

Effect of 3-Day Intensive Dietary Therapy During Admission in Women after Diagnosis of Gestational Diabetes Mellitus

Prasert Sunsaneevithayakul MD*
Pornpimol Ruangvutilert MD, PhD*, Anuwat Sutanthavibul MD*,
Sujin Kanokpongsakdi MD*, Dittakarn Boriboohirunsarn MD, MPH, PhD*,
Yoopin Raengpetch BNS**, Supanee Lertpadungkulchai MSc**

* Department of Obstetrics and Gynecology, Faculty of Medicine Siriraj Hospital, Mahidol University

** Obstetrics and Gynecology Nursing, Department of Obstetrics and Gynecology,
Faculty of Medicine Siriraj Hospital, Mahidol University

Objective : To determine the impact of 3-day intensive dietary therapy during admission on glycemic control.
Material and Method : GDM women, with level of fasting blood glucose (FBS) at or above 105 mg/dl on their oral glucose tolerance test (OGTT), were hospitalized. After 3-day intensive dietary therapy, the women were stratified by FBS value and mean 2-hour postprandial blood glucose. Those with poor glycemic control, FBS at or above 105 mg/dl, were prescribed insulin therapy.

Result : Between 1 August 2001 to 31 December 2002, a total of 9861 pregnant women were screened for clinical risk factors of GDM at their first antenatal visits, and 4663 had at least 1 risk. After 50-gm glucose challenge test and 100-gm OGTT, GDM was diagnosed in 300 women. Only 18% (54 in 300 cases) of GDM had level of FBS at or above 105 mg/dl on OGTT. They were admitted in a special ward for further investigation and initial management. After 3 days of intensive dietary therapy, the FBS and mean 2-hour postprandial blood glucose level were monitored and stratified in 3 groups. Only 42.6% of admission group (23 in 54 cases) still had FBS at or above 105 mg/dl and required insulin therapy (group 1). One third (18 in 54 cases) could avoid insulin therapy due to the level of FBS below 105 mg/dl and mean 2-hour postprandial blood glucose below 120 mg/dl (group 2). This second group was discharged, and due to attend the high risk pregnancy clinic a few weeks later. The third group (group 3), comprising one fourth (13 in 54 cases), had FBS below 105 mg/dl but had a mean 2-hour postprandial blood glucose at or above 120 mg/dl. This third group were also discharged and were monitored glycemic profile by FBS and 2-hour postprandial blood glucose every time during their visits to the high risk pregnancy clinic. According to criteria of 2-hour postprandial blood glucose at or above 120 mg/dl on two or more occasions within a 1-2 weeks interval, no one in group 3 needed insulin therapy afterward.

Conclusion : GDM women with FBS at or above 105 mg/dl on their OGTT, should be prescribed intensive dietary therapy alone for 3 days inside hospital rather than initiating insulin immediately after diagnosis. One third had a benefit of avoiding insulin therapy. Only 42% failed to achieve good glycemic control and still needed insulin therapy. One fourth showed optimal glycemic control after this intervention (FBS below 105 mg/dl) but had mean 2-hour postprandial blood glucose at or above 120 mg/dl. Longer trial of dietary therapy should be considered in this last group to avoid over treatment of insulin therapy.

Keywords : Gestational diabetes mellitus , Intensive dietary therapy, Insulin therapy

J Med Assoc Thai 2004; 87(9): 1022-8

Correspondence to : Sunsaneevithayakul P, Department of Obstetrics and Gynecology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand.

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance first detected during pregnancy^(1,2). The definition applies regardless of whether insulin or only diet modification is used for treatment or whether the condition persists after pregnancy. The incidence of GDM varies between 1-14% depending on the population and the diagnostic criteria⁽³⁾. In our institute, the incidence is 2.5% of all pregnant women and 6.2% of pregnant women with potential clinical risk factors⁽⁴⁾.

