1141-62
Effect of Tetrahydrobiopterin on Coronary Microcirculation in Healthy and Hypercholesterolemic Subjects

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Background: Tetrahydrobiopterin (BH4) is an essential co-factor of the NO-synthase which regulates vasomotion. It has been shown to normalize endothelial dysfunction in the forearm of hypercholesterolemic patients. br/br/To determine the acute effect of intravenous BH4 on myocardial blood flow (MBF) in hypercholesterolemic patients and in healthy controls at rest as well as during endothelium-dependent (exercise) and -independent (adenosine, Ado) hyperemia.

Methods: 150-labelled H2O and PET was used to measure regional MBF (ml/mg/min) at rest, during Ado (0.14mg/kg/min over 7 min) and immediately after supine bicycle exercise in 10 healthy male volunteers with normal cholesterol levels (mean workload 199 Watts [71% predicted]) and in 8 hypercholesterolemic subjects (102 Watts, 71% predicted). Both groups had no history of and low clinical probability for CAD. Sixty minutes later all MBF measurements were repeated after intravenous BH4-infusion (10mg/kg over 30 min).

Results: Exercise-induced MBF and Ado-induced hyperemic MBF are not significantly affected by intravenous BH4. Exercise-induced hyperemic MBF increases significantly (p<0.05) after BH4 in both groups.

Conclusions: In healthy men as well as in hypercholesterolemic patients, BH4 increases the tissue level reperfusion marker, such as sestamibi, predicts WMR in the infarcted myocardium. All patients were injected with sestamibi SPECT to predict WMR in the infarcted myocardium. Among MI patients treated with primary stenting and TIMI 3 grade flow, a substantial proportion of dysfunctional myocardial segments do not improve at 6 weeks. Our findings suggest that a tissue level reperfusion marker, such as sestamibi, predicts WMR.

1141-63
Improvement of Quantified To-99m Sestamibi Myocardial Perfusion Attenuation Corrected SPECT Imaging

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Background: Photon absorption, Compton scatter and resolution effects are physical phenomena that can produce imaging artifacts that may lead to misdiagnosis. Previously we developed a correction methodology (ExSPECT II) to compensate for these problems and documented its diagnostic advantage for visual interpretation. The purpose of this investigation is to document whether this correction methodology can also improve quantitative analysis for the detection and localization of CAD.

Methods: 43 patients (29 males, 14 females), 29 who had undergone coronary arteriography and 15 without evidence of CAD were imaged using ExSPECT II. We compared ExSPECT II images to a single gender-combined normal database. The corrected and uncorrected studies were compared for their accuracy to detect and localize to the LAD, LCX, and RCA vascular territories.

Results: The conventional quantification of the uncorrected studies yielded the following accuracy: CAD 91% (39/43), LAD 72% (31/43), LCX 77% (33/43), and RCA 89% (37/43). The gender-combined quantification of the corrected studies yielded the following accuracy: CAD 93% (40/43), LAD 72% (31/43), LCX 77% (33/43), and RCA 89% (37/43). Conclusion: Quantification of attenuation corrected To-99m sestamibi myocardial perfusion SPECT studies demonstrated a trend towards improved detection and localization of CAD over quantification of uncorrected SPECT studies.

1141-64
Evaluation of Peripheral Blood Flow During Exercise: A Complement to Exercise Myocardial Perfusion SPECT for Prognostic Assessment

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Background: Coronary artery disease (CAD) patients (pts) often manifest a paradoxical reduction in finger pulsatve amplitude (PWA) during exercise (EX). Since the clinical significance of this finding is unknown, we compared EX PWA responses to a sensitive measure of functional disease severity: summed reversibility score (SRS) on EX Tc-99m Sestamibi myocardial perfusion SPECT imaging.

Methods: 126 CAD pts (mean age 61 ± 11 years, 69% male) had PWA assessed by peripheral arterial tonometry (PAT) during EX SPECT. PWA for each minute of EX was compared as a ratio to the rest value. A 5 point score (0 = normal uptake, 4 = absent uptake) was assigned to 20 SPECT segments to determine SRS. 55 additional pts (mean age 53 ± 10 years, 51% male) with a low likelihood (LL) of CAD (<5%) were used as a control group.

Results: The mean slope of PWA response was significant in the LL pts but negative in the CAD pts (11 ± 10 vs. -67 ± 167, p<0.006). When grouped according to PWA ratio, CAD pts with the lowest PWA ratio had the highest number of ischemic SPECT studies, more reversible defects and higher SRS (table). Abnormal PWA responses were also associated with higher peak heart rates (p = 0.03) and higher peak systolic and diastolic pressures (p < 0.05 for each).

Conclusions: Paradoxical falls in peripheral blood flow during EX are associated with a greater frequency and magnitude of EX-induced SPECT hyperperfusion. These data suggest that peripheral arterial tonometry represents a non-invasive method of identifying pts with functionally severe CAD.

PARAMETERS

<table>
<thead>
<tr>
<th>ISCHEMIC SPECT (%)</th>
<th>19.1%</th>
<th>42.9%</th>
<th>61.9%</th>
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<tbody>
<tr>
<td>NUMBER OF REVERSIBLE DEFECTS</td>
<td>0.4 ± 0.7</td>
<td>1.6 ± 2.6</td>
<td>2.8 ± 4</td>
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<td>SUMMED DEFECT</td>
<td>1.5 ± 2.2</td>
<td>4.7 ± 6</td>
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<td>REVERSIBILITY SCORE</td>
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<td>&lt; 0.001</td>
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