Result of Ambulatory Diet Therapy in Gestational Diabetes Mellitus

Prasert Sunsaneevithayakul MD*, Sujin Kanokponsakdi MD*, Anuwat Sutanthavibul MD*, Pomvimol Ruangvutlert MD, PhD*, Dittakarn Boriboonlamsarn MD, MPH, PhD*, Teanta Keawprisit BNS**, Ruanthip Tantawattana BNS**

* 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

Objectives: To evaluate the effectiveness of an ambulatory program for glycemic control of women with gestational diabetes mellitus (GDM).

Material and Method: A total of 33 women with GDM whose FBS from OGTT > 105 mg/dl were scheduled to attend weekly ambulatory care for dietary therapy with their family. FBS and 2-hour postprandial blood glucose were monitored every visit for a few weeks. At the end of this program, those with poor glycemic control were admitted for further tight dietary control by conventional 3-day course after which insulin was finally started for the women whose glycemic control remained poor.

Results: After the ambulatory program, 14 of 33 cases (42.4%) achieved good glycemic control without hospitalization. Another 6 cases (18.2%) did not need insulin therapy after admission for 3-day intensive dietary therapy. Altogether, 20 out of 33 cases (60.6%) of GDM whose FBS from OGTT > 105 mg/dl could avoid insulin therapy after attending the ambulatory program alone or with additional 3-day intensive dietary therapy course. Similar effectiveness was observed from the authors’ previous study on 3-day intensive dietary therapy alone.

Conclusion: The authors’ current ambulatory dietary therapy program has shown to be effective in achieving good glycemic control and avoiding unnecessary insulin therapy and admission in most cases of women with GDM. In the future, an even more effective ambulatory diet control may ascertain that once a woman is hospitalized, insulin should be started right away.

Keywords: Ambulatory program, Dietary therapy, Gestational diabetes mellitus

GDM increases risks for both the mother and the baby and must be treated promptly. Satisfactory pregnancy outcomes of GDM are associated with good glycemic control prior to conception and throughout pregnancy. Although obstetricians have little opportunity to control blood glucose level before pregnancy, good glycemic control can be achieved throughout pregnancy using dietary and/or insulin therapy.

Most women with GDM are in class A1 and can be treated with diet management alone. Cases with fasting blood sugar (FBS) of ≥ 105 mg/dl are placed into class A2 and insulin is recommended according to
American College of Obstetricians and Gynecologists in 1986. Insulin therapy means hospitalization for dose adjustment and patient training for injection. However, the authors’ previous study has shown that with appropriate diet control in such cases, insulin is needed in approximately 40%\(^2\). In that study, the authors used intensive dietary therapy in a three-day period in the hospital to control maternal blood glucose in GDM with FBS from 100-g oral glucose tolerance test (OGTT) \(\geq 105\) mg/dl. Although a third of this group had the benefit of avoiding insulin therapy after this protocol, the authors still had to hospitalize these women. To reduce the admission rate, an initial trial of dietary therapy at home or as an ambulatory basis should be considered to avoid over treatment of insulin therapy and admission. There are conflicting guidelines surrounding dietary management and this has resulted in a lack of conformity to the dietary advice currently prescribed. Dietary therapy for pregnant women with diabetes should be individualized, with consideration given to usual eating habits and other lifestyle factors\(^3\). Nutrition recommendations are then developed to meet treatment goals and desired outcomes. The authors introduced the Siriraj program of a few weeks’ ambulatory dietary therapy in GDM with FBS from OGTT \(\geq 105\) mg/dl. The authors also hypothesized that this kind of ambulatory program could change lifestyle on diet of these women and control their blood glucose level, at least with the same result as our previous protocol, leading to reduction of admission rate for these patients.

