



Reproducibility of Non-Invasive Assessment of Skin Endothelial Function Using Laser Doppler Flowmetry and Laser Speckle Contrast Imaging

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Résumé en
anglais

BACKGROUND: Endothelial dysfunction precedes atherosclerosis. Vasodilation induced by acetylcholine (ACh) is a specific test of endothelial function. Reproducibility of laser techniques such as laser-Doppler-flowmetry (LDF) and Laser-speckle-contrast-imaging (LSCI) to detect ACh vasodilation is debated and results expressions lack standardization. We aimed to study at a 7-day interval (i) the inter-subject reproducibility, (ii) the intra-subjects reproducibility, and (iii) the effect of the results expressions over variability.

METHODS AND RESULTS: Using LDF and LSCI simultaneously, we performed two different ACh-iontophoresis protocols. The maximal ACh vasodilation (peak-ACh) was expressed as absolute or normalized flow or conductance values. Inter-subject reproducibility was expressed as coefficient of variation (inter-CV,%). Intra-subject reproducibility was expressed as within subject coefficients of variation (intra-CV,%), and intra-class correlation coefficients (ICC). Fifteen healthy subjects were included. The inter-subject reproducibility of peak-ACh depended upon the expression of the results and ranged from 55% to 162% for LDF and from 17% to 83% for LSCI. The intra-subject reproducibility (intra-CV/ICC) of peak-ACh was reduced when assessed with LSCI compared to LDF no matter how the results were expressed and whatever the protocol used. The highest intra-subject reproducibility was found using LSCI. It was 18.7%/0.87 for a single current stimulation (expressed as cutaneous vascular conductance) and 11.4%/0.61 for multiple current stimulations (expressed as absolute value).

CONCLUSION: ACh-iontophoresis coupled with LSCI is a promising test to assess endothelial function because it is reproducible, safe, and non-invasive. N°: NCT01664572.

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