GDM is a disorder with both immediate and long term complications. Although uncomplicated GDM with less severe fasting hyperglycemia has not been associated with increased perinatal mortality, GDM of any severity increased risk of fetal macrosomia. Neonatal hypoglycemia, jaundice, polycythemia, and hypocalcemia may complicate GDM as well. GDM can cause a four-fold increase in perinatal mortality if left untreated⁽⁵⁾, and adverse outcomes seem to be more frequent in patients treated with diet plus insulin⁽⁶⁾. However, with early diagnosis and treatment, the perinatal mortality and morbidity due to the disease could be the same as in general obstetric population. Maternal complications related to GDM also include an increase risk of cesarean delivery and chronic hypertension^(7,8). Up to 25% of women with GDM will develop type 2 diabetes mellitus within 10 years^(9,10). GDM also increases risk of obesity or impaired glucose tolerance in the offspring as well⁽¹¹⁾, but prenatal exposure to the diet-treated GDM does not increase the risk of childhood obesity⁽¹²⁾.

GDM represents nearly 90% of all pregnancies complicated by diabetes⁽¹³⁾. Clinical recognition of GDM is important because therapy, including dietary therapy, insulin when necessary, and antepartum fetal surveillance, can reduce the well described GDM associated perinatal morbidity and mortality⁽¹⁴⁾. Attaining good glycemic control is the cornerstone of managing women with GDM. Women with poor control have a high incidence of fetal macrosomia⁽¹⁴⁾, with resulting birth trauma, and other metabolic complications. It has been suggested that dietary therapy can aid in achieving maternal glycemic control. Dietary therapy should include the provision of adequate calories and nutrients to meet the needs of pregnancy and should be consistent with the maternal blood glucose goals that have been established. Although the American College of Obstetric and Gynecology (ACOG) recommends prescribing insulin if fasting glucose level exceeds 105 mg/dl or 2-hour postprandial levels exceed 120 mg/dl⁽¹⁵⁾, it is still controversial which

women with GDM will benefit from insulin therapy. Several studies suggest that a subset of GDM patients benefit from insulin therapy after failure to achieve glycemic control. Some studies recommend that insulin therapy could be initiated immediately in obese women or those with fasting plasma glucose level over 95 mg/dl on the OGTT to avoid exposing the fetus to hyperglycemic environment during the trial of diet therapy⁽¹⁶⁾.

In selecting appropriate candidates for insulin initiation based on blood glucose criteria, another question needs to be addressed is that, at what point does the practitioner declare diet therapy a failure and insulin therapy should be initiated? At the present time, there is no consensus as to which criteria should be used to transfer patients from diet to insulin therapy. The American Diabetes Association (ADA) Clinical Practice Recommendation states, "If dietary management does not consistently maintain the fasting plasma glucose at or below 105 mg/dl and/or the 2-hour postprandial plasma glucose below 120 mg/dl on two or more occasions within a 1-2 weeks interval, insulin therapy should be considered⁽¹⁷⁾. This criterion, when originally suggested, referred to patients performing weekly blood sugar testing, using self-monitoring blood glucose several times daily over a 2-weeks period⁽¹⁸⁾. The majority of patients are identified as having one or two elevated values above this criterion. It would be more practical to use the glycemic profile in a given period of time reflected by mean blood glucose.

The authors hypothesized that intensive dietary therapy in a three day during admission in patient with GDM results in improve glycemic control and less need for insulin therapy. This study evaluated effect of a 3-day intensive dietary therapy during admission on achievement of good glycemic control in patients treated with proper diet only. The purpose aimed to determine the impact of intensive dietary therapy on glycemic control in the management of GDM, who had elevated fasting glucose values at or above 105 mg/dl on their OGTT, before initiating insulin therapy.

Material and Method

This prospective study included all women with GDM diagnosed at our institution from 1 August 2001 to 31 December 2002. All pregnant women at antenatal unit who had at least a clinical risk factor for diabetes were screened for carbohydrate intolerance with a 50-g 1-hour glucose challenge at first visit, between 24-28 weeks, and 32-34 weeks gestation. Those with risk factors for GDM, including family

history of diabetes, age over 30 years, obesity (pre pregnancy body mass index at least 27), and history of GDM, macrosomic infants, still births, or fetuses with congenital anomalies, and hypertensive disorder were screened at their initial visits. If they were found not to have GDM at that initial screening, they would be retested between 24-28 weeks, and 32-34 weeks of gestation. If plasma glucose from 50-gm 1-hour testing was at or above 140 mg/dl, a 3-hour 100-g oral glucose tolerance test (OGTT) was done a week later. GDM was diagnosed using the National Diabetes Data Group criteria (equal to or exceeding 105, 190, 165, 145 mg/dl) with two or more elevated values considered abnormal.

