



4.5 Increased Central Pulse Pressure in Children Results From Increased Early Ejection Velocity and Increased Aortic Pulse Wave Velocity

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ABSTRACT

Introduction: The aim of the present study was to examine the contribution of left ventricular ejection, arterial stiffness and systemic vascular resistance to essential hypertension in children with hypertension.

Methods: A total of 81 children aged 7 to 18 years (mean age 14 years) including 31 with hypertension and 50 age matched normotensive children were recruited from the paediatric hypertension clinic and local community. 18 (58.1%) hypertensive subjects were taking anti-hypertensive medication. Non-invasive aortic flow velocity, pulse wave velocity (PWV) and central blood pressure were measured by Doppler sonography and carotid tonometry system respectively.

Results: Compared with normotensive subjects, those with hypertension had significantly higher central pulse pressure (43 ± 15 vs. 29 ± 8 mmHg, mean \pm SD), heart rate (81 ± 15 vs. 73 ± 11 bpm), and cardiac output (5.4 ± 2.0 vs. 4.3 ± 1.2 L/min), $p < 0.01$ for all comparisons. There was a trend toward increased stroke volume in hypertensive subjects but there were no significant differences in augmentation pressure, reflection index or systemic vascular resistance between the two groups. The increase in central pulse pressure was explained by an altered pattern of ventricular ejection (initial flow increased from 1.1 ± 0.2 to 1.3 ± 0.2 m/s, $p = 0.008$) and slight increase in pulse wave velocity from 5.7 ± 0.8 to 6.1 ± 0.9 m/s.

Conclusion: These results suggest that increased central pulse pressure in hypertensive compared to normotensive children is explained by an increase in arterial stiffening and altered pattern of ventricular ejection.

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