Can J Diabetes 39 (2015) 128–132

Contents lists available at ScienceDirect

Canadian Journal of Diabetes

journal homepage: www.canadianjournalofdiabetes.com

Original Research

Evaluation of the International Association of the Diabetes in Pregnancy Study Group New Criteria: Gestational Diabetes Project

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ARTICLE INFO

Article history:
Received 13 July 2014
Received in revised form
5 September 2014
Accepted 24 September 2014

Keywords:
gestational diabetes
new diagnostic criteria

ABSTRACT

Objective: To examine the diagnostic rates of gestational diabetes (GDM) and maternal/fetal outcomes before and after replacement of the Carpenter and Coustan (C&C) criteria with the International Association Diabetes Pregnancy Study Group (IADPSG) criteria.
Methods: A retrospective analysis of all pregnancies in 2 separate 6-month cohorts in the province of British Columbia. The first C&C cohort was defined as a 6-month period prior to the introduction of the IADPSG 75 g glucose tolerance test on October 1, 2010. The IADPSG cohort was studied during a 6-month period after the change.
Results: There was a significant increase in rates of GDM when using the IADPSG 75 g criteria, from 7.9% (1838 of 23 211) to 9.4% (2104 of 22 397). There were no significant changes in maternal outcomes when using the IADPSG criteria (caesarean section, induction of labour, perineal laceration, pregnancy-induced hypertension, antepartum hemorrhage >20 weeks or postpartum hospital length of stay). The caesarean section rate was not increased according to multivariate analysis (30.9% vs. 29.7%; p=0.073). There were no significant changes in most fetal outcomes when using the IADPSG criteria (mean gestational age at birth, premature birth, meconium, birth trauma, mean birth weight, large for gestational age, small for gestational age, intrauterine growth restriction), but neonatal hypoglycemia was significantly higher (1.6 % vs. 1.3 %; p=0.007).
Conclusions: The rates of GDM were higher when using the new IADPSG criteria. Overall, all of the maternal and most of the fetal outcomes were similar.

Mots clés :
diabète gestationnel
nouveaux critères diagnostiques

RÉSUMÉ

Objectif : Examiner les taux de diagnostic du diabète gestationnel (DG), et les résultats maternels et fœtaux, avant et après le remplacement des critères de Carpenter et Coustan (C&C) par les critères de l'Association internationale des groupes d'études sur le diabète gestationnel (IADPSG : International Association of the Diabetes and Pregnancy Study Groups).
Méthodes : Une analyse rétrospective de toutes les grossesses en 2 cohortes distinctes de 6 mois a été réalisée en Colombie-Britannique. La première cohorte C&C a été définie par la période de 6 mois précédant l'introduction le 1er octobre 2010 de l'épreuve d'hyperglycémie provoquée par l'ingestion de 75 g selon les critères de l'IADPSG. La cohorte IADPSG a été étudiée durant une période de 6 mois après le changement.
Résultats : Il y a eu une augmentation significative des taux de DG lors de l'utilisation de l'épreuve d'hyperglycémie provoquée par l'ingestion de 75 g de glucose selon les critères de l'IADPSG, de 7,9 % (1838 sur 23 211) à 9,4 % (2104 sur 22 397). Il n'y a eu aucun changement dans les résultats maternels lors de l'utilisation des critères de l'IADPSG (césarienne, déclenchement du travail, déchirure périnéale, hypertension gravidique, hémorragie *ante partum* > 20 semaines ou durée du séjour à l'hôpital après l'accouchement). Selon l'analyse multivariée, le taux de césarienne n'a pas augmenté (30,9 % *vs* 29,7 %; p = 0,073). Il n'y a eu aucun changement significatif dans la plupart des résultats fœtaux lors de l'utilisation des critères de l'IADPSG (âge gestationnel moyen à la naissance, naissance prématurée, méconium, traumatisme de la naissance, poids de naissance moyen, grand pour l'âge gestationnel, petit pour

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1499-2671/$ – see front matter © 2015 Canadian Diabetes Association
http://dx.doi.org/10.1016/j.jcjd.2014.09.007

l'âge gestationnel, retard de croissance intra-utérin), mais l'hypoglycémie néonatale a été significativement plus élevée (1,6 % *vs* 1,3 %; p = 0,007).
Conclusions : Les taux de DG ont été plus élevés lors de l'utilisation des nouveaux critères de l'IADPSG. Dans l'ensemble, tous les résultats maternels et la plupart des résultats fœtaux ont été similaires.

