

A Comprehensive Review Of Gestational Diabetes Mellitus : causes, risks and management.

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ABSTRACT

Gestational diabetes mellitus {GDM}, which is defined as a state of hyperglycemia that is first recognised during pregnancy, is currently the most common medical complication in pregnancy. This review article aims to provide a comprehensive understanding of the causes, risks and management strategies associated with GDM. This article begins with an introduction to GDM, explaining its definition and prevalence. It then delves into the causes and risk factors highlighting the role of genetics, hormonal changes and lifestyle factors in the development of GDM. Diagnosis and screening methods for GDM are discussed emphasizing the importance of early detection and proper management. This article explores the potential complications and risks associated with GDM, both for the mother and foetus including increased risk of preeclampsia, cesarean delivery and neonatal hypoglycemia. Management and treatment strategies are a crucial aspect of GDM care. This article explores dietary recommendations emphasizing the importance of a balanced diet and monitoring carbohydrate intake. It also discusses the role of regular exercises and lifestyle modifications in managing GDM. In conclusion, this review article provides a comprehensive overview of GDM covering its causes, risks and management strategies by understanding the complexities of GDM, health care professionals can provide effective care and support to pregnant women with this condition, ultimately leading to maternal and foetal outcomes.

KEYWORDS

Gestational diabetes- mellitus, Hyperglycemia, insulin resistance, behavioral treatment, pregnancy

ABBREVIATIONS

DM-Diabetes mellitus, GDM-Gestational diabetes mellitus, T1DM-Type 1 diabetes mellitus, T2DM-Type 2 diabetes mellitus, IADPSG-International Association of diabetes and pregnancy study

groups, OGTT-Oral glucose tolerance test, PCOS-Polycystic ovary syndrome, LGA-Large gestational age.

I. INTRODUCTION

Gestational diabetes mellitus (GDM) is a state of hyperglycemia having fasting plasma glucose >5.1 mmol/L, 1h >10 mmol/L, 2 h >8 mmol/L during a 75g oral glucose tolerance test according to IADPSG/WHO criteria that is first diagnosed during pregnancy. GDM is one of the most common medical complications of pregnancy and its inadequate treatment can lead to serious adverse health effects for both mother and child. Mothers with GDM are at risk of developing gestational hypertension, pre-eclampsia and termination of pregnancy via caesarean section. GDM affects approximately 15% of pregnancies worldwide, amounting to approximately 18 million births annually. GDM represents glucose levels in the high end of the population distribution during pregnancy. The association of GDM with immediate pregnancy complications including excess fetal growth and adiposity with subsequent risk of birth trauma and with hypertensive disorders of pregnancy is well recognized. GDM increases the risk of complications, including cardiovascular disease, obesity and impaired carbohydrate metabolism, leading to the development of type 2 diabetes (T2DM). In both mother and infant, Gestational diabetes occurs when your body can't produce enough insulin during your pregnancy. GDM also leads to a significant economic burden and deserves greater attention and awareness.

II. RESULTS AND DISCUSSION

EPIDEMIOLOGY:

The growing problem of over-weight and obesity around the world significantly contributes to the steady increase in incidence of

diabetes including. GDM in the population of women of reproductive age. According to 2019 report by the International Diabetes Federation (IDF) more than approximately, 20.4 million women presented with disorders of carbohydrate metabolism of which approximately 80% was

GDM, about one in six births was affected by gestational diabetes.

GDM affects approximately 14% (95% confidence interval: 13.97-14.04%) of pregnancies world-wide representing approximately 20 million births annually.

Occurance of gestational diabetes mellitus	27.6% (26.9-28.4%)
Middle east and north Africa (MENA)	20.8% (20.2-21.4%)
South east Asia (SEA)	
Western Pacific (WP)	14.7% (14.7- 14.8%)
Africa (AFR)	14.2% (14-14.4%)
South America and Central America (SACA)	10.4% (10.1-10.7%)
Europe (EUR)	7.8% (7.2-8.4%)
North American and Caribbean (NAC)	7.1% (7-7.2%)

ETIOLOGY OF GESTATIONAL DIABETES

Gestational diabetes etiology is apparently related to:

- The pancreatic beta-cell dysfunction or the delayed response of the beta cells to the glycemic levels.
- The marked insulin resistance secondary to placental hormonal release.

regulate your blood sugar levels like it's supposed to, which can lead to gestational diabetes. Genes and having overweight (a BMI greater than 25) may also play a role.

