



A Comparison of Maternal and Neonatal Outcomes with Two Diagnostic Strategies for Gestational Diabetes

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ABSTRACT

Objective: Consensus is lacking on the optimal diagnostic strategy for gestational diabetes (GDM). The objective of this study was to compare maternal and neonatal outcomes using two different criteria for GDM diagnosis: the International Association of Diabetes and Pregnancy Study Group (IADPSG) and Carpenter - Coustan (CC) two-step approaches.

Study Design: This was a retrospective cohort study of women with a singleton pregnancy delivering at ≥ 37 wks, between December 2010 and February 2015, in a single tertiary care center. IADPSG criteria were used from December 2010 until July 2013 when diagnostic guidelines changed to using CC criteria. Maternal and neonatal outcomes were compared between these two diagnostic epochs using bivariable and multivariable analyses. The primary outcome was the frequency of cesarean delivery. Secondary outcomes were shoulder dystocia, large for gestational age (LGA), neonatal intensive care unit (NICU) admission, preeclampsia and postpartum hemorrhage (PPH).

Results: 23,768 women were included in the analysis; 14,214 from the IADPSG epoch and 9,554 from the CC epoch. The incidence of GDM was higher using IADPSG compared to CC criteria (8.2% vs. 7.4%, $p=0.042$). Women who were screened using IADPSG criteria were younger (31.5y vs. 31.7y $p=0.030$), were less likely to be a racial/ethnic minority and delivered at an earlier gestational age (39.4wks vs. 39.5wks, $p<0.001$). Cesarean delivery, shoulder dystocia and NICU admission were significantly higher in women screened using IADPSG compared to CC criteria, whereas preeclampsia was less frequent during the IADPSG epoch. These findings persisted after adjusting for potential confounding factors. There were no differences in LGA or PPH based on screening strategy.

Conclusion: Compared to screening with CC, using IADPSG criteria for diagnosis of GDM was associated with a higher incidence of women diagnosed with GDM and lower frequency of preeclampsia; however this screening strategy was also associated with a higher incidence of cesarean delivery, shoulder dystocia, and NICU admission.

BACKGROUND

International consensus is still lacking on the diagnostic criteria for gestational diabetes (GDM)

In the U.S., screening and diagnosis for GDM involves a two-step approach with an initial 50-g glucose screen followed by a 3-hour oral glucose tolerance test using the Carpenter-Coustan criteria

In much of the world, a one-step approach of a 2-hour 75-g oral glucose tolerance test is employed to diagnose GDM by the International Association of the Diabetes and Pregnancy Study Groups (IADPSG)

ACOG and NICHD continue to support the two-step approach and call for additional well-conducted cohort studies to assess the impact of each strategy on clinical outcomes

OBJECTIVE

To compare maternal and neonatal outcomes using two different criteria for GDM diagnosis: the IADPSG one-step and Carpenter - Coustan (CC) two-step approaches

STUDY DESIGN

- Retrospective cohort study
- December 2010 until February 2015
- Inclusion criteria
 - Singleton gestation
 - Age 18-44
 - Delivery at $\geq 37^{0/7}$ weeks
- Exclusion criteria
 - Anomalous fetuses
 - Pre-gestational diabetes
- Comparison groups
 - IADPSG screening epoch (December 2010 - June 2013)
 - CC screening epoch (July 2013 - February 2015)
- Outcomes
 - Maternal: Cesarean delivery
 - Neonatal: Large-for-gestational-age infant, shoulder dystocia, NICU admission, respiratory distress syndrome, fetal or neonatal demise.

RESULTS

- 14,214 women were included in the IADPSG epoch and 9,554 women were included in the CC epoch
- GDM rates: 1,167 (8.2%) in the IADPSG epoch and 715 (7.4%) in the CC epoch ($p=0.042$)

Table I. Baseline characteristics

	IADPSG (N = 14,214)	Carpenter - Coustan (N =9,554)	P - value
Maternal age (years)	31.6 \pm 5.2	31.7 \pm 5.1	.031
Race/Ethnicity			.003
Non-Hispanic White	7,237 (50.9)	4,843 (50.7)	
Non-Hispanic Black	1,405 (9.9)	998 (10.5)	
Hispanic	2,468 (17.4)	1,717 (18.0)	
Other	926 (6.5)	684 (7.2)	
Missing	2,178 (15.3)	1,312 (13.7)	
Body Mass Index at delivery (kg/m ²)	30.1 \pm 5.5	30.2 \pm 5.3	.172
Nulliparous	7,429 (53.6)	4,959 (53.9)	.676
Gestational diabetes	1,167 (8.2)	715 (7.4)	.042
Prior cesarean delivery	1,379 (9.7)	906 (9.5)	.575
Induction of labor	104 (64.2)	2156 (55.0)	.159
Gestational age at delivery	39.4 \pm 1.0	39.5 \pm 1.1	<.001
Neonatal gender male	7,071 (50.2)	4,784 (50.5)	.577

RESULTS

Table II. Adverse perinatal outcomes

	IADPSG (N = 14,214)	Carpenter - Coustan (N =9,554)	P - value
Cesarean delivery	3,840 (27.0)	2,440 (25.5)	.025
Birthweight (kg)	3.41 \pm 0.44	3.42 \pm 0.45	.231
Large-for-gestational-age	1,328 (9.3)	952 (9.9)	.111
Shoulder dystocia	362 (2.6)	204 (2.1)	.041
Preeclampsia/ Gestational hypertension	980 (6.9)	736 (7.7)	.018
Postpartum hemorrhage	742 (5.2)	456 (4.8)	.160
Admission to NICU	458 (3.2)	196 (2.0)	<.001
Respiratory distress syndrome	71 (0.5)	39 (0.4)	.309
Fetal or neonatal death	9 (0.1)	12 (0.1)	.276

Table III. Multivariable regression for the association between type of GDM screen and adverse outcomes

	OR with 95% CI	aOR* with 95% CI
Cesarean delivery	1.7 (1.01 -1.14)	1.09 (1.02 - 1.15)
Shoulder dystocia	1.20 (1.01- 1.43)	1.22 (1.03 - 1.45)
Preeclampsia/ Gestational hypertension	0.89 (0.80- 0.98)	0.86 (0.78 - 0.95)
Admission to NICU	1.60 (1.34 -1.88)	1.62 (1.36 - 1.92)

*Adjusted for maternal age, race/ethnicity, and gestational age at delivery

CONCLUSION

- The IADPSG criteria for diagnosis of GDM was associated with a higher incidence of women diagnosed with GDM compared to CC criteria
- The IADPSG criteria was associated with lower frequency of preeclampsia
- The IADPSG screening strategy was associated with a higher incidence of cesarean delivery, shoulder dystocia, and NICU admission