GDM women with fasting glucose levels on the 3-hour OGTT below 105 mg/dl were scheduled to attend the high risk pregnancy clinic. Only subjects who had fasting glucose levels from OGTT equal to or above 105 mg/dl were admitted for dietary control. All of them were prescribed intensive diet therapy for 3 days, after which those in poor glycemic control, defined as fasting blood glucose still at or above 105 mg/dl were prescribed insulin therapy. Standard treatment of all subjects involved diabetes education, control of hyperglycemia, with fetal and maternal surveillance. Daily caloric assignment was calculated based on ideal body weight, 30-35 Kcal/kg. Women with obesity which was defined by body mass index \geq 27, calculated by prepregnancy weight (kg) divided by height (m) squared, received calorie 25 Kcal/kg/day. Nutrients were distributed as follows: 50% carbohydrate, 30% protein, and 20% fat (less than 10% saturated fat). Energy was distributed as follows: breakfast 10-15%, lunch 20-30%, supper 30-40%, postmeal snack 5-10%, and bedtime snack 5-10%.

All women received extensive dietary counseling by a well-trained diabetes nurse educator and physicians. The diabetic counseling and teaching, as well as the obstetric management, were done during admission. All pregnant women were monitored their blood glucose at day 3 of admission, including fasting and 2-hour postprandial three meals. These blood glucose assessments were performed by clinic nursing staff. To aid in assessment of their glucose control, all study participants had glycosylated hemoglobin determinations obtained before institution of their diet. Poor glycemic control criterion of fasting glucose at or above 105 mg/dl was used for insulin therapy at the fourth day of admission. Human insulin was begun in those subjects who after careful dietary evaluation and dietary adjustments, continued to have fasting

hyperglycemia above this criterion. Those who had blood glucose below this, were discharged and scheduled to attend the high risk pregnancy clinic in next couple of weeks, and blood glucose levels at fasting and 2-hour postprandial were monitored at every antenatal visit. All data including gestational age at diagnosis of GDM, initial glycosylated hemoglobin value, and the results of 3-hour OGTT, outcome variables including fasting and 2-hour postprandial capillary glucose values, and the requirement of insulin were collected prospectively.

Results

Between 1 August 2001 to 31 December 2002, a total of 9861 pregnant women were screened for clinical risk factors for gestational diabetes during their first antenatal visits, and 4663 had at least 1 risk. After 50-gm glucose challenge test and 100-gm oral glucose tolerance test, GDM was diagnosed in 300 women (6.4% among high risk for diabetes, and 3.0% of new patients) as shown in Table 1. Only 54 in 300 cases (18%) of GDM had fasting blood glucose at or above 105 mg/dl on OGTT and they were admitted in a special ward for further investigation and initial dietary therapy. After 3 days of intensive dietary therapy, the FBS and the mean 2-hour postprandial blood glucose level were monitored and stratified into 3 groups as shown in Table 2. Twenty-three of 54 cases (42.6%) still had FBS at or above 105 mg/dl (group 1) and required insulin therapy. Eighteen of 54 cases (33.3%) had FBS below 105 mg/dl and the mean 2-hour postprandial blood glucose below 120 mg/dl (group 2). This group of patients did not need insulin therapy and were discharged, being scheduled attend high risk pregnancy clinic a few weeks later. The last one, group 3, had FBS below 105 mg/dl but the mean 2-hour postprandial blood glucose at or above 120 mg/dl. This group consisted of 13 in 54 cases (24.1%). They were discharged and their glycemic profiles were monitored at each visit to the high risk pregnancy clinic by FBS and 2-hour postprandial levels. No one

Table 1. Results of screening program during the study period

Categories	Cases (%)
New cases ANC	9861
Clinical risk factor for diabetes mellitus	4663
Positive screening test (50 gm 1 hr)	2685
Gestational DM	300
FBS \geq 105 mg% from OGTT	54 (18%)
FBS < 105 mg% from OGTT	246 (82%)

in group 3 needed insulin therapy, according to criteria of 2-hour postprandial blood glucose at or above 120 mg/dl on two or more occasions within a 1-2 weeks interval of antenatal visits.