**Material and Method**

The present prospective study included women with GDM diagnosed at Siriraj Hospital from August 1, 2003 to August 31, 2004. During that period, all pregnant women who had one clinical risk factor or more for diabetes were screened with 50-g 1-hour glucose challenge test (GCT) at first visit, 24-28 weeks, and 32-34 weeks gestation\(^5,6\). If plasma glucose from 50-g GCT was \(\geq 140\) mg/dl, OGTT was done a week later. Diagnosis of GDM was made using the National Diabetes Data Group Criteria that two or more elevated values were considered abnormal. GDM women with FBS from OGTT < 105 mg/dl were scheduled to attend a high-risk pregnancy clinic. Ambulatory program for dietary therapy was offered to those whose FBS from OGTT \(\geq 105\) mg/dl. They were instructed for diet therapy every week for a few weeks by well-trained diabetes nurse educators and physicians. This primary care management involved guiding each patient to be aware of their problems and providing knowledge of the pathophysiology of diabetes in a one-on-one fashion. Counseling about diabetes in detail and general antenatal management such as fetal well-being testing were given during each visit. FBS and 2-hour postprandial blood glucose were monitored every visit. Poor glycemic control criterion of FBS \(\geq 105\) mg/dl or 2-hour postprandial blood glucose of \(\geq 120\) mg/dl at the end of ambulatory program was used for hospitalization. If hospitalized, the 3-day intensive dietary therapy was initiated as previously reported\(^2\). In addition, those with poor glycemic control after the intensive diet therapy in the hospital were prescribed insulin on the fourth day of admission\(^7\). On the other hand, those with good glycemic control after attending ambulatory program or after 3-day intensive dietary therapy were scheduled to attend high risk pregnancy clinic in the next couple of weeks for further monitoring and continuing antenatal care.

All data including gestational age at diagnosis, the results of OGTT, FBS and 2-hour postprandial blood glucose values, and the requirement of admission including insulin therapy were collected prospectively.

**Results**

Between August 1, 2003 to August 31, 2004, a total of 4,040 cases with at least one clinical risk were screened for GDM according to the authors’ guidelines\(^5\). GDM was diagnosed in 317 cases, 17.0% of these (54 cases) had level of FBS \(\geq 105\) mg/dl on their OGTT. Only 33 cases of these 54 cases (61.1%) attended the ambulatory program of dietary therapy with their family. FBS and 2-hour postprandial blood glucose levels were monitored every visit.

After the program, patients were stratified into 2 groups according to their blood glucose profiles as shown in Table 1. Of the 33 cases, 14 women (42.4%) had FBS < 105 mg/dl and 2-hour postprandial blood glucose < 120 mg/dl, thus could be discharged from ambulatory program without hospitalization and were scheduled to attend the high-risk pregnancy clinic two weeks later. These women were classified as GDM class A1.

The other 19 women (57.6%) still had FBS \(\geq 105\) mg/dl and required hospitalization for further tight conventional dietary therapy. After the 3-day intensive dietary program during admission, 13 of 19 cases (68.4%) were prescribed insulin on the fourth day of admission as their FBS levels were still \(\geq 105\) mg/dl.
as shown in Table 2. Insulin therapy was not needed in the remaining cases (6 cases; 31.6%) due to good glycemic control, FBS being < 105 mg/dl and mean 2-hour postprandial blood glucose being < 120 mg/dl.

Altogether, 20 out of 33 cases (60.6%) of GDM with FBS from OGTT ≥ 105 mg/dl could avoid insulin therapy after attending our programs of ambulatory or following with conventional 3-day intensive dietary therapy and were classified as GDM A1. The rest, (39.4%) were prescribed insulin therapy in addition to dietary therapy (GDM A2) as shown in Table 3.

Discussion
Patients with well-controlled gestational diabetes by diet therapy only are at low risk for an intrauterine fetal death. Not only the establishment of maternal euglycemia has dramatically improved fetal outcome, the benefits of strict metabolic control also go far beyond pregnancy. Pregnancy provides the ideal opportunity for education and counseling aiming at motivating the patient to improve long term diabetic control. As GDM and type 2 diabetes appear to be the same entity, with the former constituting an early sign of the latter, a good control during pregnancy and afterwards will effectively delay the onset and slow down the progression of microvascular complications in patients with insulin dependent diabetes mellitus.

