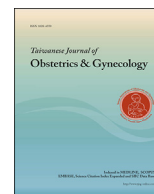




Contents lists available at ScienceDirect

Taiwanese Journal of Obstetrics & Gynecology

journal homepage: www.tjog-online.com

Original Article

Clinical significance of second-trimester 50-g glucose challenge test among Japanese women diagnosed as normoglycemic after first-trimester 75-g glucose tolerance test



Mamoru Morikawa*, Takahiro Yamada, Takashi Yamada, Takashi Kojima, Ryutaro Nishida, Kazutoshi Cho, Hisanori Minakami

Center for Perinatal Medicine, Hokkaido University Hospital, Sapporo, Japan

ARTICLE INFO

Article history:

Accepted 21 October 2014

Keywords:

gestational diabetes mellitus
glucose tolerance test
insulin resistance

ABSTRACT

Objective: This study was performed to determine how often Japanese women diagnosed as normoglycemic on first-trimester 75-g glucose tolerance test (75gGTT) later develop gestational diabetes mellitus (GDM).

Material and methods: Sixty-two women with random plasma glucose (PG) level ≥ 105 mg/dL during the first trimester and subsequent first-trimester diagnosis of normoglycemia with 75gGTT underwent 50-g glucose challenge test (50gGCT) during the second trimester. Twenty-one with a positive 50gGCT result (60-m PG ≥ 140 mg/dL) underwent second-trimester 75gGTT. First-trimester random PG levels and 75gGTT results were compared between 21 and 41 women with positive and negative 50gGCT results, respectively. Changes in immunoreactive insulin (IRI) associated with 75gGTT were determined simultaneously.

Results: All 21 women with a positive 50gGCT result showed normoglycemia on second-trimester 75gGTT. Thus, none of the 62 women developed GDM. Insulin resistance increased significantly in the 21 women with 75gGTT during the first and second trimesters, as indicated by increases in homeostasis model assessment for insulin resistance (HOMA-IR) and homeostasis model assessment for β -cell function (HOMA- β) with no significant changes in preload or afterload PG levels. Neither random PG levels (116 ± 12 vs. 116 ± 12 mg/dL, respectively) nor 75gGTT results (86 ± 6 vs. 84 ± 5 mg/dL for 0-minute [0-m] PG level, 130 ± 28 vs. 131 ± 25 mg/dL for 60-m PG, and 111 ± 19 vs. 118 ± 18 mg/dL for 120-m PG, respectively) during the first trimester differed significantly between the 41 and 21 women with negative and positive second-trimester 50gGCT results, respectively.

Conclusion: Although insulin resistance increased in the second trimester, risk of developing GDM was $< 1/62$ among Japanese women in whom hyperglycemia was excluded with first-trimester GTT.

Copyright © 2016, Taiwan Association of Obstetrics & Gynecology. Published by Elsevier Taiwan LLC. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

The Japanese guidelines for obstetric practice issued in 2011 [1] specify that pregnant women should be screened for hyperglycemia in a two-step manner: measurement of random plasma glucose (PG) level during the first trimester and subsequent 75-g glucose tolerance test (75gGTT) in women with random PG

level ≥ 95 mg/dL, ≥ 100 mg/dL, or ≥ 105 mg/dL at the facility's discretion; and measurement of random PG level or 50-g glucose challenge test (50gGCT) during the second trimester for women not diagnosed with hyperglycemia in the first trimester. Women exhibiting a second-trimester random PG level ≥ 100 mg/dL or a positive 50gGCT result (60-minute [60-m] PG level ≥ 140 mg/dL) undergo subsequent 75gGTT during the second trimester (at gestational week [GW] 24–28). Thus, a certain fraction of women undergo GTT twice during pregnancy in accordance with the guidelines. [1] However, how often Japanese women with normoglycemia on 75gGTT in the first trimester are diagnosed as having GDM based on 50gGCT and subsequent 75gGTT in the second

* Corresponding author. Department of Obstetrics and Gynecology, Hokkaido University School of Medicine, Kita-ku N15 W7, Sapporo 060-8638, Japan.

E-mail address: mmamoru@med.hokudai.ac.jp (M. Morikawa).

trimester has not been studied extensively. We conducted this retrospective study to address this issue.

Materials and methods

This study was conducted with the approval of the institutional review board of Hokkaido University Hospital. Among 1068 women who gave birth at our institution during the period between January 2009 and December 2012, a total of 77 pregnant women with a first-trimester (GW 10–12) random PG level ≥ 105 mg/dL underwent 75gGTT during the first trimester (GW 12–14). Fifteen (19%) of the 77 women were diagnosed as having hyperglycemia, including 14 with gestational diabetes mellitus (GDM) and one with overt diabetes in pregnancy, whereas the remaining 62 (81%) were diagnosed as normoglycemic based on the criteria adopted in 2010 by the Japan Society of Obstetrics and Gynecology (Figure 1) [1]; briefly, normoglycemia was diagnosed in women with fasting PG level < 92 mg/dL (5.1 mmol/L), 60-min PG level < 180 mg/dL (10.0 mmol/L), and 120-minute (120-m) PG level < 153 mg/dL (8.5 mmol/L) after 75gGTT. The percentage of women with normoglycemia after first-trimester 75gGTT did not differ according to the first-trimester random PG level (Table 1). These 62 women with a diagnosis of normoglycemia on first-trimester 75gGTT were included in the present study.

