

Carotid intima-media thickness in children with congenital heart disease

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Introduction:

Carotid intima-media thickness (cIMT) is a non-invasive marker for cardiovascular risk. Adults with congenital heart disease (CHD) are known at higher risk for developing further cardiovascular diseases. Thus, the aim of this study is to get known more about risk factors in young CHD patients and to identify high risk diagnostic subgroups.

Methods:

For this cross-sectional study 319 children (116 girls) aged 6-18 years (12.3 years \pm 3.3) were recruited between May 2015 and October 2016 in our institution. Far wall cIMT was assessed non-invasively via ultrasound, while central blood pressure (systolic=cSBP and diastolic=cDBP) and pulse wave velocity (PWV) were evaluated using a Mobil-O-Graph®. Further, anthropometrical data and medication were recorded. According to their heart defect the children were divided into five diagnostic subgroups: aortic stenosis/aortic coarctation (n=90), atrial septal defect/ventricular septal defect/atrioventricular septal defect (shunts; n=83), tetralogy of Fallot/pulmonic stenosis (ToF/PS; n=58), univentricular heart (n=55), transposition of the great arteries (TGA-switch; n=33). Data were compared by using one-way ANOVA with Bonferroni's post-hoc tests. Two-sided p-values < 0.050 were considered statistically significant.

Results:

Mean cIMT in children with CHD was 0.462 ± 0.041 on average. Children with TGA-switch showed the thickest cIMT values with 0.486 ± 0.044 . Therefore, it was significantly higher as it was in ToF/PS-patients (0.451 ± 0.036 ; p=.001) or shunts (0.452 ± 0.032 ; p<.001). Additionally, cIMT values showed a significant correlation to height (p=.027), PWV (p=.029) and cSBP (p<.001), but not with cDBP (p=.318). Still after correction for sex, age and height children with TGA showed sign. higher cIMT values (B= .025; p=.001) and patients with ToF/PS (B= -.013; p=.025) or shunts (B= -.014; p=.009) sign. lower cIMT values than children with other heart defects.

Conclusion:

Children with TGA-switch presented the highest cIMT values and should be closely monitored. The relation of cSBP and cDBP on cIMT was already shown in first studies of healthy adults and could be confirmed in this young patient group. To compare patients data to norm values an own investigation of healthy children is planned, while variations in ultrasound protocols make a generalized application of norm values impossible.