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

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Background

In Switzerland, the prevalence of gestational diabetes mellitus (GDM) is around 11%. GDM is associated with increased risk of neonatal complications, such as macrosomia, hypoglycemia, and admission to a neonatal unit. Maternal treatment modality influences clinical decisions such as the timing of labor induction, neonatal glucose monitoring and early feeding. However, data regarding this clinical practice as well as the most important parameters of adverse neonatal outcomes in routine care are lacking and if present, controversial.

Objective

The aim of the study was to identify simple clinical predictors of adverse neonatal outcomes that are potentially modifiable.

Methods

This prospective cohort study included 232 singleton pregnant women who presented with gestational diabetes (GDM) in the GDM unit of the CHUV between 4/2012 and 3/2016, for whom neonatal clinical data were available and who gave informed consent.

The **investigated predictors** included:

- ✓BMI before pregnancy
- ✓Gestational weight gain
- ✓Results of the 75 g oral glucose tolerance test (oGTT)
- ✓Treatment modality (insulin and/or metformin vs no treatment)
- ✓Foetal estimated weight by ultrasound (US) at 33 ± 1.6 weeks
- ✓Glycated haemoglobin (HbA1c) at the end of the pregnancy.

The **neonatal outcome variables** included:

- ➢BMI
- ➢Macrosomia (birthweight > 4kg)
- ➢Hypoglycemia (glycemia < 2.5 mmol/l)
- ➢Hospitalisation in a neonatal unit.

Statistical analysis
Data were analysed using linear or logistic regression analysis, adjusting for sex and gestational age at birth.

Results

Table 1. contains the maternal and neonatal population characteristics expressed as mean value ±SD for continuous variables and % for binary variables. Table 2. summarizes the significant predictors of the investigated neonatal outcomes.

Table 1: Population Characteristics

	Unit	Mean/Value	SD (±)
Maternal			
Age	Years	33.5	5
Pre-Pregnancy BMI	kg/m2	26.4	5.2
Weight Gain	kg	13.1	6.1
Treatment modality	% of population	Insulin: 49.8 Metformin: 6.8 Both: 3.4	
HbA1c end of pregnancy	%	5.6	0.4
Caesarian Delivery	% of population	39	
Neonatal			
`	Weeks	38.9	1.8
Birth Weight	g	3261.1	576.7
BMI	kg/m2	13.6	1.6
Macrosomia	% of population	7	
Hypoglycemia	% of population	12	
Neonatal Unit Admission	% of population	10.1	

Table 2: Predictors of neonatal outcomes

	Regr. Coef.	95% CI		P value
Predictors of Increased Neonatal BMI				
Maternal Pre-Pregnancy BMI	0.0427	0.0041	0.0814	0.030
Maternal Gestational Weight Gain	0.0398	0.0070	0.0725	0.018
US-estimated Fetal Weight	0.0028	0.0018	0.0039	<0.001
Maternal HbA1c end of pregnancy	0.7197	0.0450	1.3944	0.037
Predictors of Macrosomia				
Gestational Weight Gain	0.1258	0.0376	0.2141	0.005
Predictors of Hypoglycemia				
1h oGTT Glucose Value	0.2633	-0.0035	0.5301	0.053
2h oGTT Glucose Value	0.3526	0.0730	0.6323	0.013
Predictors of Neonatal Unit Admission				
1h oGTT Glucose Value	0.2883	-0.0097	0.5863	0.058
US-estimated Fetal Weight	-0.0045	-0.0086	-0.0005	0.028

Discussion & Conclusions

Weight-related and metabolic parameters, but not the treatment modality, predicted adverse neonatal outcomes. HbA1c at the end of pregnancy might represent a novel and simple clinical predictor of neonatal outcomes.

References

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