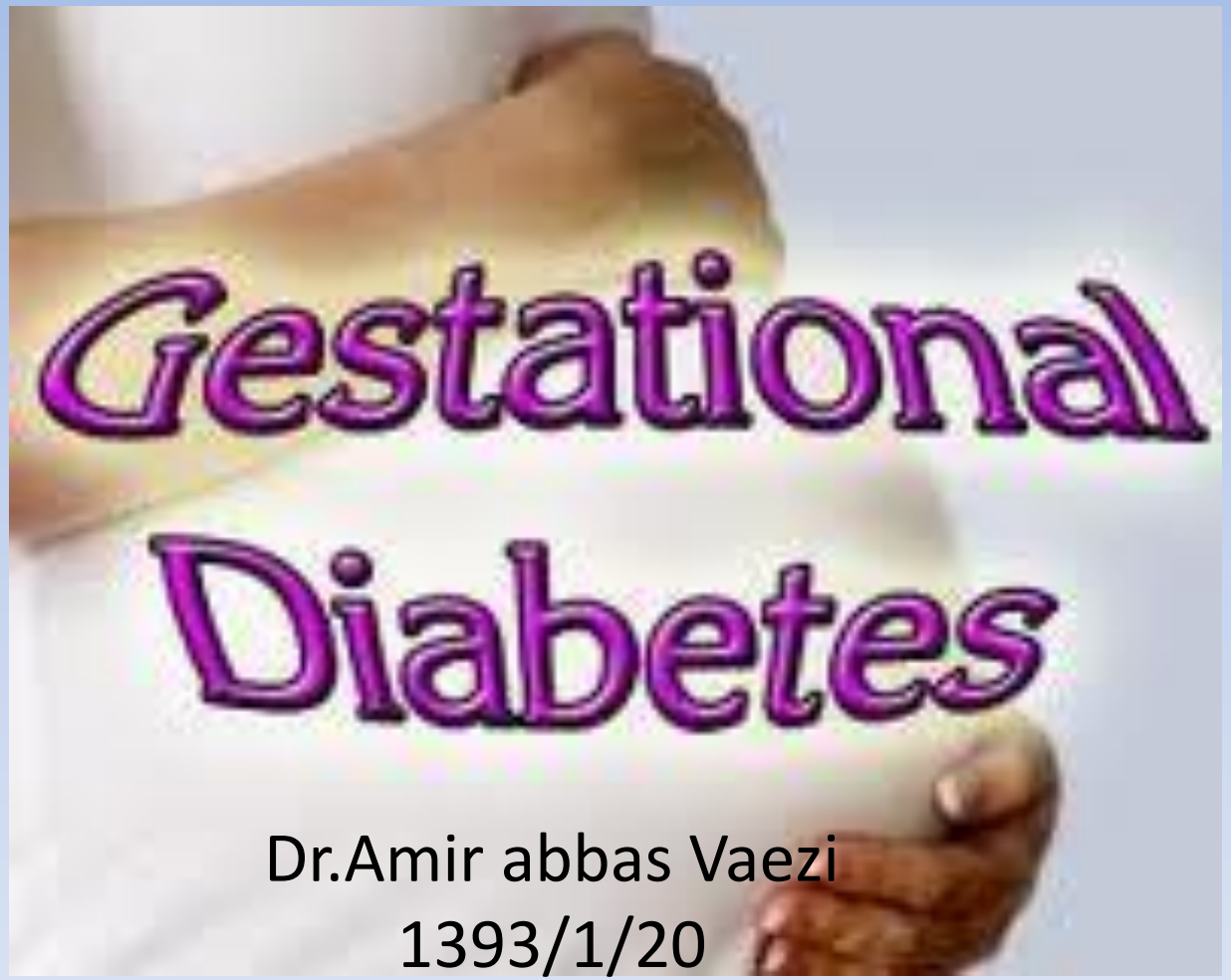


Dr.Amir abbas Vaezi

1393/1/20

Case Study

- 28 year old woman G1P0 presents to the clinic at 22 weeks' gestation with confirmed GDM
- FBS 180
- Blood sugar 2hpp:210

Case Study

- 31 year old woman G1P0 presents to the clinic at 6 weeks' gestation
- Known type 2 diabetes on Glibenclamide and Metformin
- HbA1C is 8.1%
- She expresses concerns about the impact on her health and her future newborn
- How should she be managed?

