



Research Explained

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Psychiatric Disorders in Adolescents with Single Ventricle Congenital Heart Disease

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About this Study

Why is this study important?

- Previous research studies have shown that children with critical congenital heart disease (CHD) are at higher risk for learning difficulties, attention deficit hyperactivity disorder (ADHD), mood disorders and reduced quality of life.
- There is very little research that focuses specifically on mental health, psychiatric and psychosocial difficulties in adolescents with a single ventricle.

How was this study performed?

- This study presents psychiatric data from a larger voluntary study performed at Boston Children's Hospital.
- The study was designed to determine if adolescents (ages 10-19 years) with a single ventricle who have undergone a Fontan procedure had significant differences in the incidence of psychiatric diagnoses and functioning compared to a group of healthy children.
- Mental health status, brain structure and genetic abnormalities of single ventricle Fontan adolescents were compared to a group of healthy children.
 - Mental health status was evaluated with clinician rated psychiatric interviews performed by child psychiatrists, neurocognitive (brain function) testing performed by psychologists, and questionnaires completed by both the parents and children.
 - Brain structure was evaluated with brain MRI.
 - Genetic abnormalities were detected with blood tests and physical exam.
- Comparisons were also made between the following groups:
 - Single ventricle Fontan adolescents with normal genetics
 - Single ventricle Fontan adolescents with abnormal genetics
 - Healthy adolescents

The groups were compared for differences in patient characteristics, brain MRI findings, psychiatric disorders, psychiatric symptoms, and neurocognitive function.

- Statistical methods adjusted for the potential influence of family social status on the testing results.

What were the results of the research?

- 156 adolescents with a single ventricle and 111 healthy children participated in the study.
- The youth with single ventricles tended to have lower birth weight, gestational age, family social status, and IQ scores compared to the healthy group. The single ventricle group was also younger in age and more likely to be white and have abnormal brain MRI findings compared to the healthy children group.
- 65% of the single ventricle group met criteria for a psychiatric diagnosis at some point in their life. Compared to the healthy group, the adolescents with a single ventricle were three times more likely to have a psychiatric diagnosis. Specifically, the single ventricle group had higher rates of anxiety disorder and ADHD.
- Compared to the healthy children group, the adolescents with a single ventricle scored significantly worse on tests that measured psychosocial functioning, anxiety, disruptive behavior, and depressive symptoms.
- Except for IQ and brain MRI findings, genetic abnormalities did not significantly impact testing results.
- Lower birth weight, longer period of deep hypothermic circulatory arrest (time period when the heart is stopped for surgery), lower IQ scores, and male gender were risk factors associated with an increased risk for anxiety disorder, ADHD, and lower psychosocial functioning in the single ventricle group.

What are the limitations of this study?

- The impact of parental stress levels on the incidence of psychiatric disorders in youth with a single ventricle who have undergone a Fontan procedure were not studied.
- This study was performed at only one center. Future studies with larger numbers of patients and from multiple different centers are required to confirm these research findings.
- Medical history was obtained from old medical records and may have had missing or inaccurate information.
- The genetic testing used for this study may have missed some genetic abnormalities.

What is all means

- Adolescents with a single ventricle who have undergone the Fontan procedure have increased risk for psychiatric disorders, especially anxiety disorders and ADHD.
- In this study, a genetic abnormality did not seem to be significantly associated with increased incidence of psychiatric disorders amongst youth with a single ventricle.
- Early identification and treatment of psychiatric symptoms is important medical care for all children and adolescent with critical CHD.
- Early identification and treatment of psychiatric symptoms may help patients with critical CHD improve their ability to take care of themselves and function normally in society.
- Early identification and treatment of psychiatric symptoms may help improve quality of life for patients and families facing CHD.