In pregnancy complicated by diabetes, dietary therapy is important in achieving and maintaining optimal glycemic control. Good glycemic control is one determinant of maternal and fetal complications in pregnancy complicated by GDM. The goals of dietary therapy, while aiming at blood glucose control, are to provide adequate maternal and fetal nutrition, energy intake for appropriate weight gain, and mineral supplements. If the blood glucose values in spite of an adequate diet control exceed the desirable target values, insulin therapy must be initiated.

Previously, Siriraj Hospital, all GDM women who had FBS from OGTT ≥ 105 mg/dl regardless of prior dietary therapy at home had been hospitalized for 3-day intensive diet therapy. To reduce the admission rate, longer trial of dietary therapy at home using ambulatory program was introduced. A previous study has shown that at least a 2 weeks’ period is needed for evaluation of effect of dietary therapy alone in obtaining good glycemic control in women with GDM. Thus, at least 2 weeks of dietary therapy alone should be allowed before insulin is considered.

In the present study, the authors sought to determine whether ambulatory program for dietary therapy would enable good glycemic control in GDM. Poor glycemic control which required admission was defined as FBS ≥ 105 mg/dl or 2-hour postprandial blood glucose ≥ 120 mg/dl after ambulatory program. This ambulatory program for dietary therapy resulted in 42.4% reduction of admission in GDM women who had FBS from OGTT ≥ 105 mg/dl. A few weeks span of attending ambulatory diet therapy was beneficial for GDM women and their family to adapt their lifestyle of diet during pregnancy and to gain the benefit of avoiding admission. Among those who required admission, the present study also showed that 68.4% needed insulin therapy in addition to dietary therapy after conventional 3 day intensive dietary program. Almost a third (31.6%) of this group could avoid insulin therapy due to good glycemic control at the end of the program and these patients were classified as GDM class A1.

From our previous study, the 3-day intensive dietary therapy could avoid insulin therapy in 57.4% of cases. Surprisingly, similar proportion of the same
group of GDM women who attended our ambulatory program alone or with additional 3-day intensive dietary therapy was observed (60.6%). This showed that our ambulatory program was at least as effective as in-hospital 3-day dietary therapy. Admission could be avoided in 14 of 20 cases (70%) of GDM class A1. A few weeks delay during the ambulatory care was not harmful to GDM women who finally needed insulin therapy at the end of the program(9).

The present study had some limitation due to the small number of enrolled subjects. This may be due to increased patients’ awareness about diet control after 4 years of screening program(5). The percentage of GDM with FBS of $\geq 105$ mg/dl from OGTT has dropped from 25% in the first year of the program to 17%. Another reason that only 61.1% of targeted GDM women enrolled in the present study was the effect of National Health Service Policy. Some GDM women went back to their local primary hospital after the diagnosis of GDM due to financial reasons.

Consideration might be given to this subgroup of GDM to reduce the admission rate further by enhancing the effectiveness of the ambulatory program or giving more time to attend the program. Future research to refine the ambulatory program further to substitute the 3-day intensive diet control in the hospital might ascertain that once a GDM woman fails to achieve good glycemic control after attending the ambulatory program and needs hospitalization, the insulin therapy can be started immediately.

Conclusion

An ambulatory program of dietary therapy was beneficial for the management of GDM patients, especially in whom FBS from OGTT was $\geq 105$ mg/dl. Admission could be avoided in 42.4% and insulin was not required in approximately 60% of cases after ambulatory program alone or in combination with the conventional 3-day intensive dietary therapy. This may be the effect of a few weeks period during ambulatory program that GDM women had more time to change their lifestyle on diet. However, the ambulatory management of diabetes during pregnancy requires that the women play an active role in their own diabetic care. Achievement of good glycemic control requires a supportive, knowledgeable, and accessible health care team. In the future, an even more effective ambulatory diet control may ascertain that once a woman is hospitalized, insulin should be started right away.

