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A retrospective multi-institutional study of treatment for mild gestational diabetes in Japan

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ABSTRACT

Aims: To determine whether treating mild gestational diabetes mellitus (GDM) is associated with improvement of pregnancy outcomes in Japan.

Methods: In a multi-institutional retrospective study, we examined pregnant women meeting the criteria for mild GDM (i.e., only one abnormal value [OAV] for 75-g OGTT; fasting glucose ≥ 100 mg/dL, 1-h postprandial glucose ≥ 180 mg/dL, and 2-h postprandial glucose ≥ 150 mg/dL), receiving either routine prenatal care (non-treatment group) or dietary intervention alone or dietary intervention with self-monitoring of blood glucose and/or insulin therapy, if necessary (treatment group). Pregnancy outcomes were compared between these groups.

Results: Data from 893 eligible women were collected from 30 institutions. Participants included 542 untreated and 351 treated women. Although there were no significant differences in baseline clinical characteristics or maternal and perinatal outcomes between these groups, the incidence of large-for-gestational-age (LGA) infants was lower in the treatment group ($P = 0.07$). Multiple logistic regression analysis (MLRA) revealed that pre-pregnancy BMI and gestational weight gain were associated with LGA infants, while 75-g OGTT results were unrelated to LGA. When overweight and obese women were the subjects, the number of LGA infants was significantly lower in the intervention than in the control group, and gestational weight gain was significantly lower in the treatment than in the control group. MLRA showed that intervention was significantly related to a lower incidence of LGA infants.

Conclusions: Our study suggests that maternal BMI impacts fetal growth and that treatment for overweight or obese mothers with OAV is associated with a lower frequency of LGA infants.

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1. Introduction

Gestational diabetes mellitus (GDM) is defined as glucose intolerance that first occurs or is first identified during pregnancy [1]. New criteria for diagnosing GDM were recently proposed by the International Association of Diabetes in Pregnancy Study Group (IADPSG) [2]. Maternal hyperglycemia correlates with adverse maternal, fetal, and/or neonatal outcomes [3]. The new criteria are based primarily on glucose levels associated with a 1.75-fold increased risk of giving birth to a large-for-gestational-age (LGA) infant in the Hyperglycemia Adverse Pregnancy Outcome (HAPO) study [3]. The frequency of this condition is increasing worldwide. In fact, the new criteria will result in a GDM prevalence of 17.8% [2], doubling the numbers of pregnant women currently diagnosed. LGA infants are well known to be a significant obstetrical complication of GDM [4,5]. The neonatal complications of GDM, including hypoglycemia and hypocalcemia, are due mainly to fetal hyperinsulinemia, which results from maternal hyperglycemia. The long-term complications of GDM are type 2 diabetes development in the mother [6,7] and diabetes and/or obesity in their offspring [8,9].

In 2010, the criteria for diagnosing GDM proposed by the IADPSG were adopted in Japan. The frequency of GDM consequently increased 2–4-fold as compared with the previous criteria [10], i.e., meeting at least two of three threshold values from a 75-g oral glucose tolerance test (OGTT); fasting glucose ≥ 100 mg/dL, 1-h postprandial glucose ≥ 180 mg/dL, and 2-h postprandial glucose ≥ 150 mg/dL, as

proposed by the Japan Society of Obstetrics and Gynecology (JSOG) [11]. These criteria are similar to those proposed by the IADPSG (meeting at least two of three threshold values from a 75-g OGTT; fasting plasma glucose ≥ 92 mg/dL, 1-h plasma glucose ≥ 180 mg/dL, and 2-h plasma glucose ≥ 153 mg/dL) [10] and the American Diabetes Association (meeting at least two of three threshold values from a 75-g OGTT; fasting plasma glucose ≥ 95 mg/dL, 1-h plasma glucose ≥ 180 mg/dL, and 2-h plasma glucose ≥ 155 mg/dL) [12]. Among women with newly diagnosed GDM, most had only one abnormal value (OAV) based on the JSOG criteria [our unpublished data, under submission]. A multi-institutional retrospective review was thus performed by the Japan GDM Study Group (JGSG) to assess whether the treatment of mild GDM, i.e., one abnormal OGTT value, improves pregnancy outcomes in Japan.

2. Materials and methods

2.1. Study design

The present retrospective study was conducted in 30 general hospitals in Japan from 2005 to 2010. The protocol was approved by the ethics committee at each of the 30 collaborating centers. All women with a singleton pregnancy and no prior diagnosis of diabetes mellitus were included. Women with multi-fetal gestations, pre-gestational diabetes, previous treatment for gestational diabetes or an active chronic systemic disease other than chronic hypertension, and those with the second of two pregnancies in the same year

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