Treatment of gestational diabetes

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TREATMENT OF GESTATIONAL DIABETES

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List of Abbreviation

AA – AMINO ACID

ACOG – AMERICAN COLLEGE OF OBSTETRICIANS AND GYNEOCOLOGISTS

ADA – AMERICAN DIABETES ASSOCIATION

A1C - HEMOGLOBIN A1C

CI – 95% CONFIDENCE INTERVAL

DM – DIABETES MELLITUS

FGT – FASTING GLUCOSE TOLERANCE

GDM – GESTATIONAL DIABETES MELLITUS

HAPO – HYPERGLYCEMIA AND ADVERSE PREGNANCY OUTCOME

IADPSG – INTERNATIONAL ASSOCIATION OF THE DIABETES AND PREGNANCT STUDY GROUP

IDF – INTERNATIONAL DIABETES FEDERATION

IOM – INSTITUTE OF MEDICINE

OGTT – ORAL GLUCOSE TOLERANCE TEST

OR – ODDS RATIO

PGD – PREGESTATIONAL DIABETES

T2DM – TYPE 2 DIABETES MELLITUS

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Keywords: (GDM, blood glucose monitoring, physical activity, dietary modification)

Abstract

Pregnant women with GDM have a higher risk of both short- and long-term consequences and complications, including complications during labor, macrosomia, and T2DM in both the mother and her fetus. Modifiable changes such as physical activity and diet, as well as blood glucose monitoring is essential in dealing with GDM.

The diet suggested for women with GDM should be targeted specifically to each patient and provide enough energy while keeping the normoglycemic range. The aim is to support fetal growth while also preventing postprandial glucose excursions and promoting healthy maternal gestational weight gain.

Variations in glucose levels and hyperglycemic episodes are influenced by carbohydrate intake.

Therefore, the type, quantity, and distribution of carbohydrates in the diet should be the main emphasis of nutritional counseling. Additionally, being physically active has positive impacts on insulin and glucose levels and can help with glycemic control.

Moreover, there is still lacking data regarding the best diet for women with GDM. In addition, researches are constantly provide new aspects and approaches how to prevent GDM and how to deal with that.

Sažetak

Trudnice s GDM-om imaju veći rizik od kratkoročnih i dugoročnih posljedica i komplikacija, uključujući komplikacije tijekom poroda, makrosomiju i dijabetes tipa 2 kod majke i djeteta. Promjene životnog stila, kao što su tjelesna aktivnost i .prehrana, kao i praćenje razine glukoze u krvi, bitne su u liječenju GDM-a

Prehrana predložena za žene s GDM-om trebala bi biti posebno usmjerena na svaku pacijenticu i osigurati dovoljno energije uz održavanje normoglikemije. Cilj je podržati rast fetusa u kontrola rasta fetusa, a istovremeno spriječiti postprandijalne .ekskurzije glukoze i promicati zdravo povećanje težine majke tijekom trudnoće

Na varijacije u razinama glukoze i hiperglikemijske epizode utječe unos .ugljikohidrata

Stoga bi vrsta, količina i raspodjela ugljikohidrata u prehrani trebali biti glavni naglasak nutricionističkog savjetovanja. Osim toga, tjelesna aktivnost pozitivno utječe .na razinu inzulina i glukoze te može pomoći u kontroli glikemije

Štoviše, još uvijek nema dovoljno podataka o najboljoj prehrani za žene s GDM-om. Povrh toga, istraživanja nam stalno daju nove poglede i pristupe u sprječavanju i .liječenju GDM-a.

Introduction

Gestational diabetes mellitus (GDM) is regarded as a common form of glucose intolerance in which a pregnant woman who has not yet been diagnosed with diabetes displays high blood glucose levels during the third trimester [1].

This thesis will review the treatment options for GDM. Moreover, it will deal with the risk factors, the consequences during and after pregnancy, and methods of prevention.

In recent years, the number of patients suffering from GDM is increasing, so there is enormous importance in recognizing and understanding the disease. Also, it is essential to concentrate on preventive measures and finally on treating the disease.

