Original Research

Gestational Diabetes Screening

The International Association of the Diabetes and Pregnancy Study Groups Compared With Carpenter-Coustan Screening

R. Klara Feldman, MD, Ryan S. Tieu, MS, and Lyn Yasumura, MD

OBJECTIVE: To evaluate whether one-step gestational diabetes screening recommended by The International Association of the Diabetes and Pregnancy Study Groups (IADPSG) is associated with better maternal, perinatal, or neonatal outcomes than the two-step Carpenter-Coustan screening.

METHODS: In this before–after retrospective cohort study conducted between July 1, 2010, and December 31, 2013, we compared Carpenter-Coustan and IADPSG screening in patients with singleton pregnancies. All patients diagnosed with gestational diabetes received intensive teaching, home glucose monitoring, and medications as indicated. The primary outcome was the rate of large-for-gestational-age neonates. Secondary outcome measures were macrosomia (greater than 4,000 g), primary cesarean delivery, neonatal intensive care unit admission, preterm delivery, preeclampsia, and hyperbilirubinemia. We determined that a sample size of 2,782 per group was sufficient to detect a 2% difference in the primary outcome between groups with 80% power assuming a 10% incidence in the before group. The groups were compared using Fisher exact test for proportions and a χ^2 test for odds ratios.

RESULTS: In the before (Carpenter-Coustan) group, 513 (17%) of the 2,972 patients were diagnosed with gestational diabetes, and in the after (IADPSG) group, 847 (27%) of the 3,094 patients were so diagnosed ($P<.001$). There was no significant difference in rates of large for gestational age, 10% and 9%, respectively ($P=.25$). The IADPSG group had a significantly higher primary cesarean delivery rate—16% compared with 20% ($P<.001$), but there were no significant differences in any other pregnancy outcomes.

CONCLUSION: Although one-step screening was associated with more patients being treated for gestational diabetes, it was not associated with a decrease in large-for-gestational-age or macrosomic neonates but was associated with an increased rate of primary cesarean delivery. Our results did not support the IADPSG-recommended screening protocol.

(Obstet Gynecol 2016;127:10–7)
DOI: 10.1097/AOG.0000000000001132

See related editorial on page 3.

Gestational diabetes has been associated with preterm delivery, preeclampsia, macrosomia (birth weight greater than 4,000 g), increased risk of cesarean delivery for arrest disorders, shoulder dystocia, neonatal hyperbilirubinemia, and respiratory distress syndrome[1–5] as well as the later development of noninsulin-dependent diabetes mellitus.[6] Some studies show an association between fetal exposure to uncontrolled maternal blood glucose and subsequent neonatal and childhood obesity.[7,8]

Much controversy exists about how to identify gestational diabetes and whether the benefits of intervention justify the expense, the anxiety, and the possible risks associated with this diagnosis. For many years, health care providers in the United States have screened for gestational diabetes using a two-step test early in gestation in those patients deemed to be at high risk and a second test at 24–28 weeks of gestation to average-risk patients.[9] Values were considered abnormal if they exceeded those recommended by either the Carpenter and Coustan[10] and Fourth International Workshop-Conference Criteria[11] or the values designated by the National Diabetes Data

From the Departments of Obstetrics and Gynecology, Kaiser Permanente at Baldwin Park, Montebello, and Kaiser Permanente Baldwin Park Medical Center, Baldwin Park, and the Department of Research and Evaluation, Kaiser Permanente, Pasadena, California.

Supported by the Kaiser Permanente Regional Research Committee.

The authors thank Kevin Mau, MS, for his assistance with statistical analysis and Carol Walden, RN, for her data collection and case management.

Corresponding author: R. Klara Feldman, MD, Department of Obstetrics and Gynecology, Kaiser Permanente at Baldwin Park, 1550 Town Center Drive, Montebello, CA 90640; e-mail: klara.r.feldman@kp.org.

Financial Disclosure
The authors did not report any potential conflicts of interest.

ISSN: 0029-7844/16

Group.[12] The American College of Obstetricians and Gynecologists continues to recommend this two-step approach.

Based on observational studies that specifically evaluated maternal, perinatal, and neonatal outcomes, The International Association of the Diabetes and Pregnancy Study Groups (IADPSG) and the World Health Organization recommended new criteria for the diagnosis of gestational diabetes.[13] They recommend that a hemoglobin A_{1C} (Hb A_{1c}), a random plasma glucose, or a fasting plasma glucose test be performed at the first prenatal visit to identify undiagnosed pregestational diabetics and that a one-step 2-hour glucose tolerate test with a 75-g glucose load be performed at 24–28 weeks of gestation for those not identified as having pregestational diabetes.

