

ABSTRACT

Background: Preeclampsia, a pregnancy complication that is characterised by hypertension, oedema and proteinuria, is a major cause of maternal and foetal mortality and morbidity.

Preeclampsia has been associated with the advent of Autism from previous studies. Autism is a neurodevelopmental disorder that is marked by restricted repetitive patterns of behaviour, verbal and non-verbal communication deficiencies and impaired social interaction. To assess the appearance of autism in response to intrauterine exposure to preeclampsia, we employed an array of behavioural studies in the progeny from cadmium chloride-induced preeclamptic pregnancies and those of normal pregnancies, and in addition illuminated the serotonergic system of the rat pups to investigate the presence, or lack thereof, of any structural deviations from the norm in this crucial neuromodulatory system previously reported as altered in autistic brains.

Method: 10 Pregnant Sprague Dawley (SD) rats and 44 pups were used in this study. The experimental pregnant group received an intraperitoneal injection of 0.125mg/kg/day of cadmium chloride (CdCl₂) dissolved in 1ml sterile saline for every animal, while the control group received the same volume of sterile saline for a successive period of 6 days (gestational day 9-14). Systolic blood pressure and body weight of pregnant dams were measured in the morning of GD 0,9,13,16,19 and 20. BCA protein assay was conducted to assess protein level in urine. The resulting pups from the two groups were assessed for autistic behaviour such as repetitive, cognition, gross motor coordination, sensory and anxiety. We also investigated the serotonergic neurons in the rat pups using antibody for serotonin.

Results: The systolic blood pressure (SBP) of the treated group was significantly higher than the control group. There was a gradual increase in SBP from 132mmHg to 143mmHg in the treated group, whereas in the control group the SBP increased and later dropped toward gestational day (GD) 20 from 133.30mmHg to 129.38mmHg. the proteinuria analysis revealed higher protein concentration in the cadmium exposed dams. The mean body weight of the treated group was 306.7g and that of the controls was 291.2g. We observed reduced exploratory, increased anxiety-like behaviour, and excessive repetitive behaviour evinced by greater digging in the preeclampsia exposed group as compared to the normotension-exposed group.

Conclusion: Preeclampsia induces autism-like behaviours in SD rat offspring, while the serotonergic neurons were clearly consistent with the shape, location and density of those in typically developed brains, indicating that the cell bodies themselves are not altered by preeclampsia.