

Hypertension

Catheter-based renal sympathetic denervation improves central hemodynamics and arterial stiffness: a pilot study.

BACKGROUND: Renal sympathetic denervation (RDN) is a novel treatment strategy for patients with resistant arterial hypertension. Recently, the Symplicity trials demonstrated significant peripheral blood pressure (BP) reduction. The present study aimed at measuring central aortic pressures and arterial stiffness as better predictors for cardiovascular risk in patients undergoing RDN.

METHODS: RDN was performed in 21 patients (systolic peripheral BP ≥ 150 mm Hg) with an Ardian/Medtronic (Mountain View, CA) ablation system. Data were recorded with an Arteriograph.

RESULTS: After 6 months, peripheral systolic BP was reduced by 6.1% ($P < .05$) while central systolic pressure was reduced by 7.0% ($P < .05$). Subgroup analysis showed that in responders, peripheral systolic BP was reduced by 16.1% ($P < .01$) while central systolic pressure was reduced by 18.3% ($P < .01$). Arterial stiffness improved significantly. Aortic augmentation index (AIx) improved by 9.5% ($P < .05$). In responders, AIx improved by 19.2% ($P < .02$). Pulse wave velocity (PWV) was high at baseline (10.8 m/s) and improved by 10.4% ($P < .05$). In responders, PWV improved by 13.7% ($P < .05$). Multivariate analysis showed that short-term effects on PWV were BP-related, whereas during follow-up, improvement of PWV becomes BP-unrelated.

CONCLUSIONS: RDN improves peripheral and central blood pressure as well as arterial stiffness and, thus, may improve cardiovascular outcome.

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Comparison of aortic pulse wave velocity measured by three techniques: Complior, SphygmoCor and Arteriograph.

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BACKGROUND: New 2007 European Society of Hypertension guidelines recommend measuring arterial stiffness in patients with arterial hypertension, suggesting a carotid-femoral pulse wave velocity over 12 m/s as an estimate of subclinical organ damage. Considering this cutoff point, it is worth exploring whether or not there are significant differences in results obtained using various techniques for measuring aortic pulse wave velocity. The aim of the study was to compare aortic pulse wave velocity measurements using Complior, SphygmoCor, and Arteriograph devices, and to assess the effect of pulse wave transit time and traveled distance on pulse wave velocity values.

METHODS: Aortic pulse wave velocity was measured on a single visit, using these devices, in randomized order, in a group of 64 patients with grade 1 or 2 arterial hypertension.

RESULTS: Aortic pulse wave velocity measured using Complior (10.1 +/- 1.7 m/s) was significantly higher than that obtained using SphygmoCor (8.1 +/- 1.1 m/s) or Arteriograph (8.6 +/- 1.3 m/s). No differences were noted between pulse wave velocity measurements using SphygmoCor and Arteriograph. Between-method comparison revealed that differences in traveled distance were significant: Complior versus Arteriograph [0.09 m, Confidence interval (CI): 0.08-0.12 m, P < 0.05], Complior versus SphygmoCor (0.15 m, CI: 0.13-0.16 m, P < 0.05), Arteriograph versus SphygmoCor (0.05 m, CI: 0.03-0.07 m, P < 0.05). No between-method differences were found for transit times.

CONCLUSION: Differences in pulse wave velocity obtained by compared devices resulted primarily from using various methods for measuring traveled distance. It appears reasonable to establish uniform principles for the measurement of traveled distance. Because a large number of prognosis/survival studies used direct distance between carotid and femoral sites of pulse wave recording, this distance should be mostly recommended.

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Cystatin C is better than albuminuria as a predictor of pulse wave velocity in hypertensive patients.

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INTRODUCTION: Arterial stiffness is important in the evaluation of the cardiovascular risk in both general population and hypertensive patients. In this study, we aimed to investigate the associations of both serum cystatin C levels and albuminuria with arterial stiffness in healthy controls and hypertensive patients.

PATIENTS AND METHODS: Seventy-six healthy controls (male/female=44/32) and 76 hypertensive patients (male/female=43/33) were enrolled. Arterial stiffness parameters such as augmentation index (Alx) and pulse wave velocity (PWV) were non-invasively measured with the Arteriograph (Tensiomed Ltd., Budapest, Hungary).

RESULTS: Alx (31.92 ± 14.31 vs. 27.95 ± 11.03 , $p=0.03$) and PWV (9.84 ± 1.62 vs. 8.87 ± 2.04 , $p<0.001$) were significantly higher in hypertensive patients compared to healthy controls. Patients with microalbuminuria had significantly higher Alx (43.47 ± 9.91 vs. 30.37 ± 14.13 , $p=0.002$) and higher serum cystatin C levels [0.76 (0.67 - 0.95) vs. 0.68 (0.62 - 0.78) mg/L, $p=0.03$]. In the hypertensive group, Alx was significantly correlated with PWV ($r=0.519$, $p<0.001$), glomerular filtration rate (cystatin C) ($r=-0.438$, $p=0.003$), mean arterial pressure (MAP) ($r=0.288$, $p=0.015$) and urinary albumin-creatinine ratio (ACR) ($r=0.386$, $p=0.004$). PWV was associated with serum cystatin C ($r=0.442$, $p=0.003$) and MAP ($r=0.377$, $p=0.001$). In the linear regression analysis (model $r=0.577$, $p=0.006$) for the prediction of PWV in hypertensive patients, MAP, urinary ACR, age and serum cystatin C levels were included as independent variables. Cystatin C was found to be the significant determinant of PWV in hypertensive patients.

CONCLUSION: Multivariate analysis revealed that serum cystatin C but not albuminuria was significantly associated with PWV in hypertensive patients. Serum cystatin C may be better than albuminuria as a predictor of arterial stiffness in hypertensive patients.

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Central Systolic Hypertension in Patients with Well-Controlled Hypertension.

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BACKGROUND: Central systolic blood pressure (CSBP) has prognostic significance and simplified devices for its estimation have been introduced recently. The aim of this study was to assess the achievement of the target CSBP in treated hypertensive patients.

SUBJECTS AND METHODS: One hundred patients with well-controlled hypertension were analysed. For CSBP estimation, we used the Arteriograph (TensioMed Ltd.), which uses one cuff for all measurements, the “single-point measurement” approach.

RESULTS: We found that 62% of patients had CSBP \geq 130 mmHg, the suggested cut-off value for hypertension. When sex-specific classification was employed (CSBP \geq 137 mmHg for female and CSBP \geq 133 mmHg for male), only 13% of patients (mainly women) remained in the hypertensive range. We also found that 55% of patients had a CSBP higher than brachial pressure. Multiple analyses showed that CSBP was significantly associated with sex, height, and return time.

CONCLUSIONS: A high proportion of treated hypertensive patients had CSBP levels that exceeded their brachial BP. CSBP positively correlated with lower height and shorter return time of the reflected pressure wave and was significantly higher in females compared to males. These findings suggest that, for CSBP classification, it is important to take height and sex-specific differences into account.

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