The initial glycosylated hemoglobin values in all three groups were not different. However, gestational age at diagnosis of GDM was significantly lower in group 1 than the others as shown in Table 3.

Discussion

GDM is a disorder associated with elevated circulating glucose. It has recently become recognized that women with GDM represent susceptible "prediabetes" who are identified by the metabolic changes accompanying pregnancy. In the last decade, it has become clear that gestational diabetes is a clinical entity associated with perinatal mortality and morbidity⁽¹⁹⁾. Thus, the attention to and management of GDM during pregnancy are mandatory. To manage GDM, the first step prompted after diagnosis is to educate dietary needs. The prudent treatment protocol for diabetic women is to provide sufficient energy to maintain the pregnancy and hence, prevent starvation ketosis and other metabolic consequences of hyperglycemia and hyperinsulinemia. Careful attention must be given to avoid both hyperglycemia and starvation-induced ketogenesis because both conditions are associated with high rates of fetal morbidity. The clinical goal must be normalization of glycemic status to attain ideal pregnancy outcome in women with GDM.

Table 2. Blood glucose profile after 3 day of intensive dietary therapy (N=54)

	Categories	Cases (%)
Group 1	FBS \geq 105 mg/dl	23 (42.6)
Group 2	FBS < 105 mg/dl and mean 2hr postprandial < 120 mg/dl	18 (33.3)
Group 3	FBS < 105 mg/dl and mean 2hr postprandial \geq 120 mg/dl	13 (24.1)

Table 3. Gestational age (GA) and Glycosylated hemoglobin at diagnosis of GDM

	GA diagnosis (wk)	Glycosylated hemoglobin at diagnosis (mg%)
Group 1	19.7	7.31
Group 2	24.5	5.92
Group 3	28.5	6.80

The goals of dietary therapy for pregnancy are to provide adequate maternal and fetal nutrition, energy intake for appropriate weight gain, and any necessary vitamin and mineral supplements. During pregnancy complicated by diabetes, dietary therapy is also important in achieving and maintaining optimal glycemic control. If the blood glucose values in spite of an adequate diet exceed the desirable target values, insulin treatment must be initiated.

In the past, our institute initiated insulin therapy in all GDM women who had fasting plasma glucose on OGTT above 105 mg/dl regardless of prior dietary therapy to avoid exposing the fetus to a hyperglycemic environment during the trial of diet. Using the result of fasting plasma glucose on OGTT above 95 mg/dl for initiating insulin was recommended in some publications⁽¹⁶⁾. Among the OGTT values, fasting glucose best predicts the need for insulin. Anyway, in clinical practice, the OGTT is usually performed for diagnostic purposes. Although the majority of pregnant women have normal plasma glucose concentration after glucose challenge, a certain proportion will have high glucose levels which fulfill the criteria of GDM. Insulin is commonly recommended when standard dietary management does not consistently maintain the fasting glucose below 105 mg/dl or the 2-hour postprandial blood glucose below 120 mg/dl⁽¹⁵⁾. Some may prescribe insulin in GDM after one week of dietary therapy in those with fasting glucose from OGTT above 95 mg/dl⁽²⁰⁾. It is worth noting that changing threshold for insulin initiation will change the number of patients treated by insulin. It is also important to know how much time is need to achieve good glycemic control with diet alone and to develop predictors for failure of dietary therapy alone at diagnosis.

In this study, we sought to determine whether short course of intensive dietary therapy during the 3 days of admission would enable good glycemic control in GDM, and whether the need for insulin could be predicted at diagnosis of GDM from OGTT. Our poor glycemic control needing insulin therapy was defined as fasting blood glucose at day 3 of admission still at or above 105 mg/dl. Our result showed that 42.6% of this study group of GDM women, who had fasting plasma glucose above 105 mg/dl from the result of OGTT, needed insulin in addition to dietary therapy. Compared to a previous study in which 38% of GDM population who had fasting plasma higher than 105 mg/dl required insulin therapy⁽²¹⁾, both results were nearly the same. A review of literature reveals the common belief that only 10-15% of the whole GDM women

