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Conference Abstract

P.25 Radial-Digital Pulse Wave Velocity: A Non-Invasive Method for Assessing Stiffness of Peripheral Small Arteries

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ABSTRACT

Pulse wave velocity (PWV) has been used to evaluate arterial stiffness of large arteries. Here, we examine the feasibility of radial-digital PWV (RD-PWV) as a measure of stiffness of smaller arteries, and its response to changes in local mean arterial pressure. In 29 healthy subjects, we used Complior probes to record arterial pulse wave at radial artery and tip of the index. To determine transit time, we used both second derivative and intersecting tangents of the entire recordings using the device-embedded algorithms, in house Matlab analyses of only reliable waves, and by numerical simulation using arterial tree model. In 15 subjects, we examine the response of RD-PWV to changes in local MAP by vertical displacement of the hand above and below the mid-axillary line. Using second derivative, RD-PWV were 4.68 ± 1.18, 4.69 ± 1.21, 4.32 ± 1.19 m/s respectively for device-embedded, Matlab-based and numerical simulation analyses, respectively. Using intersecting tangents RD-PWV were 4.73 ± 1.20, 4.45 ± 1.08, 4.50 ± 0.84 m/s, respectively for device-embedded, Matlab-based and numerical simulation analyses, respectively. The strongest correlation ($r = 0.92$) was seen between device-embedded and Matlab-based second derivatives. The intersession coefficients of variation were 7.0 ± 4.9% and 3.2 ± 1.9% ($p = 0.04$) for device-embedded and Matlab-based second derivative algorithms. We estimated that each increase of 10 mm Hg in local MAP by vertical displacement of the hand resulted in an increase in RD-PWV of 0.28 m/s. This study shows that RD-PWV can be used for the non-invasive assessment of stiffness of small-sized arteries.

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