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No. 12

EARLY DETECTION OF DOXORUBICIN CARDIOTOXICITY USING ^{123}I-BMIPP DYNAMIC SPECT. K. Saito*, K. Takeda, S. Okamoto, M. Miyahara, K. Makino, T. Kouji, Y. Nomura, H. Maeda, T. Ichihara, T. Nakano, Matsusaka Central Hospital, Matsusaka, Japan; Mie University School of Medicine, Tsu, Japan; Fujita Health University, Nagoya, Japan; Toshiba, Tokyo, Japan. (100447)

To evaluate the clinical usefulness of ^{123}I-BMIPP for the early detection of myocardial damage caused by doxorubicin, we performed quantitative assessment of the early kinetics of ^{123}I-BMIPP by dynamic myocardial SPECT. **Methods:** Forty patients were examined. ^{123}I-BMIPP dynamic myocardial SPECT, as well as echocardiography, was performed before and after chemotherapy. Immediately after the injection of ^{123}I-BMIPP (111 MBq), 30-sec dynamic SPECT data were acquired successively for 15 minutes using a three-headed SPECT system. Using the time-activity curve (TAC) of each myocardial segment as an output function and the TAC of the LV cavity as an input function, the Rutland equation was employed to assess all segments. **Results:** The mean K value was lower after chemotherapy, although the mean ejection fraction did not differ on echocardiography. In 21 patients in whom dynamic SPECT was performed both before and after chemotherapy, the mean K value showed a significant decrease from 0.098 ± 0.026 to $0.071 \pm 0.020 (p<0.0001)$. The degree of decrease in K values after chemotherapy showed a significant linear correlation with the administered dose of doxorubicin ($r=0.641$, $p<0.018$). **Conclusion:** ^{123}I-BMIPP dynamic myocardial SPECT is useful because it permits the early detection of abnormality of myocardial fatty acid metabolism caused by doxorubicin.

Comparisons of mean k value and EF between before and after chemotherapy

	K value	EF (%)
before (n=36)	0.092 · 0.027	68.6 · 6.0
after (n=25)	0.073 · 0.020	66.9 · 6.2

* p ≤ 0.006

No. 13

PROGNOSTIC VALUE OF THE AMOUNT OF DYSFUNCTIONAL BUT VIABLE MYOCARDIUM USING TL-201/I-123 BMIPP DUAL SPECT IN REVASCULARIZED PATIENTS WITH LEFT VENTRICULAR DYSFUNCTION. S. Fukuzawa*, S. Ozawa, M. Inagaki, J. Sugioka, Funabashi Municipal Medical Center, Chiba, Japan. (122)

Objectives: The aim of this study was to assess the prognostic value of the amount of dysfunctional but viable myocardium in revascularized patients with severe left ventricular dysfunction using Tl-201/I-123 BMIPP dual SPECT (D-SPECT). **Methods:** Seventy-six patients with LVEF < 40% underwent D-SPECT. They were revascularized using either CABG or PTCA and entered this study. To quantify the amount of dysfunctional but viable myocardium, both tracers uptake were scored using a 4-point system in 18 segment model. Dysfunctional but viable myocardium were defined if they exhibited the mismatch by at least one grade with D-SPECT image. The patients were followed up for a mean period 32 months for cardiac mortality and nonfatal cardiac events. Standard follow-up left ventriculography was performed 6 to 12 months after revascularization. **Results:** Thirty-two patients exhibited a large amount of dysfunctional but viable myocardium (>6 segments, group A), 28 patients had small amount of dysfunctional but viable myocardium (2 to 6 segments, group B) and 16 patients were found to have irreversible damage to myocardium (group C). Similar prere-vascularization LVEF of $35 \pm 5\%$, $34 \pm 8\%$, $36 \pm 6\%$ increased to $46 \pm 7\%$ (p<0.01), to $40 \pm 6\%$ (p<0.05) and to $36 \pm 3\%$ (n.s), respectively after revascularization. The greatest functional improvement after revascularization in group A was accompanied by a low rate of cardiac events during follow-up and better cardiac event-free survival as judged by the Kaplan-Meier survival analysis (p<0.05 vs group B and C). **Conclusion:** In revascularized patients with severe LV dysfunction, the presence of a large amount of dysfunctional but viable myocardium evaluated by Tl-201/I-123 BMIPP dual SPECT identifies patients with the best prognosis.

