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CLINICAL EVALUATION OF USEFULNESS OF Tc-99m-SPECT IMAGES. K. Nakada, E. Tsukamoto, K. Kawamura, K. Fujimori, K. Itoh, M. Furudate, T. Gotoh, T. Iida, K. Fujita and K. Nasuhara. Hokkaido University School of Medicine, Sapporo and Sunagawa City Hospital, Sunagawa.

Single photon emission tomography (SPECT) using Tc-99m-pyrophosphate (PYP) was performed in 47 patients, 35 with acute myocardial infarction (AMI), 6 with cardiomyopathy (CM), and 6 with ischemic heart disease (IHD), all of whom complained chest pain. Data for SPECT were collected from 180 degree from RAO 45 to LPO 45 of the patients, and then reconstructed by filtered back projection method. We used Wiener filter as a pre-filter, and no attenuation correction was done. Myocardial uptake of Tc-99m-PYP was clearly separated from uptake of ribs or spine and more delineated in SPECT than in conventional Planar image. Sensitivity of SPECT was 91.3%, higher with statistical significance than Planar image ( $P < 0.05$ ). In 2 cases of non-transmural infarction, myocardial uptake was observed only in SPECT image. In some cases, it was difficult to determine location of uptake, especially, in inferior, posterior, and lateral wall, and 4 out of 6 patients with CM showed positive uptake in SPECT resulting in low specificity (56.3%) of SPECT. We conclude SPECT is more useful in diagnosis of AMI, but more discussions should be done to determine significance of SPECT in patients of CM.

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EVALUATION OF TC-99M HMDP (HYDROXY-METHYLENE-DIPHOSPHONATE) FOR ACUTE MYOCARDIAL INFARCTION. Y. Kawamura, K. Okamoto, M. Wakakura, T. Muto, I. Okuzumi, J. Yamazaki, T. Morishita (The 1st department of internal medicine Toho university school of medicine, Tokyo)

Identification of infarcted area and size in acute myocardial infarction is an important factor to determine the prognosis. We evaluated the availability of Tc-99m HMDP (20m Ci), which was injected intravenously to the patients at 1-4 days from onset, compared with Tc-99m PYP. Sensitivity and specificity between HMDP and PYP groups were almost similar statistically. To evaluate the specificity of HMDP, uptake ratio in sternum, rib, and soft tissue were calculated at 2 and 3 hour after intravenous injection, HMDP photo could be imaged in the early time relatively. Furthermore, planar images and SPECT images were analyzed to determine the infarcted area compared with other parameter.

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ASSESSMENT OF SEVERITY OF CARDIAC REJECTION IN HETEROTOPIC HEART TRANSPLANTATION USING INDIUM-111 ANTIMYOSIN AND MAGNETIC RESONANCE IMAGING. T. Nishimura, M. Hayashi, T. Uehara, K. Hayashida, M. Sada, H. Sasaki, C. Yutani. National Cardiovascular Center, Suita, Osaka.

It is important in heart transplantation to evaluate precisely the severity and extent of cardiac rejection. Seven donor hearts in which atrial septal defect and tricuspid regurgitation had been produced beforehand, were heterotopically transplanted into the recipient's chest cavity. Indium-111 antimyosin myocardial imaging of the excised heart was performed using scinticamera. Magnetic resonance imaging was also performed and  $T_2$  relaxation time was calculated. Then, these data were correlated with pathologic findings such as mild, moderate and severe rejection. Indium-111 antimyosin uptake was high in moderate and severe rejection, but  $T_2$  relaxation time was prolonged even in mild rejection. Thus, Indium-111 antimyosin uptake was specific, and  $T_2$  relaxation time was sensitive for detection of cardiac rejection. These non-invasive procedures allow us to evaluate accurately myocardial tissue characterization in cardiac rejection.

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CHARACTERIZATION OF Tc99m-HEXAKIS-ETHER ISONITRILES FOR MYOCARDIAL PERFUSION IMAGING. S. Takahashi, S.J. Williams, S.A. Mousa, T.R. Carroll, L.J. Maheu and R.A. Morgan, E.I. du Pont de Nemours and Co., N. Billerica, MA, USA.

A number of  $^{99m}\text{Tc}$ -hexakis-isonitrile analogs appear to be useful for myocardial perfusion imaging. The first isonitrile studied in humans (t-butylisonitrile, TBI) was non-ideal due to high lung and liver background activity. A series of isonitrile derivatives have been synthesized and studied in animals to select analogs with more favorable characteristics. The most promising class of compounds which have been identified are the aliphatic (C-4 to C-5) methyl ethers. These compounds exhibit good initial heart uptake with different clearance rates, rapid blood clearance, low lung extraction, and rapid liver clearance. Of these, Tc-99m-hexakis-2-methoxy methylpropyl isonitrile ( $^{99m}\text{Tc}$ -RP-30) is superior in terms of overall imaging characteristics. The heart extraction is rapid and retention of  $^{99m}\text{Tc}$ -RP-30 persists with a  $t_{1/2}$  of ~5 hours. The activity and clearance of  $^{99m}\text{Tc}$ -RP-30 in the liver yields an increasing heart/liver ratio with increasing time after injection. This agent distributes in the heart initially in relation to regional myocardial blood flow. In rabbit coronary artery ligation release studies,  $^{99m}\text{Tc}$ -RP-30 does not redistribute while  $^{201}\text{Tl}$  shows an apparent redistribution of 40-50%. The pharmacological characteristics of  $^{99m}\text{Tc}$ -RP-30 are consistent with preliminary clinical results. These studies suggest that  $^{99m}\text{Tc}$ -hexakis ether isonitriles may be clinically valuable for myocardial perfusion and functional measurements.