in the last decades. GDM is detected through the screening of pregnant women for clinical risk factors and, among at-risk women, testing for abnormal glucose tolerance that is usually, but not invariably, mild and asymptomatic. GDM appears to result from the same broad spectrum of physiological and genetic abnormalities that characterize diabetes outside of pregnancy. Indeed, women with GDM are at high risk for having or developing diabetes when they are not pregnant. Thus, GDM provides a unique opportunity to study the early pathogenesis of diabetes and to develop interventions to prevent the disease. Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. This definition will apply irrespective of the form of treatment or whether the diabetes persists after the pregnancy. It is the most common medical complication and metabolic disorder of pregnancy, other defined as glucose intolerance of various degrees that is first detected during pregnancy.

Historical perspective:

As early as in the 1940s, it was first time recognized that women who developed diabetes years after pregnancy had experienced abnormally high fetal and neonatal mortality. By in next 10 years in 1950s the term “gestational diabetes” was applied to what was describe to be a transient condition that affected fetal outcomes adversely, then abated after delivery. In the 1960s, John B. O’Sullivan A Pioneer in the Study of Gestational Diabetes found that the degree of glucose intolerance during pregnancy was related to the risk of developing diabetes after pregnancy.

He made criteria for the interpretation of oral glucose tolerance tests (OGTTs) during pregnancy that were fundamentally statistical, establishing . In the 1980s those cut-off points were adapted to methods for measuring glucose and apprecognition during pregnancy .

Pathophysiology of GDM:

Pregnancy is a diabetogenic state characterised by insulin increase and insulin resistance. This progressive change in the maternal metabolism is due to the body's effort to provide adequate nutrition for the growing baby. In the early stages of pregnancy maternal hormones promote the release of insulin coupled with increased peripheral utilisation with the end result of a lower maternal blood sugar . As pregnancy progresses, the levels of a host of hormones such as cortisol and oestrogen increase and this leads to insulin resistance. The peak effect of these hormones is seen in the 26th to the 33rd week of gestation. Cortisol for example has a very strong diabetogenic effect . This peak hormonal effect forms the basis for screening in the 24th to 28th weeks of gestation.

And also suggested that **Gestational diabetes** is a result of increased insulin resistance secondary to *elevated* levels of **human placental lactogen** during the third trimester of pregnancy , { *hPL (a type of placental somatomammotropin) production ceases after delivery resulting in resolution of GDM* } , This Will Results in **pancreatic B-cell hyperplasia, increased insulin resistance**

Clinical features :

1 -Maternal symptom

Most patients with GDM may not have any symptoms Of GDM like Features polyuria and

And even lethargy more associated with diabetes may be related to the pregnancy not to GMD .

Maternal morbidity may be in the form of increased risk of preeclampsia, polyhydramnios and increased incidence of Caesarean Section.

some of them May present with edema and there is signs called warning signs {polyhydramnios or large-for-gestational age infants} When symptoms do occur, they can include difficulty breathing, premature contractions

And some Women with GDM are at I ncreased **risk of developing diabetes mellitus in later life.**

Risk Factors:

Screening for GDM should be performed between the 24th and 28th weeks of gestation Patients may be categorised into risk category based on the features

Risk categories for Gestational Diabetes Mellitus (GDM)

High Risk

(One or more of the following) marked obesity diabetes in a first-degree relative history of glucose intolerance previous infant with macrosomia current glycosuria

The above category of patients should be subjected to screening as soon as possible after the initial visit and if negative repeat at 24–28 weeks

Low risk patients

Young age < 25 years old

Low risk race

Normal weight gain

No history of macrosomia

Average risk patients

Do not fit into either of the above categories and should have routine screening at 24–28 weeks of gestation

Method of Screening for GDM

Second trimester (at 24–28 weeks)

- Recommended in all pregnancies
- Early screening (prior to 24 weeks) is recommended in women with risk factors for gestational diabetes

high-risk patients

a fasting plasma glucose level of more than 7.0 mmol/l or a random glucose level of 11.1 mmol/l meets the American Diabetes Association (ADA) criteria for the diagnosis of **diabetes mellitus**

. The test should be repeated and if still within the criteria stated above, the diagnosis of diabetes is confirmed and there is no need to perform any further screening tests.

In patients who do not meet the above criteria

the screening test should consist of a 50 g oral glucose load (Glucose challenge test or GCT) followed by a plasma sugar level estimated 1 hour later. A level of more than 7.8 mmol/l indicates the need for a full diagnostic 100 g 3 hour oral glucose tolerance test (OGTT) \ or further evaluation with the 75 g OGTT. The 7.8 mmol/l cut off will detect approximately 80% of women with GDM

Should one choose to use the 50g GCT, the test should be administered without regard to time of day or of last meal

although this test is more sensitive when patients are fasted prior to the test.

