Background

- New literature demonstrates that survivors of congenital heart defects (CHD) are at increased risk of neurodevelopmental delay.
- Neurodevelopmental delay often manifests as motor delay during the first year of life.
- Increasing evidence suggests that antenatal factors play a role in the origin of neurodevelopmental delay in CHD.

Objective

- To determine maternal, fetal and obstetrical prenatal predictors of neurodevelopmental outcome among infant with CHD.
- This information could help assist decision-making during prenatal counseling.

Method

Study design: Retrospective cohort study

Sample: 75 children born between 2013 and 2016 with prenatally diagnosed CHD followed at the Clinique d’Investigation Neuro-Cardioïde (CINC) of the Sainte-Justine University Hospital Center.

Outcomes: The neurodevelopmental outcomes were determined using the Alberta Infant Motor Scale (AIMS) at 4 months. Prenatal records and obstetric ultrasound reports were reviewed. CHD were classified as per antenatal finding according to the Davey Severity Scale blindly from postnatal outcome. Associations between antenatal factors and delayed neurodevelopment (AIMS scores < 10th percentile) were assessed using bivariate analyses.

Results

- Neurodevelopmental Outcomes per Prenatal and Obstetrical Variables
  - Gestational Age
  - Birth Weight (g)
  - Genetic Anomalies
  - CHD Associated with Birth Defects
- Third trimester Head to Abdomen Circumference Ratio
- Heart Defect Type: Univentricular vs Biventricular
- Heart Defect Type: Cyanogen vs Non Cyanogen

Comment

Our study shows that atypical neurodevelopment affects a majority of children with CHD. This is not explained by the severity of CHD. However, ongoing in-utero hypoxia appears to be a plausible mechanism. Indeed, it could lead to suboptimal brain development as demonstrated in our data by lower birth weight, early term delivery and a trend toward lower head to abdomen circumference ratio on third trimester ultrasound. Moreover, our data show a trend toward an association between cyanotic heart defect and atypical neurodevelopment. A genetic predisposition may be another mechanism. Even though there were no difference in diagnosed genetic disorders between the groups, there was a trend towards CHD associated with other birth defects and atypical neurodevelopment. A larger cohort is needed to validate our results.