OPEN ACCESS Freely available online

Journal of Clinical and Experimental Cardiology

Commentary

Neuropsychological Development of Children with Congenital Heart Disease: What does the Future Hold?

Shuantong Lin[1*], Juan Lu[2], Jianyue Wang[3]

[1]Department of Anesthesioloy, Eastern Bund Healthcare, Shanghai, China; [2]Department of Anesthesiology, Shanghai Health Care Center, Shanghai, China; [3]Department of Anesthesiology, Binzhou People's Hospital, Shandong, China

DESCRIPTION

Congenital Heart Disease (CHD) accounts for nearly one-third of all congenital birth defects and affects approximately 1 in 100 births each year in the United States [1]. A meta-analysis of 260 studies incorporating global data concluded that the prevalence of CHD continued to rise [2]. Nonindustrialized countries exhibited unfavorable or worsening risks for recent time periods and birth cohorts [3]. While 95% of children with simple CHD and 75% to 90% of children with complex CHD can survive into adulthood, approximately 50% of children with CHD experience neurocognitive deficits and impairments [4,5]. Non-industrialized countries face challenges in the prevention and treatment of CHD [3].

Approximately 16% of children with CHD are born prematurely, with a 2-fold higher incidence of CHD among premature infants than among full-term infants [6]. As foetal echocardiogram became widely available, prenatal diagnosis of critical CHD became possible [7]. Although many factors, including surgical treatment, anesthetic medications and Intensive Care Unit (ICU) management, are related to the neuropsychological development of children with CHD, and examinations such as Magnetic Resonance Imaging (MRI) have clearly shown that these children exhibit abnormalities in brain structure development, the impact of genetic factors in children with CHD should not be overlooked. With the development of Massively Parallel Sequencing (MPS), researchers and diagnostic laboratories can now interrogate numerous genes simultaneously, up to the whole genome, to identify sequencing variants. As a result, diagnostic standards are rapidly evolving [8]. There is no doubt that the precise diagnosis of CHD is the first step in medical and interventional management.

Approximately 9% of US adults experience major depression each year, with a lifetime prevalence of approximately 17% for men and 30% for women [9]. A study conducted by Chourpiliadis et al., involving 211200 individuals with a mean Standard Deviation (SD) follow-up of 21.0 (6.7) years suggested that 16256 individuals were diagnosed with depression, anxiety, or stress-related disorders [10]. There is a genetic association between congenital heart disease and autism, by exploring the shared genetic factors between CHD and autism, researchers may uncover common pathways involved in both conditions. This could lead to a better understanding of the biological processes contributing to CHD development and progression.

As the population with mental health disorders increases, whether parents experiencing heightened perceptual stress may lead to an increased probability of congenital heart disease in their offspring, as well as an increased likelihood of mental health disorders appearing in the offspring's lifetime, should warrant the attention of healthcare professionals.

The incidence of metabolic disorders such as diabetes mellitus and hyperlipidemia in children with CHD who have neurodevelopmental abnormalities throughout their lifespan still needs to be confirmed by long term follow-up studies. Comprehensive monitoring throughout the entire lifespan can help improve the prognosis and enhance the quality of life for children with CHD who have neurodevelopmental abnormalities.

Improvements in diagnosis and management have secured a higher quality for children with CHD, it is clear that comprehensive understanding of neuropsychological development should be implemented and the neuropsychological development could be modified by lifestyle and further advances in multidisciplinary collaboration.

REFERENCES

1. Zimmerman MS, Smith AG, Sable CA, Echko MM, Wilner LB, Olsen HE, et al. Global, regional, and national burden of congenital heart disease, 1990–2017: A systematic analysis for the Global Burden of Disease Study 2017. Lancet Child Adolesc Health. 2020;4(3):185-200.
2. Frogoudaki AA. Congenital heart disease prevalence: What does the future hold?. Eur J Prev Cardiol, 2023;30(2):167-168.

Correspondence to: Shuantong Lin, Department of Anesthesioloy, Eastern Bund Healthcare, Shanghai, China, E-mail: princelim@163.com

Received: 28-Nov-2024, Manuscript No. JCEC-24-35452; **Editor assigned:** 02-Dec-2024, PreQC No. JCEC-24-35452 (PQ); **Reviewed:** 16-Dec-2024, QC No. JCEC-24-35452; **Revised:** 23-Dec-2024, Manuscript No. JCEC-24-35452 (R); **Published:** 30-Dec-2024, DOI:10.35248/2155-9880.24.15.927

Citation: Lin S, Lu J, Wang J (2024). Neuropsychological Development of Children with Congenital Heart Disease: What does the Future Hold?. J Clin Exp Cardiolog. 15:927.

3. Su Z, Zou Z, Hay SI, Liu Y, Li S, Chen H, et al. Global, regional, and national time trends in mortality for congenital heart disease, 1990-2019: An age-period-cohort analysis for the Global Burden of Disease 2019 study. E Clin Med. 2022;43:101249.
4. Cabrera-Mino C, DeVon HA, Aboulhosn J, Brecht ML, Choi KR, Pike NA. Neurocognition in adults with congenital heart disease post-cardiac surgery: A systematic review. Heart Lung. 2024;64:62-73.
5. Diller GP, Arvanitaki A, Opotowsky AR, Jenkins K, Moons P, Kempny A, et al. Lifespan perspective on congenital heart disease research: JACC state-of-the-art review. J Am Coll Cardiol. 2021;77(17):2219-2235.
6. Lin S, Su X, Cao D. Current research status and progress in neuropsychological development of children with congenital heart disease: A review. Medicine. 2024;103(44):40489.
7. Moray A, Mugaba PM, Joynt C, McBrien A, Eckersley LG, Phillipos E, et al. Predicting high-risk fetal cardiac disease anticipated to need immediate postnatal stabilization and intervention with planned pediatric cardiac operating room delivery. J Am Heart Assoc. 2024;13(6):31184.
8. Morrish AM, Smith J, Enriquez A, Sholler GF, Mervis J, Dunwoodie SL, et al. A new era of genetic testing in congenital heart disease: A review. Trends Cardiovasc Med. 2022;32(5): 311-319.
9. Simon GE, Moise N, Mohr DC. Management of depression in adults: A review. JAMA. 2024;332(2):141-152.
10. Chourpiliadis C, Zeng Y, Lovik A, Wei D, Valdimarsdóttir U, Song H, et al. Metabolic profile and long-term risk of depression, anxiety, and stress-related disorders. JAMA Netw Open. 2024;7(4): 244525.