- An effective treatment regimen consists of
- Dietary therapy
- self blood glucose monitoring
- administration of insulin
  - if target blood glucose concentrations are not met with diet alone, but more research to determine the optimum approach is needed.

Nutritional therapy

- The goals of medical nutritional therapy are to:
  - Achieve normoglycemia
  - Prevent ketosis
  - Provide adequate weight gain
  - Contribute to fetal well-being

In clinical practice, women often require 1800 to 2500 kcal per day.

For women who are at ideal body weight during pregnancy, the caloric requirement is 30 kcal/kg/day;

for women who are overweight, the caloric requirement is 22 to 25 kcal/kg/day;

for morbidly obese women, the caloric requirement is 12 to 14kcal/kg/day (present pregnant weight)

. For those women who are underweight, the caloric requirement may be up to 40 kcal/kg/day to achieve recommended weight gains, blood glucose goals, and nutrient intake.

- A typical meal plan for women with GDM includes three small-to-moderate sized meals and two to four snacks.
- Many women will need individual adjustment (ie, 15 to 30 g of carbohydrate at breakfast or other meals), depending on postprandial glucose levels.
- Postprandial blood glucose concentrations are directly dependent upon the carbohydrate content of the meal or snack.

- carbohydrate intake needs to be distributed across meals and snacks to blunt postprandial hyperglycemia.
- Carbohydrate intake is limited to less than 40 percent of total calories,

- A practical approach is to advise patients to minimize bread, rice, cereal, pasta, tortillas, potatoes, and sweet fruits and juices.

- Restriction of carbohydrates to less than 40 percent of total calories has been demonstrated to improve maternal glucose levels and improve pregnancy outcomes . The remaining calories are divided between protein and fat.

- The remaining calories come from protein (less than 20 percent of total calories) and fats (40 percent of total calories; saturated fat intake should be <7 percent of total calories).

- Protein intake should be distributed throughout the day, and included in all meals and snacks to promote satiety and provide adequate calories.

- A bedtime snack may be needed to prevent accelerated (starvation) ketosis overnight.
- Adjustment of the meal plan should be ongoing, and based upon results of self glucose monitoring, appetite, and weight gain patterns.

- **GLUCOSE MONITORING** —
- measuring their blood glucose concentration at least four times daily (fasting and one or two hours after the first bite of each meal)

- **Glucose target**
- The ADA recommends the following upper limits for glucose levels, with insulin therapy initiated if they are exceeded

ADA glucose targets:

- Fasting blood glucose concentration ≤95 mg/dL (5.3mmol/L)
- One-hour postprandial blood glucose concentration ≤140 mg/dL (7.8 mmol/L)
- Two-hour postprandial glucose concentration ≤120mg/dL (6.7 mmol/L)

- ADA encourages a program of moderate exercise as part of the treatment plan for women with GDM and no medical or obstetrical contraindications to this level of physical activity
-

- In one small randomized trial, six weeks of a cardiovascular fitness program using arm ergometry three times a week for 20 to 30 minutes per session resulted in normalization of glucose tolerance

Role of moderate physical activity

General Guidelines For Physical Activity

Do	Don't
Participate in moderate and regular physical activity unless prohibited by a health care provider	Get too tired while working out or doing physical activity
Choose activities like swimming, that don't require a lot of standing or balance	Do any activity while lying on your back when you are in your 2nd or 3rd trimester of pregnancy
Wear loose, light clothing that won't cause excessive sweating or increased body temperature	Perform activities in very hot weather
Drink a lot of water before, during, and after your activity	Perform activities that may bump or hurt your belly, or that may cause you to lose your balance
Eat a healthy diet and gain the right amount of weight	Fast (skip meals) or do physical activity when you are hungry
Watch your level of exertion (Can you talk easily?)	Over-exert yourself

Maintain a healthy weight

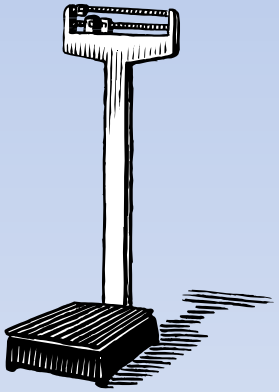
Weekly Rate Of Weight Gain

Time Frame	Expected Weight Gain
In the first trimester of pregnancy (the first 3 months)	Three to six pounds for the *entire three months*
During the second and third trimester (the last 6 months)	Between $\frac{1}{2}$ and 1 pound each week
If you gained too much weight early in the pregnancy	Limit weight gain to $\frac{3}{4}$ of a pound each week (3 pounds each month) to help get your blood sugar level under control

A weight gain of two pounds or more each week is considered high.