All of the 62 participants included in the study underwent 50gGCT during the second trimester (GW 24–28). Forty-one women with a negative 50gGCT result (60-m PG level < 140 mg/dL) were finally diagnosed as having normoglycemia, and 21 women with a positive 50gGCT result subsequently underwent 75gGTT during the second trimester (GW 24–28). Thus, 21 women underwent 75gGTT twice during pregnancy.

By using blood samples obtained during the GTT, immunoreactive insulin (IRI) was determined by enzyme immunoassay (EIA) (Tosoh Inc., Tokyo, Japan). The insulin secretory capacity and the insulin sensitivity/resistance ratio were assessed using several indices, including the quantitative insulin sensitivity check index (QUICKI), [2] the homeostasis model assessment for insulin resistance (HOMA-IR), [3] and the homeostasis model assessment for β -cell function (HOMA- β). [3].

All data are presented as the means \pm SD. The two-sample *t*-test, Kruskal–Wallis test, Mann–Whitney U-test, Wilcoxon's test, and analysis of variance (ANOVA) were used to analyze the results. Fisher's exact test was used to compare frequencies. In all analyzes, $p < 0.05$ was taken to indicate statistical significance. The statistical

software package StatView 5.0 for Macintosh (SAS Institute Inc. Cary, NC) was used for all data analyzes.

Results

None of the 21 women with second-trimester 75gGTT showed a positive test result (Figure 1). Thus, none of the 62 women with a diagnosis of normoglycemia after the first-trimester 75gGTT developed GDM. Mean birth weight expressed as the standard deviation (SD) score was 0.174 for 62 infants born to these 62 women and 9.7% of the 62 infants had a birth weight ≥ 3500 g (Table 1).

Comparison of 75gGTT results obtained during the first and second trimesters in 21 women

Twenty-one of the 62 women with a negative 75gGTT result during the first trimester showed a positive test result on the second-trimester 50gGCT and again underwent 75gGTT during the second trimester (Table 2). In these 21 women, neither the fasting PG level 60-m PG level nor 120-m PG level differed significantly between 75gGTT results of the first and second trimesters. However, insulin resistance increased in the second trimester compared with the first trimester: fasting IRI was significantly higher for second-trimester than first trimester 75gGTT in the presence of similar fasting PG level; HOMA-IR and HOMA- β increased significantly in the second trimester; and QUIKI decreased significantly in the second trimester.

Comparison of women with positive and negative 50gGCT results

Sixty-two women were divided into two groups according to the results of 50gGCT performed during the second trimester. There were no differences between the two groups in random PG levels determined during the first trimester, prepregnancy body mass index (BMI), rate of cesarean delivery, gestational week at delivery, infant birth weight, fetal growth, or PG and IRI profiles on 75gGTT performed during the first trimester (Table 3).

Discussion

In the present study, none of 62 Japanese women diagnosed as normoglycemic on 75gGTT during the first trimester following first-trimester random PG level ≥ 105 mg/dL developed GDM. However, 21 (34%) of the 62 women exhibited a positive 50gGCT result performed during the second trimester. There were no differences in parameters, such as prepregnancy BMI, infant birth weight, or profiles of PG and IRI on 75gGTT during the first trimester, between the 41 and 21 women with negative and positive 50gGCT results, respectively. Furthermore, in the 21 women undergoing 75gGTT twice during first and second trimesters, there were no significant differences in fasting PG, 60-m PG, or 120-m PG levels between the two tests, although insulin resistance increased in the second trimester compared with the first trimester. These results suggested that, among normoglycemic women on 75gGTT during the first trimester, the 50gGCT during the second trimester had limited clinical usefulness for detection of GDM.

The International Association of Diabetes and Pregnancy Study Groups (IADPSG) consensus panel acknowledged that there have been insufficient studies performed to determine whether there is a benefit of GTT before the usual window of GW 24–28. [4] Thus, it has not been determined whether 75gGTT performed during the first trimester is effective for excluding subsequent risk of GDM. The results of the present study suggested that the absolute risk of developing GDM was $< 1/62$ among Japanese women diagnosed

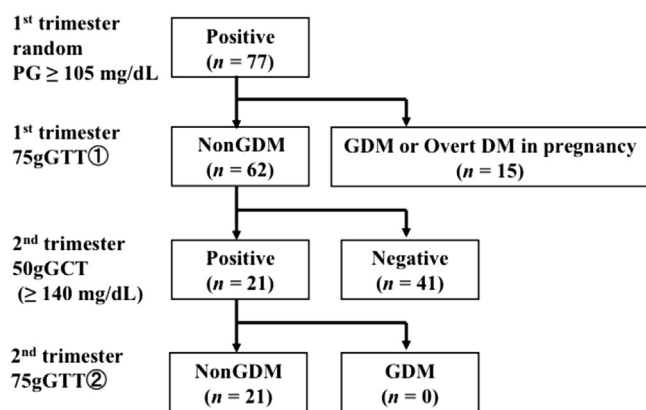


Figure 1. Flow chart for selection of 62 study participants and subsequent outcomes. DM = diabetes mellitus; GCT = glucose challenge test; GDM = gestational diabetes mellitus; GTT = glucose tolerance test; PG = plasma glucose.

Download English Version:

<https://daneshyari.com/en/article/3975006>

Download Persian Version:

<https://daneshyari.com/article/3975006>

[Daneshyari.com](https://daneshyari.com)