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**Effect of maternal iron deficiency anemia on fetal neural development**

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**Abstract**

**Objective:**Perinatal iron deficiency may have deleterious consequences on fetal neural development. The present study was conducted to determine the effect of maternal iron deficiency anemia (IDA) on fetal hippocampal morphogenesis and production of brain-derived neurotrophic factor (BDNF).

**Study design:**Seventy term, singleton neonates born to mothers with IDA (hemoglobin <110g/L and serum ferritin <12 μg/L) formed the study group. Twenty gestational age-matched neonates born to healthy mothers without IDA (hemoglobin ≥110 g/L and serum ferritin >12 μg/L) served as controls. Maternal and fetal inflammatory conditions, infections and neonates with perinatal asphyxia were excluded. Cord blood BDNF concentrations were estimated by enzyme-linked immunosorbent assay. Volumetric analysis of hippocampus (right, left and combined, corrected for total intracranial volume) was done by cranial magnetic resonance imaging on days 3-5 of life.

**Results:**In the study group, 24 mothers had mild (hemoglobin 100.0-109.0 g/L), 24 had moderate (hemoglobin 70.0-99.0 g/L), and 22 had severe (hemoglobin <70.0 g/L) anemia. Both hippocampal volumes and serum BDNF concentrations of neonates born to iron-deficient mothers were significantly reduced compared to controls. A progressive decline in hippocampal volumes and BDNF concentrations was observed with increasing severity of maternal anemia. Pearson correlation showed significant correlations among maternal and cord blood hemoglobin, iron indices, hippocampal volumes and BDNF concentrations.

**Conclusions:**Maternal IDA adversely affects hippocampal morphogenesis and fetal production of BDNF. The degree of affection is proportional to the severity of maternal anemia.

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