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DETECTABILITY OF MYOCARDIAL ISCHEMIA AND INFARCTION BY REST I-123 BMIPP AND TL-201 DUAL-ISOTOPE SIMULTANEOUS MYOCARDIAL SPECT

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The detectability of ischemic regions (15 regions), probably ischemic regions (42 regions) and infarcted regions (78 regions) which demonstrated by stress Tl-201 SPECT was examined by rest I-123 BMIPP and Tl-201 dual-isotope simultaneous SPECT. In all ischemic regions Tl uptake was higher than BMIPP uptake. In almost half of probably ischemic regions Tl uptake was higher than BMIPP uptake, but in other regions both uptakes were equal. In 78%(61/78) of infarcted regions Tl uptake and BMIPP uptake were equal. It is concluded that ischemic regions and infarcted regions can be detected by rest I-123 BMIPP and Tl-201 dual-isotope simultaneous myocardial SPECT.

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RESTING I-123 BMIPP MYOCARDIAL SPECT FOR IDENTIFYING AND LOCALIZING CORONARY ARTERY DISEASE(CAD) IN PATIENTS WITH SUSPECTED UNSTABLE ANGINA.

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The aim of this study is to validate the I-123 BMIPP imaging for the identification and localization of CAD in patients(pts) with suspected unstable angina. BMIPP SPECT were performed for 42 pts. 35 pts had documented CAD. Visual and quantitative analysis were done. The sensitivity for detection of CAD was 69% and 80%, respectively, while the specificity was 57% and 57%. The sensitivity and specificity for detection of individual vessel involvement with the visual analysis was 67% and 78% for LAD, 48% and 86% for LCX, and 43% and 95% for RCA disease. For quantitative analysis, the results were 75% and 67%, 62% and 81%, and 48% and 95%, respectively. The BMIPP defects were correlated with the degree of coronary artery stenosis and the presence of collaterals. In conclusion, the resting BMIPP SPECT is a moderately accurate technique for detecting abnormal fatty-acid metabolism in the region supplied by diseased coronary arteries in pts with suspected unstable angina.

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MYOCARDIAL WASHOUT OF ^{123}I BMIPP AT REST AND EXERCISE IN NORMAL AND ISCHEMIC HEART.

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The relation of ^{123}I-BMIPP washout and cardiac work at rest and exercise was investigated in 16 volunteers and 10 patients (pts) with ischemic heart disease (IHD). SPECT imaging was initiated 30 mins after injection of 111 MBq of ^{123}I-BMIPP and repeated after an hour rest, using a three-headed scanner (Toshiba GCA9300A). Subsequently, 11 volunteers did mild exercise (ex) for 40 mins, followed by maximal (max) ex for 15 mins. The other 5 volunteers and the 10 pts did only max ex. The washout ratio (WR) and peak and net pressure rate product (PRP) was calculated for each exercise. In the volunteers, mean WR was $3.3 \pm 3.5\%$ at rest. WR showed significant correlation with both peak PRP ($r=0.833$, $p<0.01$) and net PRP ($r=0.886$, $p<0.01$) at mild ex. At max ex, WR did not correlate with peak PRP, but showed a distinct correlation with net PRP$< 300 \times 10^3$ mmHg/min ($r=0.796$, $p<0.01$, $n=10$) and showed a plateau after netPRP $\geqq 300 \times 10^3$ mmHg/min (mean: $12.5 \pm 1.6\%$, $n=6$). Five IHD pts gained net PRP $\geqq 300 \times 10^3$ mmHg/min and WR after ex elevated only in normal segments as compared with ischemic ones (10.3 ± 2.4 % vs. 4.9 ± 3.7 %, $p<0.03$). In conclusion, ^{123}I-BMIPP is released from a normal myocardium in relation to exercise, and a certain amount of exercise is necessary to differentiate an ischemic myocardium from a healthy one.

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I-123 BMIPP IMAGING FOR THE DIAGNOSIS OF CORONARY ARTERY DISEASE: APPLICATION TO PATIENTS WITH HYPERLIPIDEMIA AND DIABETES MELLITUS.

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The aim of the present study was to assess the relation of plasma substrates concentrations to I-123 BMIPP kinetics in the myocardium and to test the application of I-123 BMIPP imaging to patients with diabetes mellitus (DM) and/or hyperlipidemia (HL). I-123 BMIPP imaging was performed on 78 patients with suspected coronary artery disease. There were 22 patients with HL, 11 patients with DM, 12 patients with HL and DM, and 33 patients without HL and DM. Significant coronary stenosis (defined as $\geq 50\%$) was documented in 49 patients. After an overnight fast, the blood samples were drawn for analysis of blood glucose, insulin, cholesterol, triglycerides, and free fatty acids levels. Then, I-123 BMIPP was injected intravenously, and radioactivity was gathered for 30 sec in a list mode at a rate of 1 frame per sec. Myocardial SPECT images were obtained 20 min and 4 hr after the injection. Myocardial uptake of I-123 BMIPP was calculated by a Ishii-MacIntyre method. Regional accumulation of I-123 BMIPP was scored semi-quantitatively from 0 (normal) to 4 (no activity), and the sum of regional scores in each patient was defined as a total defect score (TDS). Myocardial uptake and clearance of I-123 BMIPP had no relation with the levels of either blood glucose, insulin, cholesterol, triglycerides or free fatty acids. Myocardial uptake and clearance of I-123 BMIPP, TDS, and the sensitivity for detecting significant coronary stenosis were not different between the 4 groups.

I-123 BMIPP can be used to detect impaired fatty acid metabolism in patients with diabetes mellitus and/or hyperlipidemia.