A patient-centered strategy is currently being developed and implemented for preventing and treating GDM patients in the general population. This method was founded on the idea that a key component of the healing process is dependent on the unique requirements and physical characteristics of the patient. The use of a patient-centered strategy for preventing and treating diabetes has proven to produce encouraging results. Currently, interventions and treatments focus on patient specific characteristics not only in an effort to avoid any detrimental consequences and complications, but also to achieve positive results.

Epidemiology

The most common condition affecting pregnant women is GDM, which occurs in 15–25% of pregnancies globally.

GDM contributes to several complications, both short and long – term, including hyperglycemia, macrosomia, cesarean delivery, type 2 diabetes, and preeclampsia.

In addition, GDM is associated with an increased risk in developing breast cancer as well as other reproductive complications.

GDM prevalence varies depending on variables such as age, race, body mass index (BMI), and ethnicity. Women over 25 years of age and those with BMIs more than 30 have an increased risk of acquiring GDM [2].

Moreover, studies have shown a strong connection between genetic component and GDM. For example, the incidence of GDM is greater among certain ethnic groups, such as Hispanic, African American, Native American, and Asian women. Therefore, the incidence is expecting to rise together with the rising rates of type 2 diabetes mellitus and obesity. [3]

Another study the Hyperglycemia and Adverse Pregnancy Outcome (HAPO) study, clarifies the risk of adverse outcomes associated with different levels of glucose intolerance during pregnancy that are less severe than overt diabetes. Neonatal adiposity was examined in association with maternal glucose levels and cord serum C-peptide. In the study, pregnant women underwent a 75-g oral glucose tolerance test between 24 and 32 gestational weeks. Other variables including maternal age, parity, BMI, height, mean arterial pressure and the baby's sex were taken into consideration. The results show an association between increasing glucose concentration (less severe than diabetes) with fetal overgrowth and adiposity. There is strong relationship between neonatal fat and maternal glycemia and with fetal insulin levels in a form of C-peptide levels. Fetal insulin production is stimulated by maternal glucose levels which are transported via the placenta from the mother to the fetus in addition to other nutrients. This fact confirms the link between maternal glucose level and C-peptide concentrations in the fetus in addition to the fat deposition [4].

Additionally, the diagnostic criterion for GDM has been lowered after a recent recommendation by the IADPSG which is expected to result in a rise in the prevalence of GDM.

According to predictions from the International Diabetes Federation (IDF), 629 million people will have diabetes by the year 2045, up from an estimated 425 million in 2017. By 2025, it is estimated that 1 in 3 adults in the United States will be suffer from DM.

Asian women are more likely than US women to have GDM. One of the world's epicenters for the DM epidemic is India, which has the second-highest percentage of people with the disease worldwide. [3,8]

This thesis will review the treatment options for GDM. Moreover, it will deal with the risk factors, the consequences during and after pregnancy, and methods of prevention.

Risk Factors of GDM

Numerous risk factors, often known as stressors, can have an impact on glycemic management. These triggers can have varying effects on different people. We can categorize these psychological stressors into risk factors that are changeable and those that are not. Nonmodifiable factors, as the name implies, are those that cannot be altered or managed. The only approach to achieve the desired glucose levels is to deal with these stressors rather than avoiding them. Age and family history are an example for uncontrolled stressors with the majority effect. Controllable stressors, on the other hand, are stressors that can be changed or even eliminated. For instance, being overweight or obese, not exercising and having prediabetes.

Modifiable risk factors

Risk variables that can be changed include BMI, eating habits, and degree of physical exercise. The use of tobacco products has been recognized as a potential risk factor; however, studies have not consistently found a link between smoking and the development of GDM. The most often examined modifiable risk factor with the most predictable results is obesity, contributing to a high BMI. In fact, studies have repeatedly shown a strong and positive linear association between adiposity levels and the likelihood of having GDM.

