Département femme-mère-enfant

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Potentially modifiable predictors of adverse neonatal outcomes in pregnancies complicated by gestational diabetes

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Introduction & Objectives

The incidence of Gestational Diabetes Mellitus (GDM) has increased during the past decades, reflecting the ongoing epidemics of obesity and Type 2 diabetes[1]. The aim of this study is to identify simple clinical predictors of adverse neonatal outcomes which are potentially modifiable in pregnancies complicated with GDM.

Methods

This prospective observational study included 575 singleton multiethnic pregnant women with GDM followed in the Diabetes and Pregnancy Unit of the University Hospital of Lausanne (C.H.U.V.) between 4/2012 and 2/2017. The patients were diagnosed after 13 weeks of gestational age, using the International Association of Diabetes and Pregnancy Study Groups (IADPSG) criteria.

The **investigated predictors** included:
- ✓ Glycated hemoglobin (HbA1c) at first booking and at the end of the pregnancy
- ✓ T0, T60, T120 glucose OGGT value
- ✓ BMI on 1st booking after GDM diagnosis
- ✓ Gestational weight gain
- ✓ Maternal treatment requirement (insulin and/or metformin vs no treatment)

The **neonatal and maternal outcomes** included:
- ➢ Large for gestational age (LGA- BW-centile > 90)
- ➢ Small for gestational age (SGA (BW-centile<10)
- ➢ Neonatal hypoglycemia (glycemia < 2.5 mmol/l)
- ➢ Prematurity (gestational age<37 weeks)
- ➢ Maternal caesarean section requirement

Statistical analysis: Data were analysed using linear or logistic regression analysis, adjusting for newborn sex, gestational age at birth, and maternal age. Predictors with P values<0.2 in the univariate analysis were entered in the multiple regression analysis model . A P value <0.05 was considered statistically significant.

Results

Table 1 contains the maternal and neonatal population characteristics expressed as mean value ±SD for continuous variables and % for binary variables. Table 2 resumes the significant predictors of the investigated neonatal and maternal outcomes in the multivariate analysis. Table 3 shows the probabilities of cesarean section and LGA risk according to median HbA1c and BMI at first booking.

Table 1: Population Characteristics

	Unit	Mean/Value	SD (±)
Maternal			
Age	Years	32.8	5.5
BMI at 1st booking	kg/m2	30	5.5
Gestational Weight Gain	kg	12.6	7.2
Treatment modality	% of population	None 42 Insulin±Metformin 50 Metformin 7	
HbA1c at 1st booking	%	5.5	0.4
HbA1c end of pregnancy	%	5.6	0.4
Cesarean section requirement	% of population	38.2	
Neonatal			
LGA	% of population	16.5	
SGA	% of population	9.4	
Prematurity	% of population	8.2	
Hypoglycemia	% of population	11	

Table 2: Significant predictors of neonatal and maternal outcomes

	aOR	95% CI		P value
LGA				
HbA1c end of pregnancy	5.08	1.36	18.96	0.015
Gestational Weight Gain	1.11	1.06	1.17	<0.001
Prematurity				
HbA1c end of pregnancy	14.38	1.79	115.52	0.012
Cesarean section				
BMI at 1st booking	1.13	1	1.27	0.0049
T60 OGTT glucose value	1.06	1.02	1.11	0.003
Hypoglycemia				
Maternal treatment requirement	2.03	1.06	3.88	0.032
SGA				
BMI at 1st booking	0.92	0.87	0.98	0.015

Table 3: Probabilities of cesarean section and LGA risk at first booking

BMI at 1st booking	HbA1c at 1st booking	Cesarean Section	LGA
< 25kg/m^2	< 5.5 %	27%	10%
< 25kg/m^2	≥ 5.5 %	38%	14%
≥ 25kg/m^2	< 5.5 %	37%	20%
≥ 25kg/m^2	≥ 5.5 %	48%	26%

Conclusions

HbA1c at the end of pregnancy constitutes a novel simple marker that may help clinicians in the management of women with GDM.
Other biological (OGTT T60 glucose value, HbA1c at 1st booking) as well as clinical (Maternal BMI at 1st booking, Gestational Weight Gain and Maternal treatment requirement) parameters may also be used to predict adverse neonatal and maternal outcomes in pregnancies complicated with GDM; the attention of physicians aught to be drawn to these parameters.
Precise and universal guidelines for maternal and neonatal follow-up and interventions (cesarean section, timing of delivery, neonatal glucose monitoring), depending on these clinical predictors, are required.

References

1. Ignell C, Claesson R, Anderberg E, Berntorp K. Trends in the prevalence of gestational diabetes mellitus in southern Sweden, 2003-2012. Acta Obstet Gynecol Scand. 2014 Apr;93(4):420-4.

This study was sponsored by an unrestricted educational grant from NovoNordisk