Impact of fetal development on neurocognitive performance of adolescents with cyanotic and acyanotic congenital heart disease

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Objectives
Congenital heart disease (CHD) is a chronic disease that occurs with a high frequency in the world population, and is usually diagnosed “in utero” or soon after birth. Our aim was to evaluate the neurocognitive performance in adolescents with CHD and to determine whether parameters of fetal development evaluated in neonates, such as head circumference, length, weight, and Apgar scores, and the presence of cyanosis are somehow related to their neurocognitive performance.

Results
77 CHD patients (43 males) aged from 13 to 18 years old (mean=15.04 ± 1.86), 46 cyanotic (23 Tetralogy of Fallot, 23 Transposition of the Great Arteries) and 31 acyanotic (Ventricular Septal Defect) enrolled in this study. The control group included 16 healthy children (11 males) ages ranging from 13 and 18 (mean=15.69 ± 1.44). All assessment measures for CHD patients were once obtained in a tertiary hospital; the control group was evaluated in school. Demographic information and clinical history were collected. Neuropsychological assessment included Wechsler’s direct and reverse Digit Test, (WDD, WDR) and Symbol Search (WSS), Rey’s Complex Figure (RCF), BADS’s Key Searching Test (BKS), Color-Word Stroop Test (CWS), Trail Making Test (TMT) and Logical Memory Task (LMT).

Methods
77 CHD patients (43 males) aged from 13 to 18 years old (mean=15.04 ± 1.86), 46 cyanotic (23 Tetralogy of Fallot, 23 Transposition of the Great Arteries) and 31 acyanotic (Ventricular Septal Defect) enrolled in this study. The control group included 16 healthy children (11 males) ages ranging from 13 and 18 (mean=15.69 ± 1.44). All assessment measures for CHD patients were once obtained in a tertiary hospital; the control group was evaluated in school. Demographic information and clinical history were collected. Neuropsychological assessment included Wechsler’s direct and reverse Digit Test, (WDD, WDR) and Symbol Search (WSS), Rey’s Complex Figure (RCF), BADS’s Key Searching Test (BKS), Color-Word Stroop Test (CWS), Trail Making Test (TMT) and Logical Memory Task (LMT).

Conclusion: Adolescents with CHD have worse neuropsychological performance than the control group, mainly the cyanotic patients. Fetal circulation seems to have impact on cerebral and somatic growth, predicting cognitive impairment in adolescents with CHD.