

2.5 Differential Association of Central and Peripheral Arterial Compliance with Resting and Recrutable Endothelial Function in Healthy Human Subjects

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ABSTRACT

Background: Regional arterial compliance in peripheral arteries is known to be associated with ‘recrutable’ endothelial function probably mediated by an increase in smooth muscle tone [1]. However, the association between regional arterial stiffness and ‘resting’ endothelial function has not been evaluated.

Methods: Low Flow Mediated Constriction (LFMC) and Flow Mediated Dilation (FMD) were measured to evaluate ‘resting’ and ‘recrutable’ endothelial function as change in diameter of the brachial artery (ΔD) during and after 5 minutes of suprasystolic occlusion of the forearm in comparison to baseline artery diameter using B-mode ultrasound (M7, MindRay) in 27 healthy subjects (Age 50.8 ± 9.6 years). Central and peripheral regional arterial stiffness was assessed using applanation tonometry (Sphygmocor $\text{\textcircled{O}}$) to calculate carotid-femoral (cf) and carotid-radial (cr) Pulse Wave Velocity (PWV) respectively.

Results: FMD showed a significant negative correlation with crPWV ($r = -0.39, p = 0.04$) (Figure 1) while LFMC did not correlate with peripheral arterial stiffness. A significant negative correlation was observed between LFMC and cfPWV ($r = -0.53, p = 0.006$) (Figure 2) but not between FMD and cfPWV.

Conclusion: Impaired NO bioavailability has been identified as the key mechanism associated with reduced FMD and may result in increased smooth muscle tone thereby contributing to a functional decrease in peripheral arterial compliance. The results of the current study suggest that withdrawal of resting vasodilatory influence of NO may not be a major factor involved in LFMC. The exact mechanisms associating resting endothelial function with structural arterial stiffness in the central vessels needs to be further investigated.

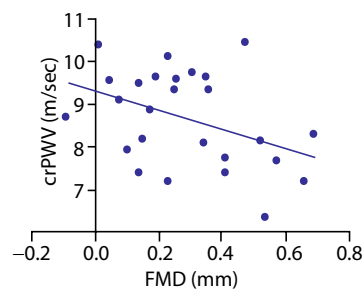


Figure 1 | Correlation between recruitable endothelial function assessed by flow mediated dilation and peripheral arterial stiffness assessed by carotid-radial Pulse Wave Velocity.

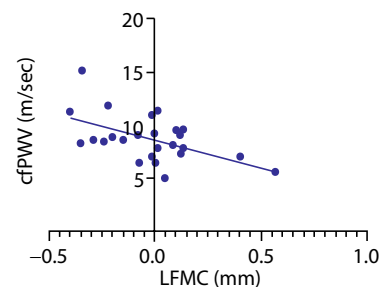


Figure 2 | Correlation between resting endothelial function assessed by low flow mediated constriction and central arterial stiffness assessed by carotid-femoral Pulse Wave Velocity.

REFERENCE

- [1] Badhwar S, Chandran DS, Jaryal AK, Narang R, Deepak KK. Regional arterial stiffness in central and peripheral arteries is differentially related to endothelial dysfunction assessed by brachial flow-mediated dilation in metabolic syndrome. *Diab Vasc Dis Res* 2018;15:106–13.

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