

OBSERVATIONS

Weight Gain and Gestational Diabetes Mellitus Is a Sensitive Issue

Normal pregnancy is associated with reduced insulin sensitivity, compensatory increase in insulin secretion, and small changes in circulating nutrients. Gestational diabetes mellitus (GDM) occurs when insulin secretion is insufficient to compensate for the insulin resistance of pregnancy. During late pregnancy, women with GDM tend to be more insulin resistant than obesity-matched women with normal glucose tolerance (1). Little is known about the effects of weight gain in the third trimester versus no weight gain or weight loss as treatments for GDM. The objective of our study was to determine the effect of medical nutrition therapy (MNT) on insulin sensitivity (S_i), glucose effectiveness (S_g), glucose tolerance (K_g), and acute insulin response to intravenous glucose (AIR_g) in women with GDM in relation to weight gained or lost during treatment.

A total of 20 women with GDM were prescribed MNT (40% carbohydrate, 40% fat, and 20% protein) (2) to achieve euglycemia. Caloric requirements were based on present pregnant weight. Women performed self-monitored blood glucose, fasting and 1 h postprandially, and visited the clinic weekly.

Frequently sampled intravenous glucose tolerance tests assessed β -cell function and insulin- and glucose-dependent glucose utilization. The frequently sampled intravenous glucose tolerance tests were performed at the beginning of treatment and 6 weeks later. K_g (%/min), S_i (min^{-1} per $\mu\text{U}/\text{ml} \times 10^{-4}$), S_g ($\text{min}^{-1} \times 1,000$), and AIR_g ($\mu\text{U}/\text{ml} \times \text{min}$) were estimated using the MINMOD computer program (3). Fourteen women were successfully treated with MNT. After 6 weeks, changes from baseline were significant and increased for weight, S_g , K_g , and AIR_g (weight 78.7 ± 17.7 to 80.1 ± 16.5 kg, $P = 0.05$; S_g 0.019 ± 0.006 to $0.027 \pm 0.006 \text{ min}^{-1} \times 1,000$, $P = 0.003$; K_g 1.54 ± 0.37 to $2.29 \pm 0.50\%$ /min, $P < 0.001$; and AIR_g 726.6 ± 409.4 to $1035.5 \pm 673.9 \mu\text{U}/\text{ml} \times \text{min}$, $P = 0.004$). Fasting insulin and S_i did not change significantly.

The most significant finding was the negative correlation between the differences from baseline for weight and S_i ($r = -0.66$, $P = 0.04$). Weight gain was significantly correlated with a decrease in insulin sensitivity. However, women in this study who stayed on MNT for 6 weeks had improved S_g , K_g , and AIR_g independent of weight. Difference from baseline for BMI was significantly negatively correlated with difference from baseline in S_i ($r = -0.65$, $P = 0.04$).

Weight gain between prepregnancy and postpartum periods, poor insulin response to intravenous glucose, and early gestational age for diagnosis of GDM are associated with risk for postpartum impaired glucose tolerance and development of type 2 diabetes (1). Prevalence of

obesity is increasing along with GDM (4); thus, treatment of women with GDM should focus on reducing risk factors such as weight gain. Our study shows that an optimal diet for women with GDM is one that minimizes weight gain and produces weight loss.

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