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Clinical Nuclear Cardiology

IMPROVED SPECIFICITY OF THALLIUM SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY IN PATIENTS WITH LEFT BUNDLE BRANCH BLOCK BY DIPYRIDAMOLE.

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Exercise (Ex) thallium single photon tomography (TISPECT) reveals defects in left anterior descending (LAD) segments of most left bundle branch block (LBBB) patients (pts) with normal coronaries. We hypothesized: 1) this pattern portrays normal autoregulation of flow in segments with lower myocardial oxygen demand during Ex (the septum requires less tension to overcome only pulmonary impedance) and 2) dipyridamole (Dp) TISPECT should enable more accurate detection of stenoses \geq 50% by uniform exploitation of flow reserve. We performed Ex and Dp TISPECT in 10 LBBB pts within 3 months of coronary angiography (CA). TISPECT was analysed comparing polar maps to normal data. CA was analyzed using computerized electronic calipers.

Five pts had normal coronaries; 4 had LAD stenosis; 1 had right coronary stenosis. Sensitivity for detection of stenoses was 1.00 (5/5) by Ex and Dp TISPECT. Specificity was 0.33 (2/6) for Ex and 1.00 (6/6) for Dp in the LAD territory ($p < .01$) and 0.80 (20/25) for Ex and 0.92 (23/25) for Dp considering all territories.

These data suggest Dp affords higher specificity than Ex for detection of LAD stenoses in LBBB patients. "False positive" Ex TISPECT in LBBB might reflect normal autoregulation of coronary flow.

REGIONAL MYOCARDIAL BLOOD FLOW RESPONSE TO PACING TACHYCARDIA AND TO DIPYRIDAMOLE INFUSION IN PATIENTS WITH SUBCLINICAL DILATED CARDIOMYOPATHY: A QUANTITATIVE ASSESSMENT BY POSITRON EMISSION TOMOGRAPHY

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To determine the influence of primitive myocardial dysfunction on regional myocardial blood flow (rMBF) response to atrial pacing (tachycardia (AP) and dipyridamole infusion (DIP), 11 consecutive pts, aged 43 ± 12 (mean \pm SD) years, with subclinical dilated cardiomyopathy (DCM) were evaluated by ^{13}N -Ammonia and dynamic positron emission tomography at rest, during AP and after DIP (0.56 mg/kg over 4 min.). All pts, referred for ventricular arrhythmias (5 pts), left bundle branch block (5 pts) or both (1 pt), were in NYHA class I-II. Diagnosis of DCM was based on: increased LV volume, abnormal LV ejection fraction ($35 \pm 9\%$, range 21-48) and LV wall motion abnormalities at radionuclide ventriculography. All had normal coronary arteries at angiography and no valvular or congenital heart disease. Quantitation of rMBF (flow times extraction) by positron emission tomography was obtained by measurements of ^{13}N -Ammonia arterial input function and LV myocardial tissue concentrations and compared with values of 5 normal subjects. In pts with DCM, rMBF was homogenous in the septal, antero-apical and postero-lateral walls at rest, during AP and after DIP (8%, 9% and 11% variability, respectively). Mean MBF at rest averaged 0.9 ± 0.2 ml/g/min, slightly increased to 1.2 ± 0.5 during AP ($p < .05$ vs rest) and to 1.6 ± 0.4 after DIP ($p < .001$ vs rest and AP). In normals, mean MBF was 1.2 ± 0.1 at rest, 2.1 ± 0.2 during AP ($p < .01$ vs rest) and 2.5 ± 0.4 after DIP ($p < .001$ vs rest and $p < .05$ vs AP). Mean MBF was significantly higher in normals in the 3 flow conditions ($p < .01$). In conclusion, in pts with subclinical DCM, the increment in rMBF was markedly impaired either during AP or after DIP, despite a homogeneous perfusion pattern. In this subclinical stage of DCM, positron emission tomography allows noninvasive quantitation of abnormal MBF response to tachycardia and to coronary vasodilators.

