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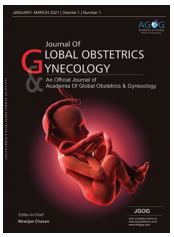
Review Article



Drug Therapy and Role of Medical Nutrition Therapy

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Gestational diabetes mellitus (GDM) is the recognition or onset of hyperglycemia for the first-time during pregnancy.[1]

One of the most common medical disorders encountered during pregnancy is GDM. The prevalence of the disorder is 15.8% of all live births (2019).[2]

Hyperglycemia in pregnancy is classified as diabetes in pregnancy and GDM.[3]

The initial treatment for patients who are diagnosed to have GDM is medical nutrition therapy (MNT) and physical exercise for 2 weeks. The patient should walk/exercise for 30 min a day.[4]

MNT[5]

The calorie intake for the patient is calculated based on the pre-pregnancy weight. If the patient is predicted to have an average weight gain of 10–12 kg during her pregnancy, an additional 350 kcal/day of calories is added in her second and third trimester. The energy requirement is calculated based on the following formula:

Energy requirement (kcal/day) = BMR × PAL

BMR is basal metabolic rate and PAL is physical activity level. BMR for adult females in the age group 18–30 years is calculated by the formula, 14 × body weight in kg + 471. BMR for adult females in the age group of 30–60 years is calculated by the formula 8.3 × body weight in kg + 788.

Calculation for MNT: [5] The calculation of calories as per the level of activity is presented in Table 1.

There needs to be an addition of 500 calories for underweight women. The obese women will need a deduction for 500 calories/day from their total energy requirement calculation.

DIET PLAN[5,6]

A proper diet plan is given to a mother suffering from GDM with adequate inputs by the dietitian and the treating obstetrician. A diet that suits the region and her palate is planned after counseling the patient and her attenders. The portions of carbohydrates, proteins, and fats to be taken are explained. The diet should contain macronutrients and micronutrients in adequate quantities. The diet should support the fetal growth, avoid spikes in hyperglycemia, and encourage weight gain of the mother in an appropriate manner.

Table 1: Level of activity and energy requirement during pregnancy (calories)

Level of activity	Energy requirement during pregnancy (calories)
Sedentary work	1900+350
Moderate work	2230+350
Heavy work	2850+350

The spikes in blood glucose levels depend on the carbohydrate intake. The mother is encouraged to have foods with carbohydrates that are spread over 3 small meals and 2–3 snacks each day instead of 3 large meals. Complex carbohydrates (such as whole-grain cereals, whole pulses, vegetables, and fruits with skins) are preferred over simple carbohydrates. Simple carbohydrates are foods with lots of added sugar or honey and foods that are made from refined white flour. There need to be 2–3 carbohydrates served at each major meal and 1–2 carbohydrates serves at each snack. The intake of saturated fat intake should be <10% of total calories. Protein foods are preferred in MNT of GDM patients. Fat intake is restricted. The intake of saturated food in the meal should ideally be <10% of the total calories.

MONITORING A MOTHER WITH GDM[5]

The patient is advised MNT and adequate exercise for 2 weeks. The blood glucose level 2 h after a meal is estimated. If the 2-h post-prandial blood sugar (PPBS), glucose is <120 mg/dL, and it indicates that she is well controlled with MNT and exercise. Then, the test is repeated as per a high-risk pregnancy protocol. She must undertake 8 further testing of PPBS during her pregnancy. These are 4 regular tests and 4 additional tests. She needs to undergo at least one test every month during her second and third trimester. Additional testing is repeated if there is a need as per the recommendation by the treating physician.

If the 2-h PPBS is ≥120 mg/dL, medical management (metformin or insulin therapy) is to be started as per the guidelines.

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INDICATIONS FOR INITIATING METFORMIN THERAPY[5]

Metformin is started if the patient is diagnosed to have GDM after 20 weeks of pregnancy. It is started at a dose of 500 mg twice daily orally. It can be increased to a maximum of two grams per day. There is a lesser chance of hypoglycemia with metformin therapy compared to insulin therapy in GDM. The weight gain of the mother is also lesser when on metformin compared to insulin therapy. Metformin can be continued even if insulin is added for better control. Metformin therapy is associated with gastrointestinal side effects which include loose stools, nausea, abdominal pain, and epigastric pain. The serious side effects associated with the drug are lactic acidosis and hypoglycemia.

MONITORING DURING METFORMIN THERAPY[5]

The fasting blood sugar (FBS) and 2-h PPBS of the mother are tested twice weekly when the mother is on metformin therapy. The dosage of metformin is adjusted based on the blood sugar levels. If the fasting blood glucose level is <95 mg/dL and her level is <120 mg/dL, it indicates that she is well controlled. If she is well controlled, the frequency of testing can be done as per a high-risk pregnancy protocol or as recommended by physician (at least once monthly).

INDICATIONS FOR INSULIN THERAPY IN GDM[5]

Insulin therapy is indicated if there is no control of blood sugar levels. If GDM is diagnosed before 20 weeks of pregnancy, it is better to initiate insulin therapy at once. The other indication is failure of control with MNT and exercise. If the blood sugar levels are more than 200 mg/dL at the screening test, insulin therapy needs to be initiated at once.

INSULIN REGIMES IN GDM[5]

The different dosages for insulin therapy are based on the blood glucose levels and are mentioned in Table 2. Human Insulin premix 30:70 is preferred for therapy of GDM.

MONITORING DURING INSULIN THERAPY[5]

When the patient is started on insulin, FBS and 2-h PPBS are tested every 3rd day.

The targets of therapy[5] when the patient is on therapy are a FBS of <95 mg/dL and 2-h PPBS of <120 mg/dL.

MONITORING AND INSULIN THERAPY[5]

The change in the modality of therapy and changes in insulin dosages are based on the blood glucose levels of the patient and is mentioned in Table 3.

Table 2: Dosage of insulin according to sugar levels

Blood sugar	Dose of insulin
Between 120 and 160	4 units
Between 160 and 200	6 units
More than 200	8 units

Table 3: Titration of Insulin dose as per blood sugar levels

Blood sugar levels	Insulin
FBS normal and 2-h PPBS is high	Increase insulin by 2 U pre-breakfast + MNT and physical exercise
If both levels are high	Insulin in 2 doses, same dose 2 U pre-breakfast and 4 U pre-dinner
If PPBS is elevated	Add 2 U pre-breakfast
If fasting is elevated	Add 2 U pre-dinner

FBS: Fasting blood sugar, PPBS: Post-prandial blood sugar, MNT: Medical nutrition therapy

Table 4: Recommendations for therapy

Guidelines	First-line therapy	Second-line therapy
Government of India	MNT	Metformin
NICE	MNT	Metformin/Insulin/Glyburide
ACOG	MNT	Insulin/Glyburide/Metformin
ADA	MNT	Insulin/Glyburide/Metformin

MNT: Medical nutrition therapy

THERAPY FOR GDM (DIFFERENT GUIDELINES)[4,5,7,8]

The therapy for GDM varies in different countries, especially the second-line therapy once MNT fails in controlling the disease and is mentioned in Table 4.

CONCLUSION

GDM is increasing in prevalence and is causing short- and long-term complications in the mother and the baby. The management of the disease is mainly based on lifestyle changes rather than intensive pharmacological therapy. Hence, clinicians should be aware of MNT and exercise for control of the disease. The drug therapy is second-line management of the disease.

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