



Conference Abstract

P.47 Feasibility Evaluation of Imaging-Free Ultrasound Technology to Measure Diameters of Brachial and Radial Arteries for Assessment of Endothelial Function

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Keywords

ARTSENS
imaging-free ultrasound

ABSTRACT

Background: Ultrasonographic imaging to record changes in peripheral arterial diameter associated with Flow mediated dilatation or Low flow mediated constriction is routinely used to assess various facets of vascular endothelial function. Imaging poses many challenges including requirement of costly ultrasound machines, trained manpower to perform imaging and effort-intensive steps to analyse the images subsequently using manual or automated methods. We tested the feasibility and validity of using an imaging-free technology to record resting arterial diameters of brachial and radial arteries.

Methods: Eight healthy volunteers initially underwent ultrasonographic imaging (M7, Mindray; Shenzhen, P.R. China) of brachial artery and proximal radial artery. The brachial and radial artery 'zones' thereby identified through imaging were surface marked on subject's arm. Imaging-free ARTSENS® Pen device [1] (Healthcare Technology Innovation Centre, IIT Madras, India) consisting of highly integrated hardware for operating a single element broadband ultrasound transducer (centre-frequency = 5 MHz, spatial half angle <1.3 degrees, diameter = 5 mm) in pulse-echo mode was used to track detectable arterial wall motion and measure end-diastolic diameters from previously identified brachial and radial 'zones'.

Results: End-diastolic diameters measured by ARTSENS® Pen decreased significantly on moving from brachial to radial zone identified by imaging (4.34 ± 1.07 mm vs 2.05 ± 0.43 mm; $p < 0.0001$) and correlated strongly with imaging-based measurements ($r = 0.93$; $p < 0.0001$).

Conclusion: ARTSENS® Pen device offers feasible and valid imaging-free solution to measure peripheral arterial diameters which could potentially be employed for assessment of vascular endothelial function.

REFERENCE

- [1] Joseph J, Chandran DS, Kiran RV, Abhidev VV, Sivaprakasam M. Image-free technique for flow mediated dilation using ARTSENS® pen. *Conf Proc Annu Int Conf IEEE Eng Med Biol Soc 2019*;2019:5051–4.

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