require insulin therapy. Our study showed only 8% (23 in 300 cases) of the whole GDM requiring insulin therapy. Therefore, a 3-day intensive dietary therapy may be beneficial for management of GDM patients. Moreover, 1/3 of our subjects, whose fasting plasma glucose from OGTT was higher than 105 mg/dl, could avoid insulin therapy following this research guideline. According to our previous guideline, all of this group of GDM women, who had fasting glucose on OGTT higher than 105 mg/dl, would have had insulin therapy. There is no doubt that this is a great benefit for the patients following this current guideline to reduce the usage of insulin. It is the first publication about dietary therapy in GDM women in Thailand.

Postprandial hyperglycemia is associated with neonatal macrosomia⁽²²⁾. Therefore, management efforts should be directed at maintaining normal postprandial glucose values. At day 3 of admission, our subjects in group 3, one fourth of the admission group, had a result of the mean 2-hour postprandial glucose at or above 120 mg/dl despite a normal fasting glucose level (below 105 mg/dl). These subjects needed slightly more time to achieve good glycemic control before decision for initiating insulin therapy was made. Some studies stated carbohydrate restriction in dietary therapy was beneficial in improving postprandial glycemic control, reducing the incidence of large for gestational age infants and cesarean deliveries, and reducing the need for insulin therapy in patients with diet controlled gestational diabetes⁽²³⁾. However, we did not use this type of dietary carbohydrate restriction in this study. It is the interesting topic for the future research even though carbohydrate restriction may potentiate the accelerated ketosis of pregnancy and increase ketone body concentration. Higher ketone body concentrations are an indicator of energy insufficiency, reflecting its inverse association on the plasma glucose rather than a direct toxic effect. However, energy restriction did not cause an increase in ketonemia at least in one randomized controlled trial study⁽²⁴⁾.

Among three groups, subjects in group 1 had GDM diagnosed at earlier gestational age (19.7 weeks of gestation) possibly indicating more severe disease. These women did not improve their glycemic control significantly after 3-day treatment period, insulin therapy appeared to be necessary. Women diagnosed with GDM before 20 weeks of gestation had an increased need for insulin treatment during pregnancy, compared with women diagnosed with GDM later in pregnancy⁽²⁵⁾. Clinicians should be aware that a

subgroup of pre-pregnancy diabetes mellitus (overt diabetes) may be first diagnosed during this current pregnancy so early diagnosis GDM may represent more severity than late diagnosis regardless of late antenatal screening. This can be explained that unrecognized glucose intolerance may have antedated or begun concomitantly with the pregnancy⁽²⁶⁾. Consideration might be given to immediate insulin prescription in this subgroup in the same fashion as in group 1, particularly if GDM is diagnosed late in gestation due to late antenatal visit, for prompt management.

The incidence of GDM in this study was 6.4% among high risk pregnant women and 3.0% of all pregnant women. This incidence is nearly the same as our previous report⁽⁴⁾.

Conclusion

In the last decade, it has become clear that gestational diabetes is a clinical entity associated with perinatal mortality and morbidity. Thus, the attention to and management of gestation diabetes during pregnancy are mandatory. In this study, one third of gestational diabetic women with fasting glucose on OGTT at or above 105 mg/dl had a benefit of avoiding insulin therapy after short course 3-day intensive dietary therapy. Of the GDM patients, about 42.6% failed to achieve good glycemic control after the same dietary therapy. Subjects in this group had gestational diabetes diagnosed at earlier gestational ages, possibly indicating more severe disease. Consideration might be given to immediate insulin prescription in this subset. However if gestational diabetes women with fasting glucose on OGTT above 105 mg% show FBS below 105 mg/dl but 2 hour postprandial blood glucose at or above 120 mg/dl after 3-day protocol with diet alone, longer trial of dietary therapy should be considered to avoid over treatment of insulin therapy. The authors hope that, with appropriated protocols, it will be easier for the rural health care providers to treat a certain proportion of women with GDM. This could extend the outreach of Siriraj program and potentially reduce cost.