Excess weight before pregnancy often plays a role. During pregnancy hormone levels change, making it harder for the body to process blood sugar efficiently.

SYMPTOMS OF GESTATIONAL DIABETES

- Nausea.
- Excessive vomiting.
- Extreme thirst.
- Fatigue.
- Sugar in the urine.
- Frequent, large volume urination.
- Numerous bladder or vaginal infections.
- Skin infections.
- Blurred vision.

RISK FACTORS FOR GESTATIONAL DIABETES INCLUDE:

- Being overweight or obese.
- Not being physically active.
- Having pre-diabetes.
- Having had gestational diabetes during a previous pregnancy.
- Having previously delivered a baby weighing more than 9 pounds (4.1 kilograms).
- Being of a certain race or ethnicity, such as Black, Hispanic, American Indian, and Asian American.

CAUSES FOR GESTATIONAL DIABETES MELLITUS

➤ Gestational diabetes comes from hormonal changes and the way our bodies and the way our bodies convert food into energy.

A hormone called insulin breaks down the glucose (sugar) from food and delivers it to our cells. Insulin keeps the level of glucose in our blood at a healthy level. During pregnancy, hormones can interfere with the way insulin works. It may not

COMPLICATIONS

MATERNAL COMPLICATIONS

- Short-term complications: Hypertensive disorders in pregnancy
 - Failure to progress in labour.
 - Cesarean section.
 - Instrumental delivery.
 - Pre-term delivery

- Long- term complications : Cardiovascular diseases.
 - Pre- eclampsia.
 - Infections.
 - Retinopathy.
 - Nephropathy.
 - Coronary artery diseases.
 - Type II diabetes mellitus.

FOETAL COMPLICATIONS

- Short-term complications: Macrosomia
 - Prenatal death
 - Shoulder dystocia and related birth injuries.
 - Neonatal hypoglycemia
 - Hyperbilirubinemia
- Long-term complications: Type II diabetes mellitus.
 - Obesity
 - Respiratory distress.
 - Congenital

DIAGNOSIS OR SCREENING FOR GDM

Screening for GDM should be performed between the 24th and 28th weeks of gestation that are of average to high risk of developing diabetes. The aim of the screening procedure is to identify those women who are at sufficient risk to warrant the formal oral glucose tolerance test (OGTT). This timing 24 to 28 weeks gestation has generally been preferred for routine GDM diagnosis as most of the physiologic insulin-resistance of pregnancy is well established. However, with globally increasing levels of obesity, raising maternal age and other environmental risk factors this assumption may no longer be valid as evidenced by high GDM detection rates in early pregnancies witnessed in recent studies from different parts of the world. The exact process and criteria for OGTT diagnosis of GDM vary widely across the world. The international association of diabetes in pregnancy study groups (IADPSG), world health organization (WHO) and FIGO have all endorsed one step OGTT testing using thresholds greater than 5.1 mmol/L, fasting 10.0 mmol/L at 1 hr and 8.5 mmol/L at 2 hrs following a 75gms glucose load for diagnosis of GDM. OGTT glucose values are independently associated with adverse pregnancy outcomes even after correction for multiple additional maternal characteristics including BMI. GDM is almost uniformly asymptomatic so, a testing strategy based on symptom is clearly untenable.

Glycosylated haemoglobin (HbA1c) is an obvious alternative and is widely used for diagnosis of diabetes outside pregnancy. However, it performs poorly both in prediction of OGTT diagnosed GDM and in prediction of pregnancy outcomes and appears to be of limited value except in early pregnancy detection of undiagnosed hyperglycemia.

PREVENTION

A woman looking to conceive should make lifestyle choices that can help her reach and maintain a healthy weight ahead of getting pregnant.

