Paediatrics

Reference values of aortic pulse wave velocity in a large healthy population aged between 3 and 18 years.

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OBJECTIVE: The measurement of aortic pulse wave velocity (PWV(ao)) is an accepted marker in stratifying individual cardiovascular risk in adults. There is an increasing volume of evidence concerning impaired vascular function in different diseases in paediatric populations, but, unfortunately, only a few studies are available on the measurement of normal PWV(ao) values in children. The aim of our study was to determine the reference values of PWV(ao) in a large healthy population using a newly developed technique.

METHODS: Three thousand, three hundred and seventy-four healthy individuals (1802 boys) aged 3-18 years were examined by an invasively validated, occlusive, oscillometric device.

RESULTS: The mean PWV(ao) values increased from 5.5 ± 0.3 to 6.5 ± 0.3 m/s ($P < 0.05$) in boys and from 5.6 ± 0.3 to 6.4 ± 0.3 m/s ($P < 0.05$) in girls. The increase, however, was not constant, and the values exhibited a flat period between the ages of 3 and 8 years in both sexes. The first pronounced increase occurred at the age of 12.1 years in boys and 10.4 years in girls. Moreover, between the ages of 3 and 8 years, the brachial SBP and mean blood pressures increased continuously and gradually, whereas the PWV(ao) remained unchanged. By contrast, beyond the age of 9 years, blood pressure and aortic stiffness trends basically moved together.

CONCLUSION: Our study provides the largest database to date concerning arterial stiffness in healthy children and adolescents between the ages of 3 and 18 years, and the technology adopted proved easy to use in large paediatric populations, even at a very young age.

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Comment from the author (MI) of the Website: In this study Arteriograph was used.

Influence of body height on aortic systolic pressure augmentation and wave reflection in childhood.

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BACKGROUND: The enhanced wave reflection in small children is a well-known phenomenon. It is explained on the basis of differences in the body height and the timing of wave reflection. This hypothesis still has not been proved directly.

OBJECTIVES: The aim of our study was to determine the reference values of aortic augmentation index (Aix(ao)) and the simultaneously measured return time of the systolic pulse wave (RT) in relation to the body height to test this hypothesis**.**

PATIENTS AND METHODS: Aix(ao) and RT were measured by Arteriograph in a healthy population aged 3-18 years (n = 4619, 2489 males).

RESULTS: The Aix(ao) decreased with increasing age in boys from 18.6 ± 8.4% to 4.7 ± 4.3% and in girls from 22.3 ± 9.2% to 8.1 ± 5.1%, whereas the RT increased from 115.5 ± 16.3 ms to 166.7 ± 20.8 ms in boys and from 106.7 ± 21.9 ms to 158.1 ± 15.5 ms in girls. These changes were constant during childhood, but they slowed down after the onset of puberty.

CONCLUSIONS: Because aortic pulse wave velocity (PWV(ao)) measured in the same population was unchanged during childhood, the increase of RT can only be explained by the increase of aortic length due to growth. In the puberty PWV(ao) starts increasing indicating that RT (Aix(ao)) does not follow the increase (decrease) of aortic length proportionally.

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