References

1. Metzger BE, Coustan DR. Summary and recommendations of the Fourth International Workshop Conference on Gestational Diabetes Mellitus. The Organizing Committee. *Diabetes Care* 1998; 21(Suppl. 2): B161-7.
2. American Diabetes Association. Clinical practice recommendations: gestational diabetes mellitus. *Diabetes Care* 2002; 25(Suppl. 1): S94-S96.

3. Engelgau MM, Herman WH, Smith PJ, German RR, Aubert RE. The epidemiology of diabetes and pregnancy in the US, 1998. *Diabetes Care* 1995; 18: 1029-33.
4. Sunsaneevithayakul P, Boriboohirunsarn D; Sutanthavibul A, Ruangvutilert P, Kanokpongsakdi S, Singkiratana D, et al. Risk factor-based selective screening program for gestational diabetes mellitus in Siriraj Hospital: a result from clinical practice guideline. *J Med Assoc Thai* 2003; 86: 708-14.
5. Coustan DR. Making the diagnosis of gestational diabetes mellitus. *Clin Obstet Gynecol* 2000; 43: 99-105.
6. Sendag F, Terek MC, Itil IM, Oztekin K, Bilgin O. Maternal and perinatal outcomes in women with gestational diabetes mellitus as compared to nondiabetic controls. *J Reprod Med* 2001; 46: 1057-62.
7. Cousins L. Obstetric complications. In: *Diabetes Mellitus and Pregnancy: Principles and Practice*. 2nd ed. New York, Churchill Livingstone, 1995, 455-68.
8. Magee MS, Walden CE, Benedetti TJ, Knopp RH. Influence of diagnostic criteria on the incidence of gestational diabetes and perinatal morbidity. *JAMA* 1993; 269: 609-15.
9. Meltzer S, Leiter L, Daneman D, Gerstein HC, Lau D, Ludwig S, et al. 1998 clinical practice guidelines for the management of diabetes in Canada. *Canadian Diabetes Association. CMAJ* 1998; 159(Suppl. 8): S1-29.
10. Kaufmann RC, Schleyhahn FT, Huffman DG, Amankwah KS. Gestational diabetes diagnostic criteria: long term maternal follow-up. *Am J Obstet Gynecol* 1995; 172: 621-5.
11. Silverman BL, Metzger BE, Cho NH, Loeb CA. Impaired glucose tolerance in adolescent offspring of diabetic mothers. *Diabetes Care* 1995; 18: 611-7.
12. Whitaker RC, Pepe MS, Seidel KD, Wright JA, Knopp RH. Gestational diabetes and the risk of offspring obesity. *Pediatrics* 1998; 101: E9.
13. Coustan DR. Gestational diabetes. In: *Diabetes in America*. 2nd ed. Washington, DC, U.S. Govt. Printing Office, 1995: 703-17.
14. Langer O, Rodriguez DA, Xenakis EM, McFarland MB, Berkus MD, Arredondo F. Intensified versus conventional management of gestational diabetes. *Am J Obstet Gynecol* 1994; 170: 1036-46.
15. American College of Obstetricians and Gynecologists. *Diabetes and pregnancy*. ACOG technical bulletin, No. 200. Washington, DC: American College of Obstetricians and Gynecologist, 1994.
16. Langer O. Maternal Glycemic criteria for insulin therapy in gestational diabetes mellitus. *Diabetes Care* 1998; 21 (Suppl 2): B 91-8.
17. American Diabetes Association. Clinical practice recommendation 1996. *Diabetes Care* 1996; 19(Suppl. 1): S1-118.
18. Owen J, Phelan ST, Landon MB, Gabbe SG. Gestational diabetes Survey. *Am J Obstet Gynecol* 1995; 172: 615-20.
19. Beischer NA, Wein P, Sheedy MT, Steffen B. Identification and treatment of women with hyperglycaemia diagnosed during pregnancy can significantly reduce perinatal mortality rates. *Aust N Z J Obstet gynaecol* 1996; 36: 239-47.
20. McFarland MB, Langer O, Conway DL, Berkus MD. Dietary therapy for gestational diabetes: how long is long enough? *Obstet Gynecol* 1999; 93: 978-82.
21. Langer O, Berkus M, Brustman L, Anyaegbunam A, Mazze R. Rationale for insulin management in gestational diabetes mellitus. *Diabetes* 1991; 190: 186-190.
22. Combs CA, Gunderson E, Kitzmiller JL, Gavin LA, Main EK. Relationship of fetal macrosomia to maternal postprandial glucose control during pregnancy. *Diabetes Care* 1992; 15: 1251-7.
23. Major CA, Henry MJ, De Veciana M, Morgan MA. The effects of carbohydrate restriction in patients with diet- controlled gestational diabetes. *Obstet Gynecol* 1998; 91: 600-4.
24. Rae A, Bond D, Evans S, North F, Roberman B, Walters B. A randomised controlled trial of dietary energy restriction in the management of obese women with gestational diabetes. *Aust N Z J Obstet Gynaecol* 2000; 40: 416-22.
25. Svare JA, Hansen BB, Molsted-Pedersen L. Perinatal complications in women with gestational diabetes mellitus. *Acta Obstet Gynecol Scand* 2001; 80: 899-904.
26. Metzger BE. Summary and recommendations of the Third International Workshop-Conference on Gestational Diabetes Mellitus. *Diabetes* 1991; 40: 197-201.

