Assessment of Visual, Verbal, and Working Memory in Adolescents with Congenital Heart Disease Post-Surgery

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Background: Memory loss has been reported in adolescents with congenital heart disease (CHD) and is problematic in a group that must eventually take responsibility for their health care. However, the specific type of memory deficits in CHD subjects post-surgery is unclear. The purpose of this study was to examine the incidence and type of memory loss in adolescents with CHD post-surgery.

Methods: We used comparative study design with 90 adolescents (45 CHD post-surgery and 45 healthy controls), age 14-21 years, matched for age (± 2 years) and gender, no known genetic syndromes, and assessed memory using the Wide Range Assessment of Memory and Learning (WRAML2). The WRAML2 provides scores on individual memory domains, working memory, and general memory index (GMI; verbal, visual, attention / concentration; GMI ≥ 100 is normal). Descriptive and nonparametric inferential statistics were used to assess group characteristics and memory scores.

Results: CHD subjects consisted of 60% males, median age 17 (range 14-21), 44% Hispanic, and surgical diagnosis 31% Fontan. Participants had a median of 2 (range 1-4) previous heart surgeries with 14 years (range 2-17) since last surgery. Significant memory deficits (GMI) were identified in the CHD compared to healthy group (CHD vs. Healthy; median 85 (range 49-112) vs. 108 (range 90-139), p <.001). Almost 50% of CHD subjects scored < 2 SD below the normal on the GMI portion of the WRAML2 compared to 2% in the healthy controls. Significant verbal and working memory deficits were identified (CHD vs. Healthy; verbal median 88 (range 67-120) vs. 105 (range 80-135), p <.001; working memory median 89 (55-122) vs. 108 (82-139), p <.001. However, no significant differences emerged between the groups for visual memory.

Conclusion: Adolescents with moderate to complex CHD post-surgical repair or palliation had significant memory deficits, especially in verbal and working memory, compared to healthy controls. These findings indicate that to enhance patient self-care in CHD, clinicians should explore the increased use of visual patient education methods rather than verbal training in adolescent CHD transition programs.

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