For instance, one study investigated BMI as a predictor tool for GDM and its sensitivity with different racial/ethnic groups: including, African Americans, Latins, Caucasian, and Asians. BMI of 25 kg/m^2 as a threshold identified different GDM in those distinct groups. 76% of African Americans, 58% of Latinas, and 46% of Caucasians, but only 25% of Asians. In other words, African American had the greatest risk of GDM followed by the Caucasians, Latinos, and Asians. However, BMI is only a predicted tool for screening and therefore there are additional factors to considers and GDM cannot be predict by BMI alone. [5]

Nonmodifiable risk factors

Age is a major risk factor for GDM development. Some studies showed a significant positive correlation connection between GDM and maternal age, with an increased risk that was linear rather than threshold-like with increasing age. This linear relationship may encourage more pregnant women, even those over 25, to get screened. This was concluded after analyzing 24 studies that comprised 120 million participants. The data was received from three electronic databases, for studies published after July 2018. The analysis concludes that for each one year of age for 18 years old there in significant increase in GDM risk for the overall population and subgroup. However, for Asian women there is a greater risk of developing GDM in comparison to other subgroup population, for women over 25. [6]

A case control study found that family history of diabetes mellitus, which is a non-modifiable factor, is a risk factor in developing GDM. This study included 200 participations: 100 women with GDM and 100 healthy women. Family history was defined as Type 2 diabetes among first degree family members. The study concluded that women with a family history of diabetes mellitus were over five times more likely to develop GDM in comparison to the healthy group; a statistical significant odds ratio (OR) = 5.62, 95% confidence interval (CI) = 2.26-13.96 for having family history of diabetes mellitus as a risk factor for development of GDM. [7]

These factors are not modifiable, and therefore, women with these risk factors should receive early and regular prenatal care to detect and manage GDM promptly. Lifestyle modifications and medical management can help reduce the risk of adverse outcomes associated with GDM.

Diagnosis

Antenatal glucose screening is the leading method for detecting GDM. In 1999, the WHO published guidelines for performing the screening test. A 75-gram glucose load is used, and blood glucose is checked after one hour, two hours and after fasting for 8-14 hours. This screening test is performed between 24 to 28 gestational weeks. If one of the values exceed the normal range, gestational diabetes is diagnosed. The normal range is for one hour up to 180 mg\dL or 10.0 mmol/L, for two hours 155 mg\dL or 8.6 mmol/L and after fasting 95 mg\dL or 5.3 mmol/L.

In addition, there are protocol – based guidelines for the diagnosis of GDM. These protocols are published by national and international organizations such as the IADPSG, American Diabetes Association (ADA), and United Kingdom-based National Institute for Health and Care Excellence (NICE) and Canada. Table 1 presents the different screening protocols.

Guidelines	Gestational Age at Screening	Glucose Load	FBS	1 h	2 h	3 h
IADPSG 2010	24–28 weeks	75 g	<92 mg/dL	<180 mg/dL	<153 mg/dL	-
Canada Diabetes Association 2018	24–28 weeks	75 g	<95 mg/dL <5.3 mmol/L	<190 mg/dL <10.6 mmol/L	<162 mg/dL <9.0 mmol/L	-
NICE 2015	24–28 weeks	75 g	<101 mg/dL <5.6 mmol/L		<140 mg/dL <7.8 mmol/L	-
ACOG 2018	24–28 weeks	100 g	<95 mg/dL	<180 mg/dL	<155 mg/dL	<140 mg/dL

Protocol-based guidelines for diagnosis of gestational diabetes following an oral glucose tolerance test [3,8].

Management

A comprehensive strategy is needed to treat patients diagnosed with GDM in the best possible way. This includes educating patients regarding blood glucose level self-monitoring, dietary adjustments and nutrition monitoring, lifestyle changes, and pregnancy weight gain control. With sufficient physical activity, dietary changes, and lifestyle adjustments, up to 70–85% of people with gestational diabetes can be treated.