No. 14

SIGNIFICANCE OF REDUCED BMIPP UPTAKE DESPITE NORMAL PERFUSION AT REST ON THE EVALUATION OF ACUTE CHEST PAIN. Y. Kawai*, E. Tsukamoto, Y. Nozaki, H. Ohshima, M. Sakurai, N. Tamaki, Hokko Memorial Hospital, Sapporo, Japan; Hokkaido University, Sapporo, Japan. (218)

The radionuclide study has an important role for risk stratification in patients with acute chest pain. Our previous studies indicated that abnormal BMIPP uptake was often associated with normal perfusion at rest in these patients. To evaluate the clinical significance of BMIPP imaging, BMIPP SPECT was obtained on the next day of the tetrofosmin perfusion SPECT at rest in patients within one week of acute chest pain. Of the 100 consecutive patients who received perfusion SPECT, 68 showed normal perfusion at rest. These patients were further divided into those with abnormal BMIPP uptake and normal BMIPP uptake to compare the clinical and laboratory findings. Result is shown in the table. These data indicate that reduced BMIPP uptake despite normal perfusion at rest was often seen in patients with acute chest pain. Such abnormalities were often associated with reduced wall motion and abnormal ECG findings but not related with organic coronary artery stenosis. In conclusion, reduced BMIPP may reflect presence of prior severe ischemic insult (ischemic memory) independent of resting perfusion.

Result

Findings	Abnormal BMIPP	Normal BMIPP	Significance
n	12	56	
Unstable angina	9 (75%)	20 (36%)	p<0.01
Over 15 min. of chest pain	7 (58%)	25 (45%)	ns
Abnormal wall motion on UCG	6 (50%)	6 (11%)	p<0.001
Abnormal ECG on examination	5 (42%)	8 (15%)	p<0.05
>90% stenosis on CAG	4 (33%)	14 (25%)	ns

Cardiovascular Track
Instrumentation and Methods

2:15 PM-3:45 PM   Session 3   Room: 502 A
Moderator: Mark W. Groch, PhD
Co-Moderator: William D. Erwin, MS

No. 15

MULTIPLE LINE SOURCE ARRAY TCT/ECT SYSTEM: A TECHNICAL PHANTOM EVALUATION. E. P. Ficaro*, J. A. Fessler, J. N. Kritzman, P. C. Hawman, S. W. DeBruin, J. R. Corbett, University of Michigan Medical Center, Ann Arbor, MI; Siemens Medical Systems, Inc., Hoffman Estates, IL. (500573)

OBJECTIVES: The purpose of this study was to evaluate a transmission(Tr)/emission(Em) tomographic system using multiple transmission line source arrays with a dual detector system to perform non-uniform attenuation correction (AC) in the chest. The AC data from this commercially available system (Profile, Siemens) was compared to data from a previously validated modified Picker STEP sytem (M-STEP) and the Profile data reconstructed with algorithms (M-Profile) developed at our institution. METHODS: For the Profile system, projection data was acquired over 180° in a non-circular orbit for 12min duration. For Tc-99m, Tr and Em data was acquired simultaneously, while for Tl-201 the data was acquired in an interleaved sequential mode. Attenuation maps were reconstructed using filtered backprojection and the AC emission data was reconstructed using an iterative mulitplicative correction algorithm. For M-STEP, both tracers were acquired simultaneously over 360° in a non-circular orbit for 12min each. Attenuation maps were reconstructed using an iterative penalized likelihood algorithm and the AC emission images were reconstructed using an iterative penalized least squares algorithm. These algorithms were also used to reconstruct the Profile data. A uniform cylinder with and without activity (19MBq Tc-99m, 3.7MBq Tl-201) was used to measure bias and uniformity in the attenuation maps due to emission crosstalk (xtalk). An anthropomorphic chest phantom with a normal and a defect heart was imaged to measure uniformity in the normal heart and defect contrast in the defect heart. Liver activity in the normal heart phantom was varied to measure its effect on AC uniformity in the heart. RESULTS: Cylinder map bias values due to xtalk were (Profile: 0.008/cm. M-STEP: 0.002/cm. M-Profile: 0.004/cm). Uniformity in Tc-99m normal heart was (Profile: 10%, M-STEP: 6%, M-Profile: 8%). Tc-99m contrast for a 2cm inferior wall defect was (Profile: 35%, M-STEP: 37%, M-Profile: 35%). CONCLUSIONS: Phantom results from the Profile system compared well with M-STEP and M-Profile. The Profile system is promising for cardiac AC imaging and warrants extensive clinical evaluation.