Preeclampsia and perinatal neurological health: insights from haemodynamics, oxidative stress and s100b protein

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Objective. This study aimed to investigate the impact of maternal haemodynamics in preeclampsia, oxidative stress markers, S100B protein on nontraumatic perinatal central nervous system disorders.

Materials and Methods. A case-control study conducted between 2007 and 2014, involving 705 pregnant women, with 339 diagnosed with preeclampsia (baseline group) and 366 without (control group). Gestational age was between 28+0 w.g. to 41+6 w.g. Maternal haemodynamic changes were assessed, and oxidative stress markers, were measured. The S100B protein was evaluated as a potential prognostic marker for perinatal neurological conditions. The study included retrospective and prospective analyses.

Results. Preeclampsia incidence correlate with personal, historical, obstetric, and somatic factors. Maternal haemodynamic alterations in preeclampsia, such as early onset hypertension (< 32 w.g.; $p < 0.0001$), increased blood pressure variability (≥ 30 mm Hg; $p < 0.003$) and hypertension persistence (> 3 weeks, $p < 0.0001$) influenced the risk of nontraumatic perinatal neurological lesions. Elevated levels of oxidative stress markers were associated with both preeclampsia and neurological conditions. Notably, S100B protein levels exceeding 1.95 μmol/L demonstrated a significant prognostic value for nontraumatic perinatal neurological disorders, with high sensitivity and specificity.

Conclusions. This study optimizes the management of preeclampsia-complicated pregnancies by incorporating an algorithm that considers key prognostic factors thereby reducing perinatal neurological impairment risks. The study's findings hold significance for improving maternal-foetal health outcome.