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Arterial Stiffness and Motor Competence in Children and Adolescents with Univentricular Heart After Total Cavopulmonary Connection

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Objective: Studies suggest that patients with congenital heart disease have increased arterial stiffness and impaired motor competence. The aim of this study is to investigate whether current patients after total cavo-pulmonary connection (TCPC) still have augmented arterial stiffness and deficits in motor competence.
Patients and Methods: From July 2014 to December 2015, 58 patients (15 girls, 11.8 ± 3.3 years) with TCPC underwent an arterial stiffness measurement and performed a motoric test with five tasks to assess muscle strength (push-ups and curl-ups), lower back strength, shoulder and harmstring flexibility. Arterial stiffness was measured using the oscillometric Mobil-o-Graph.
Data was compared to a contemporary references pool of 1964 healthy subjects (956 girls, 12.7 ± 2.4 years) recently tested in different Bavarian schools. Patients' data was compared to healthy controls using a multivariate regression model with correction for age, sex and BMI.
Results: Central systolic blood pressure, a surrogate for arterial stiffness, was 4.0 mmHg higher in TCPC patients compared to healthy peers (B=4.0, p<.002), whereas there was no difference in peripheral systolic blood pressure (p=.329). Motor competence of TCPC patients was impaired in all of the five performed motor tasks. Patients performed 2.4 push-ups (p=.041) and 10.0 curl-ups (p<.001) less. Moreover, they had impaired lower back strength (B=-9.0cm, p<.001), and shoulder (B=-7.9cm, p<.001) and harmstring flexibility (B=-5,3cm, p<.001).
Conclusions: In patients with TCPC central systolic blood pressure, a surrogate of arterial stiffness, is increased and motor competence in terms of strength and flexibility is impaired. Therefore measuring both during routine follow-up is recommended and treated if indicated.