

Diabetes Management beyond Pregnancy

Geng Song, Chen Wang, Hui-Xia Yang

Department of Obstetrics and Gynecology, Peking University First Hospital, Beijing 100034, China

Key words: Diagnosis; Gestational Diabetes Mellitus; Prevention; Treatment

Hyperglycemia in pregnancy is one of the most common pregnancy disorders, including gestational diabetes mellitus (GDM) and diabetes in pregnancy (DIP). Either preexisting diabetes (Type I or Type II) which antedates pregnancy or is first detected during pregnancy, it is associated with adverse outcomes both in mother and child, not only for the short-term consequences but also for the long-term consequences. During the past few decades, some progress has been achieved in the management in hyperglycemia in pregnancy, and severe complications of mothers and offspring were significantly reduced.

A study showed that the overall prevalence of diabetes mellitus (DM) was estimated to be 11.6% in the Chinese adult population in 2010, nearly 70% of them were undiagnosed diabetes, and half of the entire Chinese adult population (50.1%) may have had prediabetes.^[1] With the rapid development of economy, the prevalence of diabetes is increasing greatly in the recent years. In China, after the implementation of two-child policy conducted in October 2015, more and more women are trying to conceive the second child. Pregnant women will have advanced maternal age, higher body mass index than before. Moreover, history of GDM is increasing remarkably, which make the women at a high-risk of hyperglycemia in pregnancy, thus controlling hyperglycemia will be more challenging.

The guidance of GDM published by the International Federation of Gynecology and Obstetrics (FIGO) in 2015 pointed out that about 16.8% women have some form of hyperglycemia in pregnancy, 16% of these may be due to DIP, and 84% related to GDM.^[2] Other studies showed that the incidence of GDM raised from 2–6% to 15–20%.^[3,4] According to Zhu *et al.*'s study^[5] in this issue, one of every five (20%) pregnant women in Beijing was with hyperglycemia. We focus on the management of GDM during pregnancy; at the same time, we are establishing

integrated care system for diabetic women before pregnancy, during pregnancy, and post pregnancy. In addition, we pay more attention on the management of high-risk diabetic women from treatment to prevention.

BEFORE PREGNANCY – PLANNED PREGNANCY

During pregnancy, undiagnosed diabetes can cause serious adverse effects on maternal and perinatal outcomes^[6] while satisfactory glycemic control could reduce these risks.^[7] Thus, we suggest all women who are preparing for pregnancy need to screen for diabetes. According to the “*Diagnosis and management guideline of pregnancy with diabetes mellitus*” adopted by the Chinese Society of Obstetrics and Gynecology in 2014,^[8] women with diabetes, impaired glucose tolerance, impaired fasting glucose, and a history of GDM should seek for prepregnancy counseling, who need to control blood glucose at the appropriate level before pregnancy. Women with diabetes should control their prepregnancy glycated hemoglobin levels to <6.5%, and those who inject insulin can be allowed to <7.0%.

DURING PREGNANCY – DIAGNOSIS, TREATMENT, AND PREVENTION

First prenatal visit: Screening the patient who missed diagnosis of overt diabetes before pregnancy

If the blood glucose test has been missed before pregnancy, it should be done at the first prenatal visit; therefore, overt diabetes could be diagnosed at the beginning of pregnancy. If the fasting plasma glucose (FPG) level is ≥ 7.0 mmol/L

Address for correspondence: Prof. Hui-Xia Yang,
Department of Obstetrics and Gynecology, Peking University First
Hospital, Beijing 100034, China
E-Mail: yanghuixia@bjmu.edu.cn

Access this article online

Quick Response Code:



Website:
www.cmj.org

DOI:
10.4103/0366-6999.204938

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

© 2017 Chinese Medical Journal | Produced by Wolters Kluwer - Medknow

Received: 07-03-2017 **Edited by:** Li-Min Chen
How to cite this article: Song G, Wang C, Yang HX. Diabetes Management beyond Pregnancy. Chin Med J 2017;130:1009-11.

