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Application of dipyridamole stress TC-99mMIBI spect in patients with significant aortic stenosis.

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Background: Exercise cardiac stress testing in patients with significant aortic stenosis is generally avoided for safety reasons. Furthermore, the studies that actually addressed the value of exercise testing both with and without myocardial Tc99mMIBI scintigraphy for the diagnosis of coronary artery disease (CAD) proved to yield low specificity. Nowadays there are no safe and accurate means for noninvasive assessment of the presence, extent and severity of CAD in patients with significant aortic stenosis. Our study aimed to assess overall safety and usefulness of dipyridamole stress myocardial perfusion scintigraphy for detection of CAD using single-photon emission computed tomography (SPECT) in patients with aortic stenosis.

Methods: The study comprised 20 patients with significant aortic stenosis who were compared with 20 patients with CAD designated as CCS II and III. All patients underwent a 5-minute dipyridamole infusion (1.5 mg/kg body weight) protocol stress technetium-99m sestamibi SPECT. Visual 17-segment SPECT analysis used a standard five-point scoring system ranging from 0 (normal tracer uptake) to 4 (absent uptake). The SPECT results were considered abnormal if more than two segments had a stress score ≥ 2 . These results were compared to the same number of patients diagnosed with CAD. All patients also underwent coronary angiography procedure. The respective results in the groups were subsequently compared using the U-Mann-Whitney test and Pearson's correlation nonparametric test.

Results: Sensitivity of gated SPECT study was calculated at the level of 83% in the studied group vs. 100% in the controls, with positive predictive value at 88% vs. 90%, respectively.

Hemodynamic responses during dipyridamole stress testing demonstrated no significant differences in the net change in systolic blood pressure (30% vs. 25%, patients with aortic stenosis vs. control subjects), heart rate (20% vs. 20%), dyspnea (25% vs. 30%) or incidence of chest pain (30% vs. 30%).

Conclusions: Dipyridamole Tc99m MIBI SPECT study was established to be well tolerated, safe and diagnostically accurate in patients with significant aortic stenosis and suspected CAD.

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Rest myocardial perfusion imaging and troponin I in the evaluation of chest pain patients.

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Background: In patients with acute coronary syndromes there is a quantitative relation between cardiac troponins (TnI and T) and the risk of death. Also there is evidence that even a mild elevation of troponins may be related to reversible ischemic injury. Rest myocardial perfusion imaging (RMPI) in the evaluation of patients with chest pain has diagnostic but most important prognostic information.

The purpose of this study was to evaluate the relationship between the severity of perfusion defects on RMPI and the maximal level of cTnI, in a group of patients (pts) admitted in the Emergency Department (ED) due to chest pain.

Methods: We enrolled hemodynamically stable pts, without prior myocardial infarction, presenting in the ED with ongoing chest pain or an episode of pain within the last six hours.

cTnI was determined by the central laboratory, and values above 0.2 ng/ml were considered indicative of myocardial injury. The first blood sample was drawn after clinical evaluation and in higher risk patients the test was repeated at 6 and 12 hours. Three groups of patients were defined considering cTnI values: I ≥ 0.10 ; 0.10 < II ≥ 0.20 ; III > 0.20 ng/ml.

Perfusion images were acquired after an injection of 15 mCi of 99mTc-tetrofosmin and visual scoring analysis was performed using a 17 segment system. A summed rest perfusion score was obtained (SRPS).

ANOVA was used in order to evaluate the SRPS in the defined troponin groups.

Results: Ninety-nine pts were included in this study. Thirty-three (33.3%) had a final diagnosis of myocardial infarction. There were 54 pts in group I, 13 in group II and 32 in group III. The mean SRPS values ± 1 standard deviation for each group were: I-4.6 \pm 5.9; II-7.9 \pm 8.7; III-13.2 \pm 8.2 (p < 0.0001)

Conclusion: There is a strong relationship between rest myocardial perfusion imaging and troponins in the evaluation of chest pain patients and similar to troponins, rest myocardial perfusion imaging may be used for prognostic assessment.

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Rest myocardial perfusion imaging in the evaluation of patients with chest pain: rest myocardial perfusion imaging and cardiac ischemic events within 90-days of presentation.