PREOPERATIVE EVALUATION OF CARDIAC RISK BEFORE MAJOR NON-VASCULAR SURGERY.

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We previously identified an algorithm (ALG) utilizing clinical (CLIN) and dipyridamole-thallium imaging (DTHAL) predictors that optimizes cardiac risk stratification (STRAT) before vascular surgery (VASC). Independent predictors were 5 CLIN [Age > 70 , angina (ANG), Q wave ECG, treated VEA, diabetes (DM)], and DTHAL redistribution (RED). To evaluate the ALG for major non-vascular surgery (NON-VASC), we studied 85 consecutive Pts referred for preoperative DTHAL: Age 68 ± 5 years; history (HX) ANG-36; HX MI-32; HX CHF-17; Q-20; HX VEA-8; DM-25. 8 Pts experienced 10 postoperative cardiac events (CARD): Death-1; MI-2, unstable ANG-5; pulmonary edema-2. 1 Pt had MI and death. RED on DTHAL was 100% sensitive and 71% specific (positive predictive value 27%) for CARD. Application of ALG, showing risk of CARD in relation to # of independent CLIN and presence or absence RED is displayed in table. CONCLUSION: 1. STRAT for NON-VASC is improved by the CLIN and DTHAL ALG. 2. Pts with none of the 5 CLIN do not need DTHAL. 3. RED on DTHAL correlates with substantial change in risk of CARD for NON-VASC Pts at both intermediate (1-2 CLIN) and high (≥ 3 CLIN) clinical risk. 4. Pts with ≥ 2 CLIN and RED have high risk of CARD (7/20) but low risk of MI (1/20) and death (0/20). Thus, routine preoperative coronary angiography and revascularization even for this high risk subgroup appears unnecessary. Its low rate of serious CARD may be due to intensive perioperative monitoring and therapy.

# CLIN	RISK OF CARD		coronary angiography and revascularization even for this high risk subgroup appears unnecessary. Its low rate of serious CARD may be due to intensive perioperative monitoring and therapy.
	RED-	RED+	
0	0/13	0/1	
1	0/20	0/9	
2	0/15	4/13	
≥ 3	0/7	3/7	

LIMITED PROGNOSTIC VALUE OF PREDISCHARGE LOW-LEVEL EXERCISE THALLIUM TESTING AFTER THROMBOLYTIC TREATMENT OF MYOCARDIAL INFARCTION.

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Predischarge low-level exercise (Ex) thallium imaging (TL) has been used after myocardial infarction (MI) to predict prognosis, however, its value following thrombolytic therapy is unknown. In 67 consecutive such patients there were 19 events: 3 from a positive (+) test prior to discharge and 16 (4 MI, 1 death, 6 coronary bypass surgery, and 5 angioplasty) after discharge during a 1 year follow-up interval. 4 events occurred in 1 month, 12 in 3 months, and the remaining 4 in one year. A (+) Ex test was 1mm ST segment depression. A (+) TL test was any redistribution. The occurrence of events with regard to the Ex and TL results including lung uptake and LV cavity dilatation follows:

Event	Increased Lung Uptake		LV Cavit. Dilatation	
	(+) Ex	(+) TL	5 (31%)	8 (50%)
No Event	8 (16%)	17 (35%)	10 (21%)	13 (27%)

* $p = 0.03$ compared to no event.

Angina during Ex occurred in 5 pts and had no prognostic value. The Ex test detected 2/16 (12%) events; addition of TL detected 7/16 (44%) more. Lung uptake or reversible LV cavity dilatation increased this to 12/16 (75%). Of the 1 death and 4 MI, Ex was (-) in all and TL was (-) in 2.

Therefore cardiac events occur mostly in 3 months after acute MI treated with thrombolysis and are not accurately predicted by predischarge low-level Ex TL. Maximal Ex testing, dipyridamole, or close follow up may be needed to optimize identification of future events.