Blood glucose monitoring

In both GDM and PGD, fasting and postprandial self-monitoring of blood glucose are advised for achieving optimal glucose levels. Fasting plasma glucose levels of less than 95 mg/dL (5.3 mmol/L) and either one- or two-hour postprandial glucose levels of less than 140 mg/dL (7.8 mmol/L) or 120 mg/dL (6.7 mmol/L) are the ideal glucose levels. Blood glucose levels in some women who have PGD should be checked earlier at the initial prenatal. [8]

Increasing A1C values within the normal range are linked to unfavorable outcomes in studies of women without diabetes and who have never been diagnosed with diabetes.

The Hyperglycemia and Adverse Pregnancy Outcome (HAPO) study found an association between rising glycemia levels and poorer results. [9]

A1C 6% (42 mmol/mol) had the lowest risk of large-for-gestational-age newborns, premature labor, and preeclampsia in the second and third trimesters. In light of all of this, if a target of 6% (42 mmol/mol) can be kept throughout pregnancy without serious hypoglycemia, it is the best choice.

Physical activity

For pregnant women with GDM, exercise and physical activity are advised and encouraged. Pregnancy benefits from moderate exercise, which can help decreased the risk of developing GDM, developing large-for-gestational-age neonates, hypertension concerns, preterm birth, and fetal growth restriction. [8]

Exercise lowers peripheral insulin resistance and is a suitable weight control method for GDM patients. Patients are urged to exercise for 30 minutes, multiple times each week.

Following proper assessment and counseling, exercise during pregnancy may be permitted by women with specific contraindications.

Due to musculoskeletal or mechanical symptoms such as pubic symphysis dysfunction or back pain, pregnant women frequently need to modify their workout routine. It may be practical to provide supervised group activity, such as walking groups, antenatal fitness programs, or aqua aerobics for at risk women, as gestational diabetes is a reasonably common problem.

dietary modification

In 70–85% of women with GDM, it has been suggested that lifestyle changes in general, and specifically dietary modifications, are sufficient to control blood glucose. The best diet to follow for women with GDM is a controversial issue that is still under discussion.

Carbohydrates are the most significant macronutrient in women with GDM. Postprandial hyperglycemia is primarily influenced by carbohydrate intake since the digestion and absorption of carbs raise blood glucose levels. Both the quantity and the

type of carbohydrate influences glucose levels. Therefore, hyperglycemia can occur when a meal contains a large quantity of carbohydrates. While glucose levels for the pregnant woman need to be monitored, glucose is the primary energy source for the placenta and fetus, which is necessary for normal fetal growth and metabolism. There is no global consensus determining the ideal daily carbohydrate consumption for those women with GDM. According to certain recommendations, the daily carbohydrate intake shouldn't be higher than 40% to 50% of daily calories. [10]

Other nations, such as Denmark and other Nordic countries, adhere to more general recommendation, that is, 45%–60% of daily calories.

To prevent consuming too much food at once, particularly carbohydrates, it is advised to have three large meals per day and two to three smaller meals or snacks. Vegetables, legumes, fruits, and whole grains are examples of starchy foods with a naturally high concentration of dietary fiber that should make up the majority of carbohydrate intake. This will lower blood sugar levels after meals, as it shown in Figure 1.

