

Correlation between Folic Acid Deficiency and Transforming Growth Factor- β 1 and Insuline-like Growth Factor-I Concentrations in Serum and Skull

Experimental and Observasional Studies to Explain The Mechanism of Defect-Forming at The Skull of Meningocele Patients

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ABSTRACT

Objective: To determine the correlation between folic acid deficiency and growth factors TGF- β 1 and IGF-I to explain the mechanism of skull defect in meningocele patients.

Design: Thirty mature Sprague-Dawley rats were divided into three groups. Purified diet with 10 ug of folic acid was given to first group, 30 ug to the second group, and 50 ug to the third group. After sixteen weeks the blood samples were taken to examine folic acid (FIA method), TGF- β 1 and IGF-I (ELISA method) concentrations. After pregnancy and delivery (through hysterotomy at 18th-19th gestation's day), the skull bone samples of baby-rats were taken to examine the TGF- β 1 and IGF-I concentrations with immunohistochemistry method. The bone sample from the edge of the skull defect of meningocele patients were taken to examine the concentrations of TGF- β 1 and IGF-I, also with immunohistochemistry method.

Results: There was positive correlation between folic acid serum concentration and TGF- β 1 and IGF-I serum concentrations; and also folic acid and TGF- β 1 and IGF-I skull concentrations. Negative correlation was found between TGF- β 1 and IGF-I concentrations in defect-bone of meningocele patients and the width of skull defects, were also found.

Conclusion: Folic acid deficiency could cause defect-forming of the skull by lowering TGF- β 1 and IGF-I concentrations in the serum and skull.

Key words: Folic acid deficiency, Growth factors, Encephalocele, Neural tube defects.