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Background: Rest myocardial perfusion imaging (RMPI) in the evaluation of patients with chest pain could be a valuable tool, not only because of its diagnostic but also because of its prognostic value. This study used RMPI for the evaluation of patients with chest pain to define the relationship between test results and the occurrence of ischemic events over a ninety-day period.

Methods: Eighty-seven patients (pts) admitted in the emergency department for ongoing chest pain or an episode of pain in the last six hours, were studied by RMPI. None of them had a history of myocardial infarction.

Tomographic perfusion images were acquired after the injection of 15mCi of 99mTc-tetrofosmin and analyzed using a 17 segment scoring system. The summed rest score was expressed as a percentage of the maximal possible obtainable score (% summed rest perfusion score SRPS). Regarding the result of the exam, 3 groups were established (based on the mean M value of %SRPS in patients with negative troponins, and the M + 1SD): I-%SRPS $\geq 9.0\%$; II- $9.0\% < \%SRPS \geq 20.3\%$; III-%SRPS > 20.3%. Ischemic events were: death, myocardial infarction (chest pain and elevated troponin I) and myocardial revascularization over a 90-day period. Statistical analysis was performed using Kaplan-Meier survival analysis and the Logrank test.

Results: Thirty-nine pts were included in group I (44.8%), 27 in group II (31.1%) and 21 in group III (24.1%). The ischemic events were: 29 myocardial infarctions (33.3%), 8 revascularizations (9.2%) and 1 death (1.1%). Four pts from group I (10.3%), 15 pts from group II (55.6%) and 19 from group III (90.5%) had an ischemic event. Using the Logrank test with a Mantel-Cox analysis there was a strong relationship between %SRPS and events (p < 0.0001).

Conclusion: In this study a very strong relationship was found between the occurrence of ischemic events and the extent of rest perfusion defects. This exam could be used in the evaluation of patients with chest pain for risk stratification of events related with ischemic heart disease.

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Clinical relevance of gated spect imaging in ischemic dilated cardiomyopathy.

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Background: Perfusion defects are common in gated single-photon emission computed tomography (GSPECT) of dilated cardiomyopathy patients (DCM pts), even in the absence of major coronary artery disease. Left ventricle dilatation or remodeling could affect the sensibility and specificity of GSPECT.

The aim of this work was to correlate perfusion, motility and thickness scores with coronary anatomy in DCM pts.

Methods: We retrospectively evaluated 87 pts with ischemic DCM (ejection fraction 45%, end systolic volume > 75 ml) who performed Tc-99 tetrofosmin QGS-QPS TM GSPECT and coronary angiography (CA) for etiologic diagnosis or risk stratification, with a 4 months lag. Those who underwent surgical or percutaneous revascularization, or had myocardial infarct (MI) between both exams were excluded (n=17).

Results: We analysed data from 70 pts, 55 (78.6%) males, age 63 \pm 12 years, with ejection fraction 33.3 \pm 8.6 %. Treadmill exercise was used in 19 (27.1%) pts and pharmacologic stress in 45 (64.3%) pts. Left bundle branch blockage was observed in 11 (15.7%) pts, 55 (78.6%) pts had previous MI and 55 (78.6%) pts were under anti-ischemic therapy. CA was performed within 1.2 \pm 2.5 months from GSPECT and revealed multivessel disease in 42 (60%) pts.

We found that left anterior descending artery (LAD) stenosis was correlated with motility (p=0.006, r= 0.34) and thickness (p=0.001, r=0.42) scores, perfusion defect extension in stress (p<0.01, r=0.55) and in rest (p<0.01, r=0.48), severity in rest (p<0.01, r=0.46) and reversibility (p=0.002, r=0.38) in LAD territory. Right coronary (RC) stenosis was only correlated with reversibility in RC territory (p=0.012, r=0.35). We found no correlation between perfusion, motility and thickness scores and the presence of multivessel or circumflex artery disease.

Conclusion: Significant LAD stenosis (>60%) can be anticipated by GSPECT analysis but, contrary to the expected results, we could not predict multivessel coronary disease in our patients. These results could be a particular feature of ischemic DCM.