Obstetric and neonatal outcomes in gestational diabetes: the influence of maternal body mass index and gestational weight gain

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Introduction: Due to the growing prevalence of obesity, more women are overweight in early pregnancy (1). Previous studies demonstrated that pre-obesity/obesity is associated with adverse neonatal and obstetric outcomes, namely pre-eclampsia, cesarean delivery, prematurity, macrosomia, neonatal intensive care unit admissions and stillbirth (2,3). There is also evidence that excessive gestational weight gain is associated with an increased risk of gestational hypertension, gestational diabetes (and, inclusively, pharmacological therapy), delivery by cesarean section, postpartum weight retention, macrosomia and neonatal intensive care unit admissions (4,5). Some studies also shown that obese women tend to have an earlier gestational diabetes, more insulin resistance with increased risk of type 2 diabetes, which might lead to a poorer long-term prognosis (6).

Objective: To evaluate the influence of maternal pre-pregnancy body mass index and gestational weight gain on blood glucose levels at diagnosis of gestational diabetes, obstetric and neonatal outcomes.

Methods: Retrospective observational study including women with gestational diabetes and follow-up at Baixo Vouga Hospital Center between January 2015 and June 2018. Multiple gestation pregnancies, cases of loss of follow-up and stillbirths were excluded. Pregnant women were divided in 4 categories according to pre-pregnancy body mass index: low weight (<18,5 Kg/m^2), normal weight (18,5-24,9 Kg/m^2), pre-obesity (25-29,9 Kg/m^2) and obesity (≥30 Kg/m^2). Categorical variables were compared using Kruskal-Wallis test, association was assessed by Pearson correlation and, posteriorly, logistic regression was performed. Statistic analysis was performed with SPSS 24.

Results: 462 cases of pregnant women, medium age of 32,65 years (SD 5,45) and medium body mass index of 27,29 Kg/m^2 (SD 5,57), with no significant differences in terms of macrosomia and gestational diabetes on previous gestation between maternal body mass index categories. In pregnant women with normal body mass index a familiar history of diabetes was found in less than 50% of cases, while in women with low weight, excessive weight or obesity the percentage of familiar history of diabetes was found in more than 50% (p 0,001). With respect to the trimester of diagnosis of gestational diabetes, 53,7% of women with normal body mass index and 55,8% with obesity were diagnosed in the first trimester (p 0,011). Body mass index positively and significantly correlated with fasting glucose level in the first (r=0,213; p 0,001) and second (r=0,210; p 0,001) trimester, even though not correlating with glucose level at 60 and 120 minutes. In what weight gain was concerned, 44,9% women with pre-obesity and 40,2% with obesity had excessive weight gain (p<0,05) and 65,1% of obese women required pharmacological treatment (p 0,05). There were no relevant differences between categories in terms of pre-eclampsia, hydramnios and prematurity, but gestational hypertension was more frequent in obese women (p 0,004). Although there were no differences in terms of neonatal morbidity, the majority of cesareans (40,3%) and large-for-gestational age birthweight (50%) occurred in women with obesity (p<0,05 and p

0,035, respectively). By adjusting for maternal age on logistic regression, body mass index had a predictive value only for macrosomia (adjusted OR 1,177 (1,006-1,376) p 0,041). Body mass index and weight gain were positively correlated with birth weight (r=0,132 p 0,005 and r=0,188 p 0,005 respectively), but not with gestational age.

Conclusion: Maternal obesity is associated with a higher probability of diagnosis of gestational diabetes in the first and fasting hyperglycemia in the second trimester, a consequence of associated insulin resistance. Overweight women require, more frequently, pharmacological therapy and, similarly to previous studies, are associated with gestational hypertension and cesarean delivery. However, in these women, there was no increase in the number of stillbirth or pre-eclampsia. Although Infants of obese women were, more frequently, macrosomic, there was no association with an increase of neonatal morbidity.

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