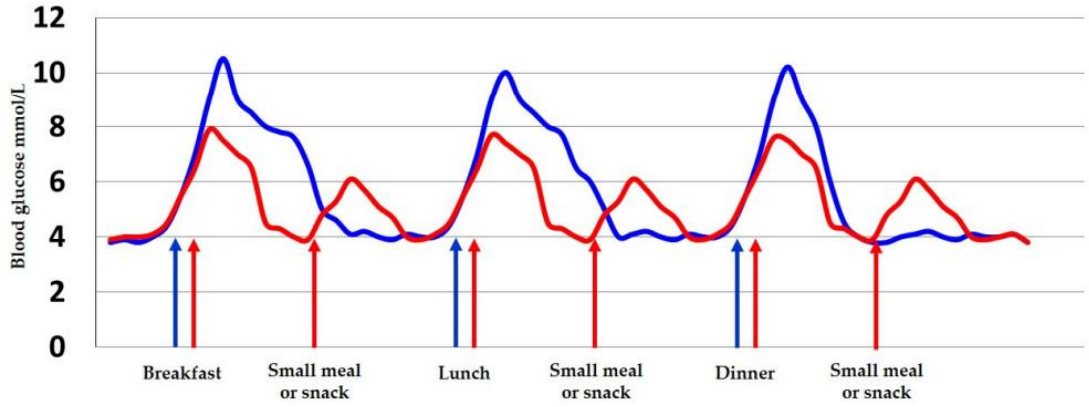

Figure 1 shows the blood glucose values for various daily food intake patterns. For pregnant women with GDM, red curve represents the meal pattern to maintain the planned quantity of calories to be consumed and blue curve represents the typical meal pattern. Three meals in blue are the primary meals. Three meals and three snacks are indicated by red arrows. [10]

It has been suggested that breakfast should only contain modest amounts of slowly absorbed carbs because morning blood glucose levels often rise more after meals. Some recommendations suggest maximum of 30 g of carbohydrates for breakfast. [10]

These suggestions are mostly based on personal experience since, there is limited scientific evidence to support them.

There is a lack of randomized clinical trials studying the preferred amount of carbohydrates to eat in the morning for best outcomes.

Protein has significant importance in pregnancy. Due to its function in the synthesis of maternal (blood, uterus, and breast) fetal, and placental tissues, there is an increased need for protein intake during pregnancy. For the dietary management of GDM, protein intake recommendations are for healthy pregnancies. The Institute of Medicine (IOM) advises pregnant women to consume between 10 and 35 grams of protein per meal, with an estimated average requirement of 0.88 g/kg/d and a minimum advised daily intake of 71 g protein. [10]

Animal proteins are known as complete proteins because they include all nine essential amino acids (AA), while but plant proteins are classed as incomplete since they may be lacking in one or more AA.

However, consuming a variety of plant-based proteins throughout the day will supply enough essential AA. Vegans should carefully plan their diets because they are more likely than omnivores and vegetarians to not get enough daily protein.

In healthy non-pregnant adults and adults with T2DM, pre-meals of protein given before a meal have shown promising results on the postprandial blood glucose levels. Casein is a protein found in milk (20% whey and 80% casein make up milk protein) and in dietary supplements. In a randomized clinical trial of 52 women with GDM, who received either 8.5 g of casein hydrolysate (n = 26) or a placebo (n = 26) prior to breakfast and supper for eight days, the researchers found that the average blood glucose level was lower in the casein group. In healthy adults, those with metabolic syndrome, and those with T2DM, pre-meal whey protein has demonstrated advantageous effects with decreased postprandial blood glucose levels. Because the pathophysiology of T2DM and GDM is similar, women with GDM may also experience the positive effects of whey pre-meals on blood glucose.

According to the most recent research, treating GDM with more protein from plants, lean meat, and fish while consuming less red and processed meat may improve insulin sensitivity. [10]

The ADA advises that as part of medical nutrition therapy, women with GDM should get a tailored nutrition plan. The patients and a qualified dietician should work together to create the nutrition plan [10]. The nutrition plan should be continuously adjusted based on self-glucose monitoring, hunger, and weight gain patterns as well as taking the pregnant woman's dietary choices, work, and exercise preferences into account. Maintaining constancy in carbohydrate intake at meals and snacks is crucial if insulin therapy is combined with nutrition therapy in order to facilitate insulin adjustment.

While fats are necessary, it is recommended to limit saturated fats, avoid trans fats, and include in the diet mostly monounsaturated and polyunsaturated fats.

The recommended amount of fat in the dietary treatment of GDM is similar to the general nutrition advice for normal glucose tolerance pregnancies.