Keep daily records of your diet, physical activity, and glucose levels

- Your health care provider might ask that you keep track of the following:
  - Blood sugar level
  - Food
  - Physical wellness
  - Physical activity
  - Weight gain



PHARMACOLOGIC THERAPY

Insulin (and some insulin analogs)

- selected oral anti-hyperglycemic agents

- Hospitalization is not necessary to initiate insulin. However, if teaching of insulin technique and dosage of multiple insulin injections, self-monitoring blood glucose, and charting of the blood glucose and insulin is not possible in the outpatient setting, then the use of an inpatient setting to utilize the expertise of the hospital's nursing staff may justify the cost of hospitalization

-

- Typically, regardless of body weight, a patient whose glucose elevations are mostly postprandial is prescribed a starting dose of 30 units (20 units of intermediate acting insulin and 10 units of rapid acting insulin) in the morning prior to breakfast.

- If the GDM is diagnosed and therapy instituted prior to the third trimester, we generally start with half this dose, since insulin resistance has not reached its maximum level in the second trimester

- The three rapid acting insulin analogs (lispro, aspart, glulisine) are comparable in immunogenicity to human regular insulin , but only lispro and aspart have been investigated in pregnancy and shown to have acceptable safety profiles, minimal transfer across the placenta, and no evidence of teratogenesis.

- Neonatal outcomes are similar to those of women treated with regular insulin [47].

- These two insulin analogs both improve postprandial excursions compared to human regular insulin and are associated with lower risk of delayed postprandial hypoglycemia.

- Long-acting insulin analogs (insulin glargine ,insulin detemir)
- Based on available data, we prefer use of human NPH insulin as part of a multiple injection regimen in pregnant women with GDM [85].

- there was no consistent evidence of an increase in any adverse maternal or neonatal outcome with use of glyburide , acarbose , or metformin compared with use of insulin
-
- The ADA and ACOG do not endorse the use of oral anti-hyperglycemic agents during pregnancy and such therapy has not been approved by the Unites States Food and Drug Administration (FDA) for treatment of GDM

- **Glyburide**
- more prevalent,

- **Metformin** — Second and third trimestermetformin treatment of GDM appears to be safe, and is effective in many women, but between one third and one half of women will need insulin to achieve glycemic targets.

FUTURE RISKS

- Waist circumference and BMI are the strongest anthropometric measures associated with development of type 2 diabetes in women with GDM

- Additional risk factors for impaired glucose tolerance and overt diabetes later in life include autoantibodies (eg, glutamic acid decarboxylase, insulinoma antigen-2),

- high fasting blood glucose concentrations during pregnancy and early postpartum,
- higher fasting blood glucose at diagnosis of GDM and high glucose levels in oral glucose tolerance testing,
- neonatal hypoglycemia, and GDM in more than one pregnancy

- Parity, large birth weight, and diabetes in a first-degree relative are less correlated with later diabetes.

Long-term follow-up

- All women with previous GDM should undergo an oral glucose tolerance test 6 to 12 weeks after delivery, using a two-hour 75 gram oral glucose tolerance test.

- Breastfeeding during the test appears to have a modest effect on glucose levels.
-

- Women with normal glucose tolerance should be counseled regarding their risk of developing GDM in subsequent pregnancies and type 2 diabetes in the future.
- Lifestyle interventions (weight loss, exercise) are clearly beneficial for reducing the incidence of these disorders
- s Drug therapy (eg, metformin , pioglitazone) also may have a role in preventing future type 2 diabetes

SUMMARY AND RECOMMENDATIONS

- We recommend that women with gestational diabetes mellitus receive treatment (Grade 1A).
- Randomized trials have shown that a program of
  - medical nutritional therapy,
  - self-monitoring of blood glucose levels,
  - and insulin therapy,
- when needed, improves perinatal outcome (reduction in preeclampsia, macrosomia, shoulder dystocia

- Calories are generally divided over three meals and two to four snacks and are composed of about 40 percent carbohydrate, 20 percent protein, and 40 percent fat.

- Self blood glucose monitoring should be performed to evaluate the effectiveness of medical nutritional therapy

- We recommend initiating insulin therapy in women who do not achieve adequate glycemic control with nutritional therapy and exercise alone (Grade 1A).

- THANK YOU