ผลการรักษาด้วยการควบคุมอาหารอย่างเข้มงวดในโรงพยาบาลเป็นเวลาสามวันในสตรีที่ได้รับการวินิจฉัยภาวะเบาหวานขณะตั้งครรภ์

ประเสริฐ ศันสนีย์วิทยกุล, พรพิมล เรืองวุฒิเลิศ, อนุวัฒน์ สุทัศน์วิบูลย์, สุจินต์ กนกพงศ์ศักดิ์, ดิฐกานต์ บริบูรณ์หิรัญสาร, ยุพิน แร่งเพชร, สุพรรณิ เลิศผดุงกุลชัย

วัตถุประสงค์ : เพื่อประเมินผลการรักษาด้วยการควบคุมอาหารอย่างเข้มงวดในโรงพยาบาลเป็นเวลาสามวันต่อการควบคุมระดับน้ำตาลในเลือดในสตรีตั้งครรภ์ที่มีภาวะเบาหวานขณะตั้งครรภ์

วิธีการ : สตรีตั้งครรภ์ที่ได้รับการวินิจฉัยภาวะเบาหวานจากผลการตรวจเลือด OGTT ที่ FBS มีค่าตั้งแต่ 105 mg/dl ขึ้นไป จะได้รับการรักษาในโรงพยาบาลด้วยการควบคุมอาหารอย่างเข้มงวดเป็นเวลาสามวันหลังจากนั้นแบ่งกลุ่มสตรีตั้งครรภ์ดังกล่าวโดยอาศัยผลระดับน้ำตาลในเลือด FBS และ mean 2-hour postprandial blood glucose สตรีตั้งครรภ์ที่ยังคงมีระดับ FBS สูงตั้งแต่ 105 mg/dl ขึ้นไป จะได้รับการรักษาเพิ่มเติมด้วยยาฉีดอินซูลิน