In non-pregnancy, the IOM advises 25–40% of daily calorie from fat, while 20–35% is recommended in pregnancy. A high consumption of fat should be avoided because it has been linked to reduced muscle glucose absorption, increased maternal oxidative stress and inflammation, and newborn obesity. Additionally, a high-fat diet may result in placental dysfunction. [10]

Women with GDM should be advised to choose low fat products and comply with the following guidelines. Meat products should comprise a maximum of 10% fat, dairy products should be limited to a maximum of 1.5% fat, and fatty dairy products, such as cream and butter should be restricted. [10]

Pharmacotherapy

Blood glucose control is insufficient in up to 15–30% of GDM patients despite suggested dietary and lifestyle changes, justifying the use of medication. There aren't any well-researched guidelines for recommending when to start medication for glycemic control. Typically, if hyperglycemia persists throughout the day after a period of 10 to 14 days of dietary and lifestyle changes, medication should be taken into consideration. [8]

Individual randomized controlled trials support limited efficacy of metformin and

glyburide in reducing glucose levels for the treatment of GDM, thus, these agents are not recommended as first-line treatment for GDM. In addition, these medications are known to cross the placenta and data on long-term safety for the fetus is of some concern. [8]

When administering insulin to patients, factors such as body weight, gestational age, and the time of day that hyperglycemia is present all need to be taken into consideration.

Following initiation, insulin doses are regularly modified throughout the pregnancy based on blood glucose levels, symptomatic hypoglycemia, physical activity, nutritional intake, infection, and compliance.

Based on the precise timing of recurrent hyperglycemia, there are two basic techniques for prescribing insulin. Depending on when hyperglycemia occurs, insulin can be given as a single daily dose or scattered out over the day. Women who only experience hyperglycemia when fasting in the morning should get a single dosage of intermediate insulin, such as NPH or detemir, before bedtime. Rapid-acting insulin before the meal should be recommended for women who only experience postprandial hyperglycemia after specific meals. With a total daily dose of 0.7-1.0 unit/Kg divided into rapid-acting insulin given before meals and intermediate- or long-acting insulin in the morning or at bedtime, women who experience hyperglycemia throughout the day should be managed with a combination of intermediate- or long-acting and short-acting insulin. [8]

It is essential to optimize patients' insulin doses and follow their regular self-monitoring of blood glucose levels since the need for insulin may increase as the pregnancy progresses.

As shown in Figure 2 the calculated total daily dose of insulin should be split into two equal parts and administered as either rapid-acting or normal insulin before each of the three meals, with the other half administered as basal insulin before bedtime.