- Measuring out smaller portion sizes.
- Avoiding packaged food and junk food.
- Replacing candy with fruit.
- Eating more lean protein such as fish and tofu to stay fuller for longer.
- Increasing fibre intake by eating plenty of vegetables and whole grains.
- Replacing juices, dairy laden coffee, drinks and sodas with herbal tea, black coffee or sparkling water with lemon.

EXERCISE

Exercise is a vital part of maintaining a healthy weight both before and during pregnancy. Exercise can help to prevent gestational diabetes

- Walking.
- Cycling.
- Yoga.
- Doing active leisure activities such as hiking, gardening or playing with children outdoor games.
- Doing low impact exercise.

MANAGEMENT

Regarding women with GDM due to lack of randomized clinical trials it is extremely difficult to propose an ambiguous and uniform model of management in order to achieve obstetric results similar to the population of healthy women. The treatment of GDM is based on consensus and expert opinion. Analyses of coherent data base reviews showed the lack of an ambiguous data on the co-relation between the intensity of glycemic control and obstetric outcomes.

The management of gestational diabetes focuses on maintaining blood sugar levels within a target range to ensure the health of both the mother and the baby. It typically involves a combination of

life style modifications, blood sugar monitoring, in some cases, medication.

Lifestyle modification plays a crucial role in managing gestational diabetes. This includes following a healthy balanced diet that is rich in fruits, vegetables, whole grains and lean protein while limiting the intake of sugary and processed foods. Regular physical activity such as walking or swimming, is also encouraged as it helps to regulate blood sugar levels and maintains a healthy weight.

Blood sugar monitoring is an essential aspect of managing gestational diabetes it involves regularly checking blood sugar levels throughout the day using glucose meter this helps women with gestational diabetes to understand how their blood sugar levels respond to different foods and activities. Based on these readings, health care providers can provide personalized recommendations and adjustments to the treatment plan.

In some cases, medication may be necessary to manage gestational diabetes. This could include injections or oral medications to help regulate blood sugar levels. Health care providers will determine the appropriate medication based on the individual needs and closely monitor the response to ensure optimal control.

The first ADA first line of treatment for GDM is insulin. The therapy with insulin has been considered the standard therapy for gestational diabetes management when adequate glucose levels are unachievable with diet and exercise.

Oral medications for GDM are Metformin.

Glycomet.

Oral hypoglycemic medications are also used to treat gestational diabetes mellitus has not been recommended because of concerns about potential teratogenicity and transport of glucose across the placenta.

A recent RCT comparing the use of glyburide and insulin in women with gestational diabetes mellitus demonstrated that glyburide therapy resulted in comparable maternal outcomes and neonatal outcomes. Glyburide therapy was not started before 11 weeks of gestation and was not detected in any of the neonatal cord blood samples. The goal of INTRAPARTUM Management is to maintain normoglycemia in an effort to prevent neonatal hypoglycemia.

Women with Gestational diabetes mellitus rarely require insulin in the postpartum period. A insulin

resistance quickly resolves, so does the need for insulin.

III. CONCLUSIONS

GDM is one of the most common complications of pregnancy and confers lifelong risks to both women and their children. Observational data demonstrated a linear association between maternal glycemic parameters and risks for adverse pregnancy and offspring outcomes. SARS-CoV-2 Infection will undoubtedly effect the risk of GDM. Many doubts regarding the diagnostic criteria and treatment of GDM are under still discussion. Treatment with insulin is effective, but costs and patient experiences limit its using clinical practice. The use of metformin as first line agent of GDM remains controversial due to its transplacental passage and limited long term follow up data. Further clinical trails are necessary to us other oral hypoglycemic agents to treat GDM. It is very important for patients with GDM to receive behavioural therapy and to closely cooperate with the doctor. Future work in the field should include studies of both clinical and implementation outcomes, examining strategies to improve the quality of care deliver to women with GDM. The screening and treatment for GDM early in pregnancy are very controversial due to the lack of data from large randomized control trails. There is an urgent need for well designed research that can inform decisions on the best practice regarding Gestational diabetes mellitus screening and diagnosis.

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