ผลการศึกษา : สตรีตั้งครรภ์ที่มาฝากครรภ์ใหม่ระหว่างวันที่ 1 สิงหาคม 2544 ถึงวันที่ 31 ธันวาคม 2545 มีจำนวน 9861 ราย ในจำนวนดังกล่าวพบสตรีตั้งครรภ์ที่มีภาวะเสี่ยงทางคลินิกอย่างน้อย 1 ข้อต่อการเป็นเบาหวานขณะตั้งครรภ์จำนวน 4663 ราย ภายหลังจากการตรวจเลือดคัดกรองและการตรวจยืนยันด้วยการรับประทานน้ำตาลความเข้มข้น 50 กรัม และ 100 กรัมตามลำดับ สามารถให้การวินิจฉัยสตรีตั้งครรภ์ที่มีภาวะเบาหวานจำนวน 300 ราย ในจำนวนดังกล่าวมีเพียง 54 ราย (ร้อยละ 18) เท่านั้นที่มีระดับ FBS จากผลการตรวจ OGTT ตั้งแต่ 105 mg/dl ขึ้นไป ได้ทำการรับไว้ในหอผู้ป่วยเพื่อการรักษาด้วยการควบคุมอาหารอย่างเข้มงวดเป็นเวลาสามวัน หลังจากนั้น แบ่งกลุ่มโดยอาศัยผลการตรวจ FBS และ mean 2-hour postprandial blood glucose ได้เป็น 3 กลุ่ม กลุ่มที่ 1 มีจำนวน 23 ใน 54 ราย (ร้อยละ 46) จำเป็นต้องได้รับยาฉีดอินซูลินเพิ่มเติมเนื่องจากระดับ FBS ยังคงมีค่าสูงตั้งแต่ 105 mg/dl ขึ้นไป กลุ่มที่ 2 มีจำนวน 1/3 (18 ใน 54 ราย) ที่ไม่มีความจำเป็นต้องใช้ยาฉีดอินซูลิน และสามารถจำหน่ายพร้อมนัดตรวจฝากครรภ์ที่คลินิกตั้งครรถ์ความเสี่ยงสูงใน 2-3 สัปดาห์ถัดไป เนื่องจากระดับน้ำตาล FBS และ mean 2-hour postprandial blood glucose อยู่ในเกณฑ์ปกติทั้งสองค่า (น้อยกว่า 105 และ 120 mg/dl ตามลำดับ) สำหรับกลุ่มที่ 3 มีจำนวน 1/4 (13 ใน 54 ราย) ที่ระดับ FBS อยู่ในเกณฑ์ปกติต่ำกว่า 105 mg/dl แต่ mean 2-hour postprandial blood glucose มีค่าตั้งแต่ 120 mg/dl ขึ้นไป ได้ทำการจำหน่ายและนัดตรวจติดตามระดับน้ำตาลในเลือดทุกครั้งที่มาฝากครรภ์ที่คลินิกตั้งครรถ์ความเสี่ยงสูง ผลปรากฏว่าไม่มีสตรีตั้งครรภ์รายใดได้รับยาฉีดอินซูลินเพิ่มเติมเนื่องจากระดับน้ำตาลมีค่าต่ำกว่าเกณฑ์ที่กำหนดไว้สำหรับการใช้ยาฉีดอินซูลิน กล่าวคือระดับน้ำตาล mean 2-hour postprandial blood glucose ต้องมีค่าสูงตั้งแต่ 120 mg/dl ขึ้นไปอย่างน้อย 2-3 ครั้ง ในการตรวจติดตามทุก 1-2 สัปดาห์

สรุป : สตรีตั้งครรภ์ที่ได้รับการวินิจฉัยภาวะเบาหวานจากผลการตรวจ OGTT ที่มีระดับ FBS ตั้งแต่ 105 mg/dl ขึ้นไป ควรจะได้รับการรักษาด้วยการควบคุมอาหารอย่างเข้มงวดเป็นเวลาสามวันในโรงพยาบาลก่อนที่จะตัดสินใจเริ่มต้นการรักษาด้วยยาฉีดอินซูลินทันทีภายหลังจากผลการวินิจฉัยเนื่องจาก 1/3 ของสตรีกลุ่มดังกล่าวสามารถหลีกเลี่ยงการใช้ยาอินซูลินได้ภายหลังให้การรักษาเบื้องต้นด้วยการควบคุมอาหารด้วยวิธีดังกล่าว ประมาณร้อยละ 42 ยังคงมีความจำเป็นต้องได้รับยาฉีดอินซูลินเพราะระดับน้ำตาลในเลือดไม่สามารถลดลงมาอยู่ในเกณฑ์ปกติได้ภายหลังให้การรักษาด้วยการควบคุมอาหารนอกจากนี้ 1/4 ของสตรีกลุ่มดังกล่าวสามารถลดระดับน้ำตาลลงมาอยู่ในระดับใกล้เคียงค่าปกติ (FBS มีค่าน้อยกว่า 105 mg/dl แต่ mean 2-hour postprandial blood glucose มีค่าตั้งแต่ 120 mg/dl) สตรีตั้งครรภ์กลุ่มนี้สามารถหลีกเลี่ยงการใช้ยาฉีดอินซูลินได้เช่นกัน ถ้าใช้ระยะเวลาในการรักษาด้วยการควบคุมอาหารอย่างเข้มงวดให้นานขึ้น