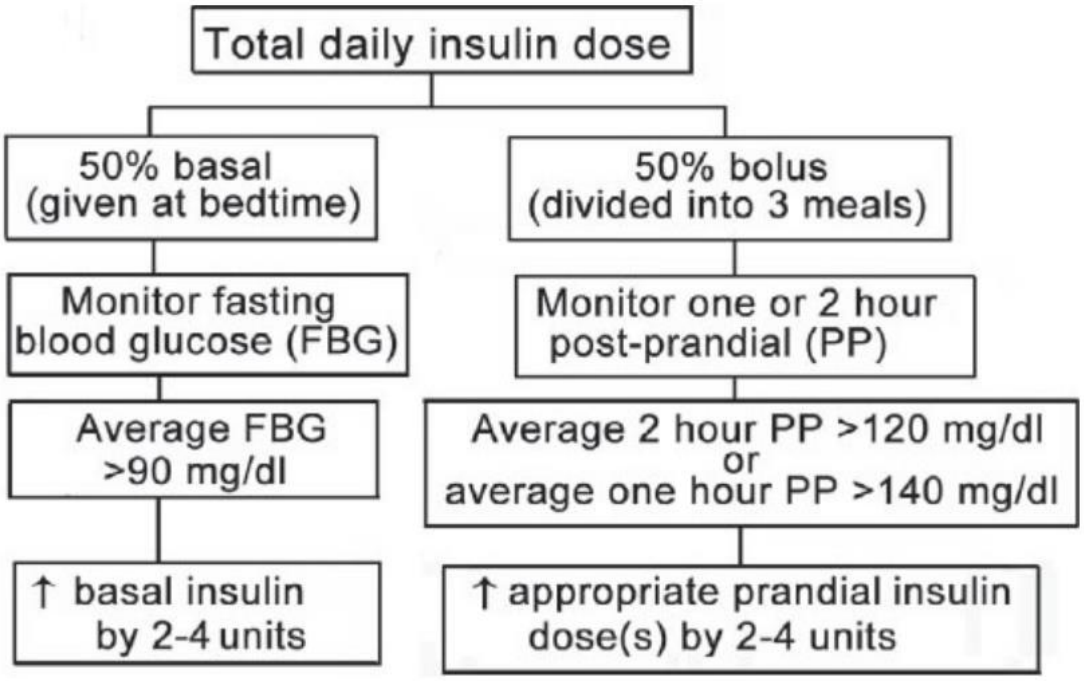

Figure 2. Initiation and optimization of insulin therapy in hyperglycemia during pregnancy. (FBG > 5.0 mmol/L, 2 hours PP > 6.7 mmol/L, one hour PP > 7.8 mmol/L. [9]

To try to prevent hypoglycemia or hyperglycemia, close blood glucose monitoring is necessary when prescribing insulin. It is encouraged that patients provide their self-monitored blood glucose records to the doctor's office so they may discuss any necessary adjustments to the insulin regimen. [8]

Oral medicines may be provided in cases where individuals are either unable to obtain insulin or refuse it. Congenital abnormalities and fetal hypoglycemia are the main worries associated with using non-insulin antihyperglycemic medications during pregnancy. Metformin seems to be a safer oral drug when compared to glyburide. Glyburide has been linked to increased birth weight and neonatal hypoglycemia, which can raise the risk of shoulder dystocia and necessitate cesarean delivery. Additionally, it has been shown that glyburide is present in umbilical cord blood samples at levels that are 50–70% of the mother, which might result in neonatal hypoglycemia. The levels of metformin in umbilical cord blood are said to be comparable to or higher than maternal levels, even though it is said to have a lower risk of neonatal hypoglycemia.

Depending on glycemic control, the starting dose of metformin is 500 mg taken orally every night or 500 mg twice daily. The maximum total daily dose during pregnancy is 2500-3000 mg, which is more than in the non-pregnant state. Based on glycemic management, glyburide should start at 2.5 mg per day or every 12 hours and gradually increased to a maximum of 10 mg twice daily. Glyburide's serum concentration in pregnancy increases 30 to 60 minutes after oral treatment and reaches its peak in two to three hours following treatment, peaking at the same time as blood glucose levels do after a meal. [8,9]

Delivery planning and Intrapartum care

Based on glycemic management, the American College of Obstetrics and Gynecology (ACOG) developed guidelines describing the time of delivery in women with gestational diabetes. Delivery should be taken into consideration beginning at 39 weeks if GDM is adequately controlled with diet and exercise. Patients who need medication and have stable blood sugar levels give birth between 39 and 39-6/7 weeks gestation. [8]

The aim of maintaining normoglycemia throughout labor and delivery is to keep blood glucose levels between 4 and 7 mmol/L (72-126 mg/dL) to prevent neonatal hypoglycemia. Capillary glucose monitoring is necessary every one to two hours in patients with GDM who need to take insulin.

An ideal strategy for managing insulin and glucose during childbirth is not explicitly advised. It is advised to start treating patients with dextrose 5% normal saline (NS) at a rate of 125 cc/hour and switch them to Ringer lactate or NS when their blood sugar levels rise above 5.6 mmol/L (100 mg/dl). When blood glucose levels exceed 7.8 mmol/L (140 mg/dl), insulin infusion should be started, and the dose should be adjusted in accordance with capillary glucose levels to maintain the desired range. [9]

POSTPARTUM GLUCOSE INTOLERANCE SCREENING

Within ten years of giving birth, type 2 diabetes mellitus strikes more than 50% of women having a history of GDM. The ADA advises women with a history of GDM to undergo lifelong examinations for diabetes at least every three years and to be evaluated for postpartum glucose intolerance by 75-gram two hours OGTT at 6 to 12 weeks after giving birth. A fasting plasma glucose level of<100 mg/dL or 5.6 mmol/L and a 2-h post-load plasma glucose level of<140 mg/dL or 7.8 mmol/L are considered normal. [8,11]

