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The vascular reactivity to serotonin of human chorionic plate arteries in gestational diabetes, preeclampsia and both pregnancy complications

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Context. Recent studies revealed an important role of serotonin in gestational diabetes (GDM) and preeclampsia (PE). Serotonin might play a crucial role not only in the development of these conditions but also in several consequences as it has receptors and effects in different systems and organs including heart, brain, vessels, carbohydrate metabolism. An increased plasma concentration of 5-HT (5-hydroxytryptamine) has been shown in GDM, PE pregnancies. Moreover, studies suggest an important role of downregulated serotonin transporters in GDM. However the vascular reactivity to 5-HT has not been studied comparing considered pregnancy complications.

Objective. To investigate the response to serotonin in isolated human chorionic plate arteries (HCPA) from PE, GDM, PE+GDM and normal pregnancies.

Methods and patients. The contractile responses of 16 HCPA were evaluated using wire myography (DM? A/S, Denmark) in four groups of age-matched women: with GDM+PE, PE, GDM, controls. Contractile response in HCPA was investigated to raising serotonin concentrations: 0,001-10 µM. Data are presented as mean±SEM. Statistical analysis was performed using Prism version 6.0 (GraphPad Software, San Diego, CA, USA).

Main outcome measures. Dose-response curve to serotonin raising concentrations, Emax (% KCl) ? response to maximum serotonin concentration (10µM)

Results. Serotonin caused HCPA contraction in a concentration-dependent manner in all investigated groups, at 1-5 µM agonist concentration range contraction in all investigated groups were similar ($p>0,05$). The agonist effect significantly differs at 5µM and higher concentrations ($p<0,01$).

Emax (%KCl) for serotonin was significantly higher in GDM and GDM+PE arteries comparing to controls ($p < 0.05$). The mean Emax (%KCl) for controls was 53,68 (±9,77) whilst GDM arteries showed a mean Emax of 163,12 (±42,28) and GDM+PE ? 90,52 (±17,21). The mean Emax (%KCl) for PE arteries was 102,38 (±9,80).

Conclusions. This study demonstrated for the first time an augmented response to serotonin in GDM chorionic plate arteries comparing to similar vessel response in PE, GDM+PE and normal pregnancies. Serotoninergic system might be involved in the pathogenesis of studied pregnancy disorder as well as explain the association of GDM with PE, cardiovascular disorders in mother and offspring, fetal heart defects, psychiatric disorders and other long-term consequences of GDM.

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