In this study we sought to address whether changing from the traditional two-step Carpenter-Coustan screening recommended by the American College of Obstetricians and Gynecologists to the one-step test recommended by The International Association of Diabetes and Pregnancy Study Groups would be associated with meaningful improvements in maternal, perinatal, or neonatal outcomes.

MATERIALS AND METHODS

In November 2011, our hospital and affiliated clinics switched from the two-step Carpenter-Coustan screening approach to the one-step approach recommended by the IADPSG. We performed a before–after retrospective cohort study that compared patients before and after the change. We extracted demographic and obstetric data from the electronic medical record and verified it by selective chart review.

The sample consists of singleton pregnancies managed from the first trimester within the Kaiser Permanente Baldwin Park Medical Center and its affiliated clinics between July 1, 2010, and December 31, 2013. Mothers who were classified as diabetic before pregnancy were excluded. To keep the before and after groups statistically independent, patients were excluded if they had more than one pregnancy in the study period.

For the primary outcome of large birth weight for gestational age and sex (LGA), we determined that a sample size of 5,564 (2,782 per group) would allow the detection of an absolute rate difference of 2% between groups assuming a rate of 10% in the before group with 80% power at the 0.05 (two-tailed) significance level.

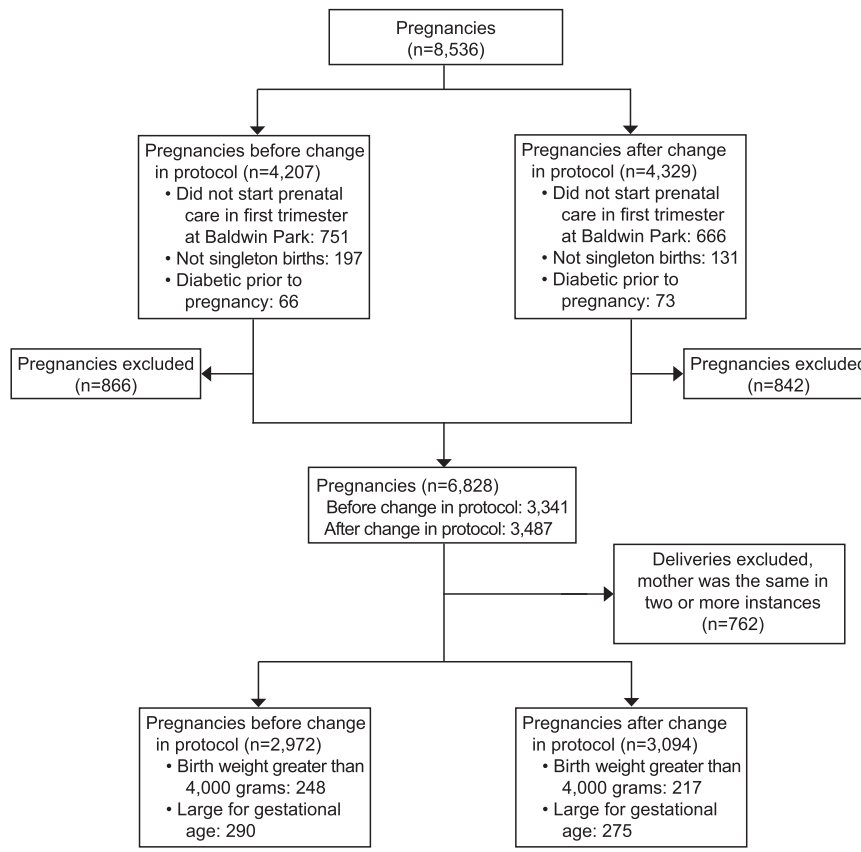

Fig. 1. Cohort selection criteria for before and after groups.

Feldman. Carpenter-Coustan Criteria vs IADPSG Criteria. Obstet Gynecol 2016.