Despite widespread recommendations for postpartum glucose screening, postpartum diabetes testing is only carried out in between 16% and 22.5% of women with GDM, which is a very low screening rate. Increased efforts are being made to test more women for diabetes after GDM pregnancies due to concerns over low postpartum screening compliance. These methods have mostly concentrated on identifying and removing follow-up barriers at the patient, provider, and system levels, especially when healthcare transitions are involved. [12]

Future T2DM may be predicted by the level of glucose intolerance a woman has during pregnancy. In comparison to women with diet controlled GDM, those treated during pregnancy with insulin or oral glycemic medicines have higher risks of T2DM at 6 to 9 weeks postpartum. [13]

One study by Bernstein and her colleagues shown an adjusted OR of 2.36 for T2DM for women with GDM that was being managed by medication compared with women who were managed by diet alone. [14]

Fetal and neonatal complications

Type 1 or Type 2DM that exists prior to pregnancy is referred to as PGD. It raises the risk of complications for both the mother and the fetus throughout pregnancy and delivery. Strict glucose control and intensive fetal development monitoring are part of the treatment, for example, routine ultrasounds to check for congenital anomalies. The risk of complications is higher with PGD than with GDM.

Early pregnancy loss and significant congenital defects such as neural tube defects and cardiac defects are mostly associated with the first trimester. In the study done by Tinker and colleagues, for infants delivered to patients who had PGD, there was a

statistically significant elevated risk for 24 different heart anomalies, 4 of which had OR values more than 10: truncus arteriosus, atrioventricular septal defect, and single ventricle complex. Moreover, a greater than 10-fold increased risk was also observed for holoprosencephaly adjusted OR, 13.1; 95% confidence interval, 7.0-24.5 [15]

The ACOG advises on starting low-dose aspirin prophylaxis (81 mg/day) between 12 weeks and 28 weeks of gestation (ideally before 16 weeks of gestation), and continuing it until delivery, as PGD is thought to be a high-risk factor for the development of complications. [16]

During second and third trimesters, the complication are associated equally with PGD and GDM, including metabolic complications, polycythemia, increased weight of organs and pregnancy loss. [16]

Conclusion

GDM is the most common obstetric metabolic disorder.
Before and during pregnancy, maternal glucose management should be maintained closely to normal values to reduce the risk of complication such
as hyperglycemia, spontaneous abortion, fetal deformity, fetal macrosomia, fetal death, and newborn morbidity.
The dietary strategy for glycemic management is centered on careful carbohydrate control and providing the right amounts of carbohydrates for meals and snacks. Individual carbohydrate requirements should be assessed. Patients should be encouraged to select starchy foods such whole grains, legumes, fruits, and vegetables.

Consumption of carbohydrates should be spread out throughout the day.
Prenatal care should emphasize the value of euglycemic control prior to conception as well as the negative obstetric and maternal outcomes that might arise from poorly managed diabetes.
Physical activity is vital at all ages, but it's crucial before and throughout pregnancy since it can impact both the mother's and the child's health. It depends on pre-pregnancy habits to maintain enough physical activity during pregnancy.
In 70-85% of cases, lifestyle modification including specific and individualized diet and physical exercise are sufficient and pharmacotherapy isn’t required.

The second and third trimesters of pregnancy are when GDM most frequently occurs, which is a state of decreased glucose tolerance. Patients often asymptomatic and the fetus is usually large for gestational age. An oral glucose challenge test should be used for in all pregnant women. If glycemic control is inadequate, insulin or other oral medication therapy should start. GDM often disappears after pregnancy.
In conclusion, PGD and GDM prevalence are both increasing, and diabetes will probably continue to be the most prevalent metabolic condition of pregnancy for a very long time in the future. [10,16]

Biography

Noga Ben Haim was born to Ran and Ahuva on October 24th, 1995, in Petah-Tikwa, Israel.
From 2014 to 2016, she served in the Israeli military, in the artillery corps as a sports instructor.

Between 2017-2023, Noga studied general medicine in the general School of Medicine University of Zagreb, Croatia.

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