and/or the 2-h plasma glucose level is ≥ 11.1 mmol/L after a 75-g oral glucose tolerance test (OGTT) or the random plasma glucose level is ≥ 11.1 mmol/L with symptoms of diabetes, a diagnosis of DIP should be made. Women with FPG levels ≥ 5.1 mmol/L meanwhile < 7.0 mmol/L cannot be diagnosed GDM directly, because the FPG will decrease with the increasing gestational age, but they should be considered as high-risk population of developing GDM, and nutrition and exercise recommendation should be provided.^[3,9]

DIAGNOSIS OF GESTATIONAL DIABETES MELLITUS

According to *the guidance of GDM in China in 2014*,^[8] the standard we have been used since 2011,^[10] a single-step 75-g OGTT test should be performed at 24–28 weeks of gestation or at any period during pregnancy for women who visit clinic after 28 weeks of gestation. If any point plasma glucose values exceed the standard (FPG 5.1 mmol/L, 1 h post-OGTT 10.0 mmol/L, 2-h post-OGTT 8.5 mmol/L), a diagnosis of GDM would be made.

In the low-resource areas, another strategy of screening for GDM can be carried out. In 24–28 weeks of gestation, if FPG level is < 4.4 mmol/L, GDM can almost be ruled out; if FPG level is ≥ 5.1 mmol/L, GDM can be diagnosed directly; if FPG level is ≥ 4.4 mmol/L and < 5.1 mmol/L, women need to return for a 75-g OGTT. Based on this strategy, more than 45% pregnant women can avoid the 75-g OGTT in China.^[11]

MANAGEMENT OF GESTATIONAL DIABETES MELLITUS

When GDM was detected, the mainstay of treatment of GDM remains lifestyle intervention, including medical nutrition therapy and physical exercise. If the lifestyle intervention is insufficient to maintain normoglycemia, pharmacological management would be used.

Feng *et al.*'s study^[12] in this issue shows that various characteristics of OGTT were associated with different adverse outcomes. For example, pregnant women with GDM and abnormal fasting glucose had a higher risk of macrosomia, large-for-gestational-age child, and cesarean delivery than those with normal fasting glucose, and those with GDM and hyperglycemia at OGTT-2h had a higher risk of preterm birth and small-for-gestational-age child than those with normal glucose at OGTT-2h. This reminds us a careful reconsideration for GDM with hierarchical and individualized management according to OGTT characteristics is needed. We will establish near to normal metabolic control to minimize the morbidity and mortality of mother and child. Most of them could maintain ideal blood glucose level just after diet and behavioral adjustments, but some of them will require medical intervention with insulin or a hypoglycemic agent.

Insulin is still the first choice when healthy lifestyle intervention failed. Obstetrics in major hospitals in China have basically mastered the use of insulin in the recent years, and metformin has been gradually used in

the management of GDM in some of the top hospitals. FIGO believes that insulin and metformin used for GDM in late pregnancy are safe and effective and can be used as first-line treatment of hyperglycemia.^[2] Recently, the safety and efficacy of metformin have been proven constantly, especially in overweight and obese population.^[13] Compared with insulin and other hypoglycemic drugs, metformin can improve insulin sensitivity, reduce maternal weight gain during pregnancy, and minimize the risk of hypoglycemia.^[14] According to most maternal and neonatal outcomes, metformin is an effective and safe alternative to insulin for GDM patients.^[15] Long-term side effects of metformin in GDM offspring still need to be studied in the future.

PREVENTION OF GESTATIONAL DIABETES MELLITUS

In the past few decades, we have paid great attention on the management and treatment of GDM and made a lot of outstanding achievements. And now, we need to draw more attention on prevention. The prevention can radically reduce the number of GDM. One of our studies has shown that exercise could lead to a 45.8% reduction of GDM in overweight and obese pregnant women.^[16] However, there is no unified and clear guideline for physical activity during pregnancy. Many organizations recommend that for pregnant women without contraindications to exercise, an accumulated time for moderate exercise of ≥ 30 min on most, if not all, days of the week (at least 150 min/week) is needed during pregnancy and the postpartum period.