In clinical practice, most patients who are at high risk of GDM are subjected to the 75g Oral Glucose Tolerance Test (OGTT) as this will clinch the diagnosis and save the patient from undergoing two procedures.

The diagnosis of GDM with a 100-g oral glucose load

Time of Measurement	mg/dl	mmol/l
After overnight fast	95	5.3
Post glucose ingestion		
60 minutes	180	10.0
120 minutes	155	8.6
180 minutes	140	7.8

Management:

can be divided into 4 main aspects, which include:

1 Monitoring

A Maternal

-Maternal metabolic

encouraged and daily selfmonitoring of blood glucose (SMBG)

intermittent glucose checks during the follow up visit

Glucometers easy to use

Post meal and premeal recommdent to use

plasma sugar level of not more than 5.3 mmol/l while
postprandial levels at 1 hour and 2 hours should be below 7.8
and 6.7 mmol/l

Foetal Monitoring

Reduce risk hyperglycaemia for mothers because

increased risk of intrauterine death in mothers with severe hyperglycaemia. The presence of fasting hyperglycaemia of more than 5.8 mmol/l may be associated with an increase risk of intrauterine foetal death during the last 4–8 weeks of pregnancy .

Maternal monitoring of foetal movement, cardiotocography and ultrasonography are recommended methods of foetal monitoring. All carrying mother should perform foetal movement counting after 28 weeks of gestation to know activty of Foetal .

2 Non-pharmacological intervention

Doctors try to educate and explain the condition and currency situation and it is an important part of the management of diabetes.

Women should be counselled regularly. They should also be aware of the implications of poor glycaemic control to the foetus.

Nutritional counselling is of the utmost importance in patients with GDM. The aim is to provide adequate calories for maternal needs, foetal growth and adequate weight gain while avoiding hyperglycaemia and ketosis

Exercise in patients with GDM it is helpful of carrying and help to reduce stress without overload it, excessive Exercise lead to trigger premature labour

studies concludes that a pregnant woman can exercise up to 3 times per week for up to approximately 40 minutes with no harm to either herself or the foetus.

3 Pharmacological Intervention

Insulin if glycaemic control is insufficient to maintain euglycaemia, Human insulin should be the insulin of choice, Insulin treatment in GDM is NPH in the morning and :lispro after dinner and

Oral Hypoglycaemic agents (OHAs)

Metformin and glyburide in patients who are unwilling or unable to use insulin, The goal of obstetric management is to detect foetal compromise and at the same time deciding on the optimal time and route for delivery

4. Obstetric Management

The aim of obstetric management is to detect foetal compromise and at the same time deciding on the optimal time and route for best way delivery and the factors must be

considering in account Factors as : {size of the baby as the risk of birth trauma and shoulder dystocia increases when the birth weight of the infant exceeds 4000 g. “}, This will help the to make corect decide on whether to proceed with vaginal delivery or Caesarean Section.

Complications:

- **Maternal**
 - Gestational hypertension
 - Preeclampsia, eclampsia, and HELLP syndrome
 - Urinary tract infection
- **Fetal**
 - Diabetic fetopathy
- **Macrosomia**
- **Polycythemia**
- **Neonatal hypoglycemia**
- Electrolyte imbalances (hypocalcemia, hypomagnesemia)
- **Respiratory distress**
- Hypertrophic cardiomyopathy
- .Shoulder dystocia

Prognosis:

- In most cases, gestational diabetes **resolves after pregnancy**.
- Increased risk of gestational diabetes recurring in subsequent pregnancies (~ 50%)
- Increased risk of developing T2DM (up to 50% over 10 years)
→ screen for DM 6–12 weeks postpartum (75 g 2-hour GTT); repeat every 3 years

Conclusion:

GDM is the most common medical and metabolic complication seen in pregnancy. Women who are at high risk of developing GDM should be appropriately screened to reduce maternal and foetal morbidity. The method of screening and diagnosis of GDM has been outlined.

The management of GDM should be based on a team approach involving the diabetologist, obstetrician, dietician and paediatrician with the invaluable support of a diabetic nurse educator. Patients with GDM are at risk of developing type 2 diabetes in the future and should be monitored regularly. Similarly the offspring of diabetic pregnancies are at risk of developing obesity, IGT and diabetes and should also be periodically followed up.

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