Establishing the relationship between third-trimester fetal abdominal circumference, birthweight and neonatal morbidity in gestational diabetes

Maria Teresa Pereira[1], Susana Garrido[1], Raquel Almeida[1], Joana Vilaverde[1], Fernando Pichel[2], Clara Pinto[3], Joaquim Gonçalves[3], Jorge Dores[1]
[1]Division of Endocrinology, Diabetes and Metabolism; [2]Division of Nutrition; [3]Division of Obstetrics. Centro Hospitalar do Porto, Porto, Portugal
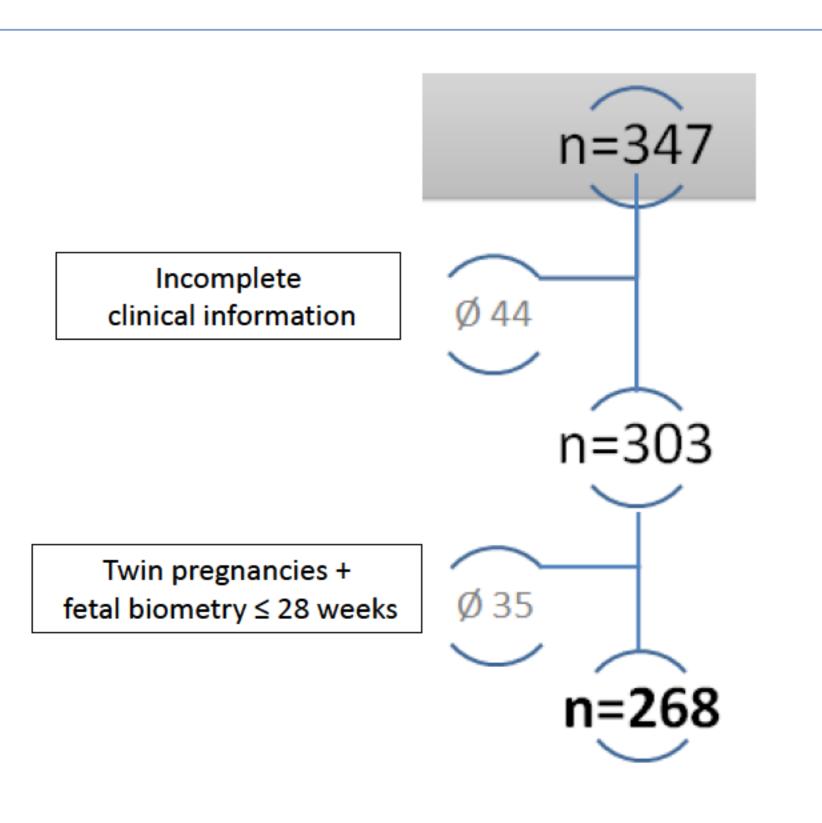
INTRODUCTION

Gestational diabetes (GD) is associated with a significantly higher risk of perinatal complications. It has been suggested that third-trimester (3^{th}T) fetal abdominal circumference ($_fAC$) determination is an important predictor of macrossomia and large for gestational age (LGA).

OBJECTIVE

The purpose of this study was to evaluate the association between the 3^{th}T $_fAC$ percentile with birthweight (BW) and adverse neonatal outcomes in a cohort of women with GD.

METHODS

- We retrospectively analyzed the $_fAC$ percentile of the 3^{th}T ultrasound screening in pregnant women with GD within a 2-years period in a central university hospital;
- We enrolled 268 pregnant women with singleton pregnancy undergoing routine fetal biometry after 28 weeks;
- We considered adverse neonatal outcomes: macrossomia (BW > 4 Kg), LGA[1], small for gestational age[1] (SGA), neonatal hypoglycemia and neonatal morbidity *compositum* (neonatal hypoglycemia and hyperbilirrubinemia, sepsis, admissions in ICU, neonatal respiratory distress syndrome, prematurity, traumatic delivery);
- The relationship between $_fAC$ and BW was explored using the Spearman's correlation;
- The relationship between $_fAC$ percentile groups (<50; ≥50) and adverse neonatal outcomes was performed using the Fisher's exact test.

RESULTS

Table 1- Descriptive analysis of some demographic and clinical variables (median; min-max)

Variable	Median (min-max)
Age, yrs	33 (17-52)
3^{th}T fetal biometry, weeks	36 (29-40)
$_fAC$ percentile, %	50 (1-100)
Delivery week, weeks	39 (29-41)
BW, g	3165 (1370-4450)

Table 2- Adverse neonatal outcomes, n and %

Adverse neonatal outcomes	n	%
Macrossomic newborns	12	4.5
LGA	24	9.0
SGA	25	9.3
Neonatal morbidity *compositum*	67	25
Neonatal hypoglycemia	5	1.9

Tables 4 and 5- Adverse neonatal outcomes differences between 3^{th}T fetal biometry week (<35 weeks vs ≥35 weeks) for both $_fAC$ percentile <50 and ≥50

3^{th}T $_fAC$ percentile <50

3^{th}T fetal biometry, weeks Variable	29-34 (n=43)	35-40 (n=77)	p*
Macrossomia, n (%)	0 (0)	1 (1.3)	1.000
LGA, n (%)	0 (0)	1 (1.3)	1.000
SGA, n (%)	7 (16.3)	18 (23.4)	0.483
Neonatal morbidity *compositum*, n (%)	13 (30.2)	25 (32.5)	0.841
Neonatal hypoglycemia, n (%)	0 (0)	1 (1.3)	1.000

3^{th}T $_fAC$ percentile ≥50

3^{th}T fetal biometry, weeks Variable	29-34 (n=45)	35-40 (n=103)	p*
Macrossomia, n (%)	5 (11.1)	6 (5.8)	0.336
LGA, n (%)	7 (15.6)	16 (15.5)	1.000
SGA, n (%)	0	0	-
Neonatal morbidity *compositum*, n (%)	11 (24.4)	18 (17.5)	0.511
Neonatal hypoglycemia, n (%)	3 (6.7)	1 (0.97)	0.100

*Fisher's exact test

p> 0.05

Table 3- Adverse neonatal outcomes differences between $_fAC$ percentile groups (<50; ≥50), n and %

$_fAC$ percentile Variable	<50 (n=120)	≥50 (n=148)	p*
Macrossomia, n (%)	1 (0.8)	11 (7.4)	0.014
LGA, n (%)	1 (0.8)	23 (15.5)	<0.001
SGA, n (%)	25 (20.8)	0 (0)	<0.001
Neonatal morbidity *compositum*, n (%)	38 (31.7)	29 (19.6)	0.033
Neonatal hypoglycemia, n (%)	1 (0.8)	4 (2.7)	0.384

*Fisher's exact test

R=+0.626, p<0.001 (R²=0.392)

- A strong positive correlation between $_fAC$ and BW **(R)**
- About 39% of the variation in BW may be explained by the predictor $_fAC$ **(R²)**

CONCLUSIONS

- The intrapartum $_fAC$ measurement was useful on the screening of fetal macrossomia and LGA;
- These results suggest that $_fAC$ measured by ultrasound can help to predict the BW and seems to be a valuable parameter to be included when we evaluate a gestational diabetic pregnant woman in order to decide the intensity of maternal hyperglycemia treatment;
- The 3^{th}T fetal biometry ultrasound week does not appear to influence the occurrence of adverse neonatal outcomes.

References: [1]Pedreira *et al*. Birth weight patterns by gestational age in Brazil. 2010.

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