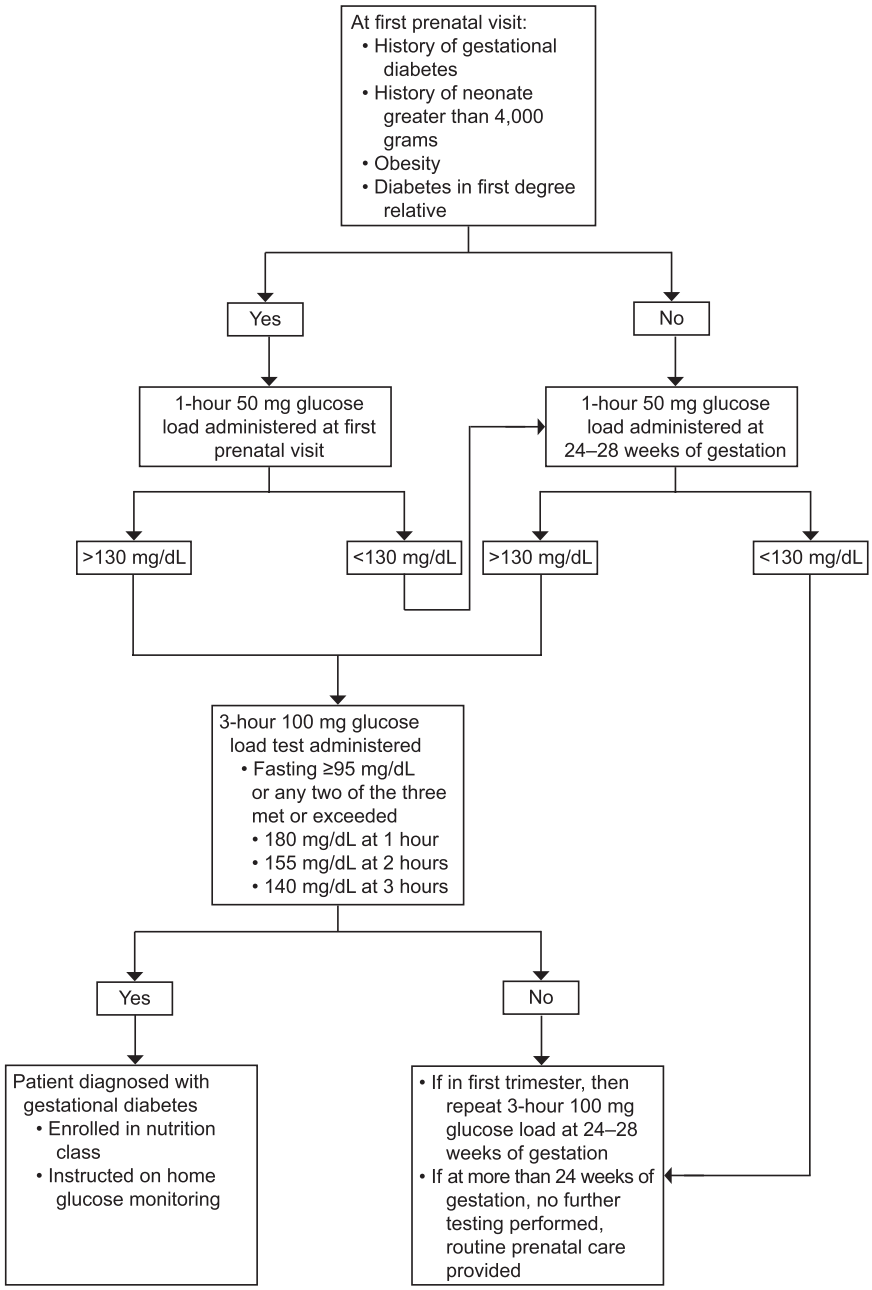

Fig. 2. The protocol for glucose screening in pregnancy before the change.

Feldman. Carpenter-Coustan Criteria vs IADPSG Criteria. Obstet Gynecol 2016.

Figures 1 and 2, respectively, illustrate the screening protocols used in the before and after groups. Patients with Hb A_{1c} levels of 6.5% or higher were considered to have overt diabetes. Because they had not been diagnosed with diabetes before the pregnancy, they were included in our treatment group and for statistical purposes were also categorized as having gestational diabetes. These patients were not excluded because our before group likely also had some patients with undiagnosed overt prepregnancy diabetes. Patients with Hb A_{1c} levels between 5.7 and 6.4 were diagnosed with prediabetes and were treated in a similar manner as those having gestational diabetes. For statistical purposes, they were also included with those having gestational diabetes.

The care of patients with gestational diabetes did not change over the time course of the study. Patients attended a nutrition class and began home glucose monitoring with a fasting and three postprandial tests. The patients were seen in the office every 1–4 weeks at the discretion of their health care provider.