QUANTITATIVE EVALUATION OF FATTY ACID METABOLISM USING $^{123}$I$^2$-BMIPP DYNAMIC SPECT: COMPARATIVE STUDY BETWEEN ISCHEMIC AND DOXORUBICIN INDUCED CARDIOMYOPATHY BY THE RUTLAND METHOD.

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Quantitative assessment of $^{123}$I$^2$-BMIPP dynamic myocardial SPECT was performed to compare the fatty acid metabolic abnormality between ischemic heart disease (IHD) and doxorubicin-induced myocardial damage (DxMD). 20 pts with IHD, 20 pts with various malignancies administered doxorubicin (38-640 mg) and 36 control subjects were examined. Soon after an injection of $^{123}$I$^2$-BMIPP, 30-sec dynamic SPECT data were acquired successively for 15 minutes. On short-axis mid-ventricular slices of left ventricle (LV), region of interest was set in the ischemic segment in IHD or in the whole myocardium in DxMD for output function and in LV cavity for input function. Using the time-activity curves of the output function (Mo(t)) and the input function (B(t)), the Rutland equation was calculated.

$$\frac{Mo(t)}{B(t)} = F + K \int B(t) dt$$

where F; background subtraction factor, K; uptake constant, Mo(t)/B(t) showed a good linear correlation with $\int B(t) dt$ from 30 sec to 210 sec in normal myocardium. The duration of this linearity was shortened less than 120 sec in IHD and prolonged up to 270 sec in DxMD. The mean ratio was 0.56±0.03 in IHD, 0.70±0.02 in DxMD and 0.97±0.02 in controls, respectively. There was a significant difference between IHD and the controls (p<0.01). These findings suggested that the metabolic abnormality of fatty acid was caused by increased back diffusion in IHD but decreased metabolic rate of BMIPP or in the whole myocardium in DxMD for output function and in LV cavity for input function. Using the time-activity curves of the output function (Mo(t)) and the input function (B(t)), the Rutland equation was calculated.

THE ASSESSMENT OF MYOCARDIAL AUTONOMIC NEUROPATHY IN DIABETIC PATIENTS WITH THE RUTLAND METHOD.


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Aim: Previous studies suggest that there are autonomic nerve system abnormalities in patients with MVP. In this study we use MIIBG scintigraphy to assess myocardial sympathetic nerve function in these patients.

Methods: Eleven patients (4 males, 45±15 years) with MVP and twelve controls (3 males 45±10 years) underwent planar and SPECT myocardial imaging 4 hours after the intravenous injection of 5mCi $^{123}$I$^2$ MIIBG. The heart to mediastinum (H/M) ratio was calculated in order to quantify cardiac MIIBG accumulation, while the SPECT study was performed in order to investigate the regional distribution of adrenergic innervation.

Results: The H/M Ratio was less in patients than controls (1.300±0.21 vs 2.510±0.23 p<0.001). In SPECT Study 9/11 patients had a regional alteration in adrenergic innervation (31.8%) while only two out of twelve control subjects (16.6%). Segments with reduced uptake were observed in patients: 1 septum, 5 inferior-lateral, 3 inferior-septal, 1 anterior-apical, 2 anterior-septal, 1 anterior-lateral and 2 apical. Two out of twelve controls presented in SPECT study mild reduce uptake in apical wall.

Conclusions: Patients with MVP show localized abnormalities of myocardial adrenergic innervation. This confirms previous studies which assumed that the autonomic nervous system plays an important role in the pathophysiology of MVP.

A COMPARISON OF MYOCARDIAL PET IMAGING WITH $^{62}$CuETS AND THE NOVEL PET TRACER $^{62}$Cu-Ethylglycolal bis(thiosemicarbazone) ($^{62}$Cu-ETS) IN HUMANS.


Generator produced $^{62}$CuETS ($^{62}$Cu-pyruvaldehyde bis(N4-methylthiosemicarbazone)) provides high quality PET myocardial perfusion images, however, it exhibits high liver uptake and nonlinear tracer uptake with hyperemia which may affect determination of perfusion. A related generator-produced ligand, $^{62}$CuETS ($^{62}$Cu-ethylglycolal bis(thiosemicarbazone), has been developed in an attempt to improve on imaging characteristics. We performed a comparison of $^{62}$CuETS and $^{62}$CuPTS using paired rest/dipyridamole stress cardiac PET studies performed in 12 normal volunteers. Regions of interest were drawn in the LV blood pool, heart, and liver. Comparison of $^{62}$Cu-ETS vs $^{62}$CuPTS demonstrated a higher resting heart/liver ratio (1.01±0.14 vs 0.66±0.17; p<0.0005) and a higher stress heart/liver ratio (1.12±0.21 vs 0.60±0.15; p<0.0001). The myocardial stress/rest ratio was also higher for $^{62}$Cu-ETS vs $^{62}$CuPTS ([1.56±0.16 vs 1.33±0.21; p<0.005].

Conclusions: $^{62}$Cu-ETS like $^{62}$CuPTS can be generator-produced and provides excellent myocardial image quality. The significantly lower liver uptake at rest and following dipyridamole stress along with the enhanced stress/rest myocardial uptake ratio demonstrated suggests $^{62}$Cu-ETS provides improved myocardial PET imaging characteristics and may be a better PET perfusion agent than $^{62}$CuPTS.