Introduction

Gestational diabetes (GDM) is defined as carbohydrate intolerance that is first recognized in pregnancy. For many decades, the Carpenter and Coustan (C&C) criteria have been the gold standard diagnostic test for GDM in our region. This test, originally derived from the O'Sullivan and Mahan criteria, was designed to predict the risk for developing type 2 diabetes postpartum, not to predict the risk for developing the complications of GDM (1). The International Association of the Diabetes in Pregnancy Study Group (IADPSG) proposed new diagnostic criteria for the diagnosis of GDM and eliminated the category of glucose intolerance/impaired fasting glucose of pregnancy (2). The new criteria are based on the Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) study, which prospectively examined 23 316 women who underwent a 75 g glucose tolerance test (GTT); subsequent glucose values correlated with clinical outcomes (3). The new diagnostic test comprises a 75 g GTT, with 1 abnormal value being diagnostic of GDM (cutoff values fasting: 5.1 mmol/L; 1 hour post-test: 10.0 mmol/L; 2 hours post-test: 8.5 mmol/L). The new diagnostic criteria have been based on the HAPO study clinical outcomes (birth weight >90th percentile; fetal cord C-peptide >90 percentile and percent body fat >90th percentile. With an odds ratio of 1.75, approximately 16% of the HAPO cohort would be diagnosed with GDM (2).

British Columbia is Canada's westernmost province and has a population of approximately 4 million inhabitants (4). On October 1, 2010, the province adopted the IADPSG 75 g GTT and eliminated the C&C 100 g GTT. Prior to October 2010, the suggested standard approach to diagnosing GDM was to perform a 50 g glucose challenge test (GCT) between 24 and 28 weeks of gestation (cutoff value <7.8 mmol/L). Those who failed the screening 50 g GCT proceeded to a confirmatory 100 g oral glucose tolerance test. After October 1, 2010, the suggested approach to diagnosis of GDM was to perform a solitary 75 g GTT for screening and diagnostic purposes. The 50 g GCT was not eliminated, so physicians continued to have the choice of using a 50 g GCT followed by the new IADPSG 75 g GTT for those with failed 50 g GCTs. Following October 1, 2010, per IADPSG recommendations, those at high risk for GDM were recommended to have a fasting glucose and a glycated hemoglobin (A1C) test at the first prenatal visit. A fasting glucose of ≥5.1 mmol/L or an A1C ≥6.5% were diagnostic for GDM (overt diabetes).

Crowther et al (5) showed that GDM treatment improved outcomes; Landon et al (6) showed that GDM treatment improved secondary outcomes. A recent meta-analysis showed benefits of GDM treatment (7).

This analysis was an opportunity to evaluate the maternal and fetal outcomes of the 2 differing diagnostic strategies in our province.

Objectives

The first objective of this study was to compare the rate of GDM before vs. after a change in GDM diagnosis. The second objective was to compare the total maternal and fetal outcomes (non-GDM and GDM) of the 2 time periods. The baseline maternal characteristics examined were age, smoking, preexisting hypertension, pregravid weight, body mass index (BMI) and gravida. Smoking history, history of preexisting hypertension and pregravid weight were the only self-reported data. The maternal outcomes examined were caesarean section rate, induction of labour, gestational hypertension, antepartum hemorrhage >20 weeks, perineal laceration and postpartum length of stay. The fetal outcomes examined were mean gestational age, premature birth, meconium, birth trauma, mean birth weight, large for gestational age, small for gestational age, intrauterine growth restriction and neonatal hypoglycemia (<2.2 mmol/L).

Methods

This was a retrospective cohort study of all pregnancies during 2 time periods so we could compare the total outcomes of the 2 diagnostic strategies (those with and without GDM). The 2 time periods were compared.

Clinical baseline maternal characteristics, maternal outcomes and fetal outcomes were extracted from the British Columbia Perinatal Data Registry provided by Perinatal Services of British Columbia (PSBC). The BC Perinatal Data Registry is the Ministry of Health-sponsored database that captures nearly all births in the province of British Columbia. It includes more than 60 hospitals as well as births occurring at home that are attended by BC-registered midwives. The database contains maternal baseline characteristics, maternal delivery outcomes and newborn delivery outcomes. After every delivery in BC, a data source is completed and mailed to PSBC for entry into the perinatal database. The database flags subjects diagnosed specifically with GDM. There is no category in the database for borderline GDM. It was up to the individual clinicians who completed the data source sheet to categorize borderline GDM as GDM. Because the 2 time periods were 2 years apart, it was possible for a subject to be in both groups.

Clinical data from the BC Perinatal Data Registry was derived from 2 separate 6-month time periods. The 2 blocks of 6 months were chosen because they provided data on approximately 44 000 births (C&C and IADPSG cohorts). The exact dates were chosen to reflect births before and after changing to the IADPSG criteria: the C&C criteria era (April 1, 2009 through September 30, 2009) vs. the IADPSG criteria era (April 1, 2011 through September 30, 2011). These dates reflect the dates of birth rather than the dates of diagnostic testing. The province of British Columbia universally changed to the IADPSG criteria on October 1, 2010.

Inclusion criteria included all subjects who gave birth between April 1, 2011 and September 30, 2011, in the BC Perinatal Data Registry (IADPSG criteria), and all subjects in the PSBC database who gave birth between April 1, 2009 and September 30, 2009 (C&C criteria).

Data extraction and management, and statistical analysis

The rates of GDM in the prechange and postchange groups were compared using a 2-sample z test of proportions and a 95% confidence interval for the difference.

Comparisons of subgroups with respect to maternal baseline characteristics, maternal outcomes and fetal outcomes were made separately for each cohort, using independent 2-sample t tests and Mann-Whitney U tests for interval measures (e.g. age, pregravid