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Calcium Sensing Receptor in pregnancies complicated by gestational diabetes mellitus

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Calcium Sensing Receptor in pregnancies complicated by gestational diabetes mellitus

Abstract

Introduction: Infants born from mothers with Gestational diabetes mellitus (GDM) experience several complications, including a higher rate of postnatal hypocalcemia. In this study, we investigated the association between Calcium Sensing Receptor (CaSR) and neonatal hypocalcemia observed in GDM pregnancies.

Methods: Our study consisted of 58 pregnant women with GDM and 40 healthy women and their neonates. CaSR placental expression was evaluated with immunohistochemistry and Western Blot. Three CaSR single nucleotide polymorphisms, A986S, R990G, Q1011E, were evaluated in neonate's genomic DNA. Serum Ca, P, Mg, 25(OH)D and PTH were measured in cord blood and at 2nd day of life.

Results: GDM neonates had lower mean cord blood Ca levels than controls ($2.47 \pm 0.21 \text{ mmol/l}$ vs $2.59 \pm 0.13 \text{ mmol/l}$, $p=0.001$) while 15.5% developed postnatal hypocalcemia. CaSR expression was lower in GDM than in healthy placentas ($p<0.001$). In the GDM group, reduced CaSR immunostaining in the syncytiotrophoblast ($p=0.042$) and extravillous cytotrophoblasts ($p=0.002$) was associated with lower Ca cord blood levels. Moreover, the absence of the S allele of the A986S polymorphism was associated with lower serum Ca levels both at birth (AA: $2.41 \pm 0.23 \text{ mmol/l}$, AS+SS: $2.57 \pm 0.12 \text{ mmol/l}$, $p=0.002$) and at 2nd day of life (AA: $2.05 \pm 0.22 \text{ mmol/l}$, AS+SS: $2.20 \pm 0.18 \text{ mmol/l}$, $p=0.019$).

Conclusions: Our results showed that CaSR is under-expressed in GDM compared with healthy placentas and this alteration may be associated with the lower Ca levels measured in cord blood of GDM infants. Placental CaSR seems to exert a local effect in fetal Ca homeostasis, which is dissociated from its contribution to the regulation of Ca homeostasis in postnatal life.

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