



Noninvasive assessment of endothelial function in the skin microcirculation

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BACKGROUND:

The structure and function of blood vessels varies along the vascular tree. Endothelial dysfunction is a hallmark of increased cardiovascular (CV) risk that can be assessed by several methods, some of which are invasive and of restricted application. The aim of this study was to determine whether the laser Doppler response of skin microcirculation to acetylcholine, reflects that of conduit artery assessed by brachial artery flow-mediated dilation (FMD).

METHODS:

Noninvasive measurement of endothelium-dependent vasodilation in the skin microcirculation by laser Doppler flowmetry (LDF) in response to a local transdermal iontophoretic application of acetylcholine (Ach-SkBF) is an operator-independent method. Ach-SkBF and FMD were measured in the nondominant upper limb of 55 unselected consecutive patients admitted in our department for evaluation of CV risk factors.

RESULTS:

Ach-SkBF was (mean +/- s.d. (min-max)) 490 +/- 414%, (10-1667%) and FMD was 3.77 +/- 3.01% (0.91-10.91). A strong linear relationship was found between Ach-SkBF and FMD: Ach-SkBF = 122.7 FMD + 25.8 (r = 0.92, P < 0.0001).

CONCLUSIONS:

Endothelial dilatory response to increased blood flow and to acetylcholine are similar in large arteries and in the skin microvasculature. Thus, measurement of blood flow changes in the skin microcirculation using LDF coupled with acetylcholine iontophoresis represents a technically challenging and reliable noninvasive method for the assessment of endothelial function within a large range of normal and altered endothelium responses.

Résumé en
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