
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 of 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 collection 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 91.3% was higher with statistical significance than Planar image (P<0.05). In 2 cases of non-traumatic infarction, myocardial uptake was observed only in Planar 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.


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 TI 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 TI relaxation time was prolonged even in mild rejection. Thus, Indium-111 antimyosin uptake was specific, and TI relaxation time was sensitive for detection of cardiac rejection. These non-invasive procedures allow us to evaluate accurately myocardial tissue characterization in cardiac rejection.

259 CHARACTERIZATION OF Tc99m-HEXAKIS-ETHER ISONITRILES FOR MYOCARDIAL PERFUSION IMAGING. S. Takahashi, SJ Williams, SA Mousa, TR Carroll, LJ Maheu and RA Morgan, E.I.du Pont de Nemours and Co., N. Billerica, MA, USA.

A number of 99mTc-hexakis-isonitrile analogs appear to be useful for myocardial perfusion imaging. The first isonitrile studied in humans (t-butylinosonitrile, TBI) was non-viable 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 (99mTc-RP-30) is superior in terms of overall imaging characteristics. The heart extraction is rapid and retention of 99mTc-RP-30 persists with a t1/2 of ~5 hours. The activity and clearance of 99mTc-RP-30 in the liver yields an increasing heart to 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, 99mTc-RP-30 does not redistribute while 201-T1 shows an apparent redistribution of 40-50%. The pharmacological characteristics of 99mTc-RP-30 are consistent with preliminary clinical studies. These studies suggest that 99mTc-hexakis ether isonitriles may be clinically valuable for myocardial perfusion and functional measurements.