AFTER PREGNANCY: POSTPARTUM FOLLOW-UP

The risk of DM was significantly higher in GDM patients. A study reported that women who had GDM have at least a 7-fold increased risk of developing type 2 diabetes compared with those who had a normoglycemic pregnancy,^[17] making GDM one of the strongest predictors of type 2 diabetes. Almost all guidelines suggest that attention should be paid to the postpartum follow-up of GDM. Postpartum follow-up not only deals with the problem of maternal and perinatal complications but also includes early prevention of obesity, diabetes, hypertension, and cardiovascular disease. For those mothers with GDM history, guidance between the two pregnancies becomes quite necessary. The FIGO guideline suggests that lifestyle intervention should last for life. The Diabetes Prevention Programme (DPP) showed that in GDM women, lifestyle intervention and metformin therapy can reduce the incidence of diabetes at 53% and 50% in the 4th year after childbirth,^[18] and in the 10th year after childbirth, the reduced rates were 35% and 40%, respectively.^[19]

It is known that the cycle of “diabetes begetting diabetes,” it seems so fateful and unbreakable. However, we also believe that, through our unremitting efforts, the care system for diabetic women all through their life – before pregnancy, during pregnancy, and after pregnancy – will be established, we do more prevention as well as treatment, and the cycle

will be weaker and weaker, that will be our ultimate dream and final goal.