References

ผลการรักษาด้วยการควบคุมอาหารในรูปแบบที่ไม่ต้องอยู่ในโรงพยาบาล ในสตรีที่ได้รับการวินิจฉัยภาวะเบาหวานขณะตั้งครรภ์

ประเสริฐ ศันสนีย์วิทยกุล, สุจินต์ กนกพงศ์ศักดิ์, อนุวัฒน์ สุดมาทิวิบูลย์, พรมพล เรืองวัตถิลศ, ดิฐกานต์ บริบูรณ์หิรัญสาร, เตือนตา แก้วประสิทธิ์, รุ่งทิพย์ ตันทะรัตน์

วัตถุประสงค์: เพื่อประเมินผลการรักษาด้วยการควบคุมอาหารในรูปแบบที่ไม่ต้องอยู่ในโรงพยาบาล ดูจากการควบคุมระดับควบคุมน้ำตาลในเลือด ในสตรีที่ได้รับการวินิจฉัยภาวะเบาหวานขณะตั้งครรภ์

วัสดุและวิธีการ: สตรีตั้งครรภ์ที่ได้รับการวินิจฉัยภาวะเบาหวานจากผลการตรวจเลือด OGTT ที่ FBS มีค่าตั้งแต่ 105 mg/dl ขึ้นไป จำนวน 33 ราย ได้รับการรักษาด้วยการควบคุมอาหารในรูปแบบที่ไม่ต้องอยู่ในโรงพยาบาล รวมกับครอบครัว โดยมีการตรวจสอบระดับน้ำตาลในเลือด FBS และ 2- hour postprandial blood glucose เทียบกับที่มารับบริการเป็นเวลา 2-3 สัปดาห์ ติดต่อกันที่ท้องคลอดตรวจระดับน้ำตาลในเลือดสูงเกินเกณฑ์ปกติจะได้รับการรักษาด้วยรีวิวในโรงพยาบาลเพื่อดูการควบคุมน้ำตาลในเลือดให้อยู่ในเกณฑ์ปกติได้

ผลการศึกษา: ภายหลังการรักษาด้วยการควบคุมอาหารในรูปแบบที่ไม่ต้องอยู่ในโรงพยาบาล ติดต่อกันที่ได้รับการวินิจฉัยภาวะเบาหวานขณะตั้งครรภ์ จำนวน 14 ราย ใน 33 ราย (ร้อยละ 42.4) มีระดับน้ำตาลในเลือดอยู่ในเกณฑ์ปกติ ทำให้ไม่จำเป็นต้องเข้ารับการรักษาในโรงพยาบาล ขณะที่ต้องตั้งครรภ์ จำนวน 6 ราย (ร้อยละ 18.2) จ่ายเป็นต้องรับในโรงพยาบาลเพื่อดูการควบคุมน้ำตาลในเลือดอยู่ในเกณฑ์ปกติ แต่ไม่จำเป็นต้องรับยาฉีดอินซูลิน ติดต่อกันที่ Cที่มีระดับ FBS จากผลการตรวจเลือด OGTT ตั้งแต่ 105 mg/dl ขึ้นไป จำนวน 20 ราย ใน 33 ราย (ร้อยละ 60.6) สามารถหลีกเลี่ยงการใช้ยาอินซูลินได้ส่วนใหญ่จากการรักษาด้วยการควบคุมอาหารในรูปแบบที่ไม่ต้องอยู่ในโรงพยาบาล แต่เพียงอย่างเดียว หรือร่วมกับการรักษาด้วยการควบคุมอาหารระยะสั้นในโรงพยาบาลเป็นเวลาไม่น้อยกว่า 3 วัน ผลการรักษาในรูปแบบที่ 2 วิธีโดยเลยไม่เดินทางไป

สรุป: ผลการรักษาด้วยการควบคุมอาหารในรูปแบบที่ไม่ต้องอยู่ในโรงพยาบาล ที่ใช้ในการศึกษานี้มีประสิทธิภาพในการควบคุมระดับน้ำตาลในเลือด ลดการใช้ยาอินซูลิน และการรักษาในโรงพยาบาลที่ไม่จำเป็นต้องไป ในอนาคต ควรจะมีการเพิ่มประสิทธิภาพในการควบคุมอาหารรูปแบบที่ไม่ต้องอยู่ในโรงพยาบาลดังกล่าวมาให้มากขึ้นจนถึงขั้นที่ว่า อาจลดตั้งครรภ์จึงเป็นต้องเข้ารับการรักษาในโรงพยาบาลสามารถกินดื่มได้อย่างอินซูลินได้ทันที