

Are the changes in brain development of fetuses conceived by in vitro fertilization related to the procedure or secondary to maternal characteristics?

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Objective

Neurosonographic studies comparing cortical development in fetuses conceived through in vitro fertilization (IVF) and those spontaneously conceived (SC) have revealed differences in the IVF group. However various pregnancy conditions may influence brain development, making it unclear whether IVF itself directly impacts fetal cortical development or is secondary from the baseline characteristics of women undergoing IVF.

Methods

We conducted an observational cross-sectional neurosonographic study in fetuses conceived either through IVF or SC. In the IVF group, conception was achieved using a single frozen embryo transfer following a standardized protocol. Women who conceived through oocyte donation or had pre-existing chronic diseases, or fetal structural or growth defects were excluded. Neurosonography was performed between 29 and 33 weeks to evaluate the depths of the Sylvian fissure (SF), parieto-occipital fissure (POF), and calcarine fissure (CF) normalized for head circumference (HC). (Figure 1) Maternal characteristics including ethnicity, age, body mass index (BMI), adherence to the Mediterranean diet, smoking habits were recorded. Neurosonographic findings were compared between groups after adjusting for maternal factors using multiple regression analyses.

Results

A total of 150 fetuses were included comprising 75 IVF conceived and 75 SC. Overall, compared to spontaneously conceived (SC) fetuses, those conceived through IVF exhibited statistically significant differences in cortical development, with reduced depths of SF ($p = 0.041$), POF ($p = 0.007$), and CF ($p = 0.029$), all normalized for HC. However, multiple regression analysis revealed that after adjusting for maternal BMI and adherence to the Mediterranean diet, these differences were no longer significant (SF: $p = 0.723$; POF: $p = 0.612$; CF: $p = 0.524$).

Conclusions

Fetuses conceived through IVF exhibited a distinctive pattern of cortical development, primarily influenced by baseline maternal characteristics rather than the IVF procedure itself.

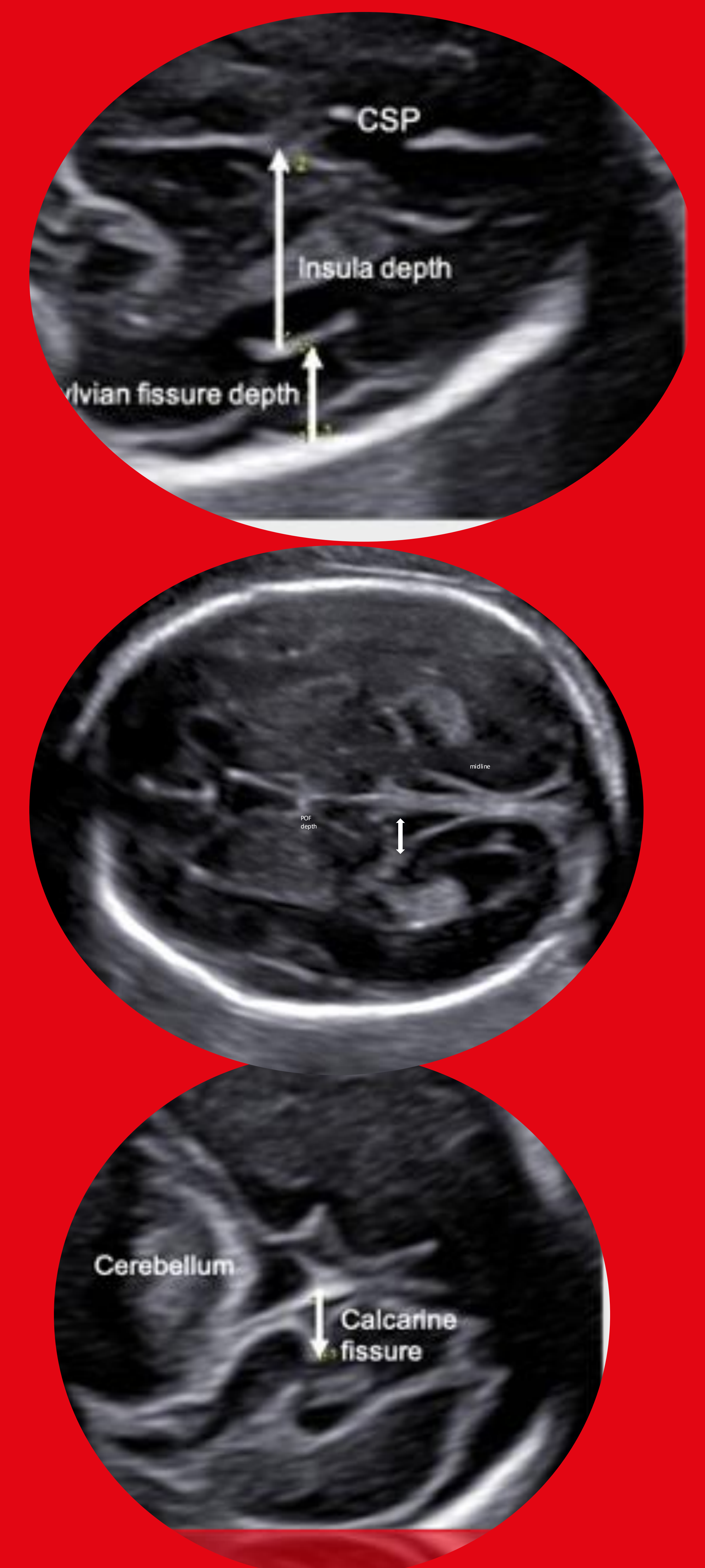


Figure 1: Ultrasonographic evaluation of cerebral fissure