REFERENCES

1. Xu Y, Wang L, He J, Bi Y, Li M, Wang T, *et al*. Prevalence and control of diabetes in Chinese adults. *JAMA* 2013;310:948-59. doi: 10.1001/jama.2013.168118.
2. Hod M, Kapur A, Sacks DA, Hadar E, Agarwal M, Di Renzo GC, *et al*. The International Federation of Gynecology and Obstetrics (FIGO) Initiative on gestational diabetes mellitus: A pragmatic guide for diagnosis, management, and care. *Int J Gynaecol Obstet* 2015;131 Suppl 3:S173-211. doi: 10.1016/S0020-7292(15)30007-2.
3. Zhu WW, Yang HX, Wei YM, Yan J, Wang ZL, Li XL, *et al*. Evaluation of the value of fasting plasma glucose in the first prenatal visit to diagnose gestational diabetes mellitus in China. *Diabetes Care* 2013;36:586-90. doi: 10.2337/dc12-1157.
4. Wei Y, Yang H, Zhu W, Yang H, Li H, Yan J, *et al*. International Association of Diabetes and Pregnancy Study Group criteria is suitable for gestational diabetes mellitus diagnosis: Further evidence from China. *Chin Med J* 2014;127:3553-6. doi: 10.3760/cma.j.issn.0366-6999.20140898.
5. Zhu WW, Yang HX, Wang C, Su RN, Feng H, Kapur A. High prevalence of gestational diabetes mellitus in Beijing: Effect of maternal birth weight and other risk factors. *Chin Med J* 2017;130:1019-25. doi: 10.4103/0366-6999.204930.
6. Corrado F, Pintauro B, D'Anna R, Santamaria A, Giunta L, Di Benedetto A. Perinatal outcome in a Caucasian population with gestational diabetes and preexisting diabetes first diagnosed in pregnancy. *Diabetes Metab* 2016;42:122-5. doi: 10.1016/j.diabet.2015.11.007.
7. American Diabetes Association. Standards of medical care in diabetes 2016: Summary of revisions. *Diabetes Care* 2016;39 Suppl 1:S4-5. doi: 10.2337/dc16-S003.
8. Obstetrics Subgroup, Chinese Society of Obstetrics and Gynecology, Chinese Medical Association; Group of Pregnancy with Diabetes Mellitus, Chinese Society of Perinatal Medicine, Chinese Medical Association; Obstetrics Subgroup Chinese Society of Obstetrics and Gynecology Chinese Medical Association; Group of Pregnancy with Diabetes Mellitus Chinese Society of Perinatal Medicine Chinese Medical Association. Diagnosis and therapy guideline of pregnancy with diabetes mellitus (in Chinese). *Chin J Obstet Gynecol* 2014;49:561-9. doi: 10.3760/cma.j.issn.0529-567x.2014.08.001.
9. Zhu WW, Yang HX, Wei YM, Yan J, Wang ZL, Li XL. Evaluation of the value of 81 fasting plasma glucose in the first prenatal visit to diagnose 82 gestational diabetes mellitus in China. *Diabetes Care* 2013;36:586-590. doi: 10.2337/dc12-1157.
10. Wei YM, Yang HX. Diagnosis and management of gestational diabetes mellitus in China. *Chin Med J* 2012;125:1206-8. doi: 10.3760/cma.j.issn.0366-6999.2012.07.002.
11. Wei YM, Yang HX, Zhu WW, Yang HY, Li HX, Kapur A. Effects of intervention to mild GDM on outcomes. *J Matern Fetal Neonatal Med* 2015;28:928-31. doi: 10.3109/14767058.2014.937697.
12. Feng H, Zhu WW, Yang HX, Wei HM, Wang C, Su RN, *et al*. Relationship between oral glucose tolerance test characteristics and adverse pregnancy outcomes among women with gestational diabetes mellitus. *Chin Med J* 2017;130:1012-8. doi: 10.4103/0366-6999.204928.
13. Lautatzis ME, Goulis DG, Vrontakis M. Efficacy and safety of metformin during pregnancy in women with gestational diabetes mellitus or polycystic ovary syndrome: A systematic review. *Metabolism* 2013;62:1522-34. doi: 10.1016/j.metabol.2013.06.006.
14. Gandhi P, Bustani R, Madhuvrata P, Farrell T. Introduction of metformin for gestational diabetes mellitus in clinical practice: Has it had an impact? *Eur J Obstet Gynecol Reprod Biol* 2012;160:147-50. doi: 10.1016/j.ejogrb.2011.11.018.
15. Feng Y, Yang H. Metformin – A potentially effective drug for gestational diabetes mellitus: A systematic review and meta-analysis. *J Matern Fetal Neonatal Med* 2016;9:1-8. doi: 10.1080/14767058.2016.1228061.
16. Wang C, Wei Y, Zhang X, Zhang Y, Xu Q, Su S, *et al*. Effect of regular exercise commenced in early pregnancy on the incidence of gestational diabetes mellitus in overweight and obese pregnant women: A randomized controlled trial. *Diabetes Care* 2016;39:e163-4. doi: 10.2337/dc16-1320.
17. Bellamy L, Casas JP, Hingorani AD, Williams D. Type 2 diabetes mellitus after gestational diabetes: A systematic review and meta-analysis. *Lancet* 2009;373:1773-9. doi: 10.1016/S0140-6736(09)60731-5.
18. Ratner RE, Christophi CA, Metzger BE, Dabelea D, Bennett PH, Pi-Sunyer X, *et al*. Prevention of diabetes in women with a history of gestational diabetes: Effects of metformin and lifestyle interventions. *J Clin Endocrinol Metab* 2008;93:4774-9. doi: 10.1210/jc.2008-0772.
19. Aroda VR, Christophi CA, Edelstein SL, Zhang P, Herman WH, Barrett-Connor E, *et al*. The effect of lifestyle intervention and metformin on preventing or delaying diabetes among women with and without gestational diabetes: The Diabetes Prevention Program outcomes study 10-year follow-up. *J Clin Endocrinol Metab* 2015;100:1646-53. doi: 10.1210/jc.2014-3761.