



Conference Abstract

P.32 Non-Invasive Measures of Arteriosclerosis Across Childhood and Adolescence: Insights Into the Natural History of Disease

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ABSTRACT

Objectives: Non-invasive methodologies for assessing arteriosclerosis, including carotid intimal-medial thickness (cIMT) for assessing subclinical atherosclerosis and carotid-femoral pulse wave velocity (cfPWV) for measuring arterial stiffness, are well established and validated in adults [1, 2]. However, they are less well-described in children. Alternative methodologies, such as aortic IMT (aIMT), may be more appropriate in children provided the natural history of atherosclerotic disease [3]. Previous studies have predominantly applied these methodologies in a narrow age-range of children; methodological differences between studies make inter-study comparison of absolute values difficult. Therefore, we aimed to assess the severity of arteriosclerosis across childhood and adolescence using standardised application of age-appropriate and established methodologies.

Methods: We prospectively recruited 97 healthy children aged 2 to 20 (mean age = 11.2 ± 5.12 years old; stratified into five sex-balanced age groups). cIMT and aIMT were assessed via high-resolution B-mode ultrasonography. cfPWV was assessed via a semi-automated cuff-based device (Sphygmocor XCEL; AtCor Medical, Australia).

Results: aIMT increased with age (9 µm per year [95% CI: 6, 12], $p < 0.0001$), whereas cIMT did not meaningfully increase with age (2 µm per year [95% CI: -1, 5], $p = 0.14$). cfPWV remained relatively stable during early childhood, with an apparent increase from adolescence onwards.

Conclusions: Carotid and aortic atherosclerosis both increase throughout childhood, although this increase is greatest in the aorta. The aorta begins to stiffen during adolescence. Assessment of aortic arteriosclerosis is feasible in childhood and adolescence, and should be prioritised over assessment of carotid atherosclerosis in this age group.

REFERENCES

- [1] Urbina EM, Williams RV, Alpert BS, Collins RT, Daniels SR, Hayman L, et al. Noninvasive assessment of subclinical atherosclerosis in children and adolescents: recommendations for standard assessment for clinical research: a scientific statement from the American Heart Association. *Hypertension* 2009;54:919–50.
- [2] Townsend RR, Wilkinson IB, Schiffrin EL, Avolio AP, Chirinos JA, Cockcroft JR, et al. Recommendations for Improving and Standardizing Vascular Research on Arterial Stiffness: A Scientific Statement From the American Heart Association. *Hypertension* 2015;66:698–722.
- [3] Skilton MR, Celermajer DS, Cosmi E, Crispi F, Gidding SS, Raitakari OT, et al. Natural history of atherosclerosis and abdominal aortic intima-media thickness: rationale, evidence, and best practice for detection of atherosclerosis in the young. *J Clin Med*, 2019;8.

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