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POSSIBLE LIMITATIONS OF DOUGHNUT PATTERN OF Tc-99m PYROPHOSPHATE MYOCARDIAL UPTAKE AS AN INDICATOR OF POOR PROGNOSIS.

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Prognostic implications of doughnut pattern of Tc-99m pyrophosphate myocardial scintigraphy were determined in 51 patients (pts) with acute anterior myocardial infarction. Twenty-one pts (39%) showed doughnut pattern radionuclide uptake and had more frequent major arrhythmias than pts with nondoughnut scintigrams (85% vs 38%, $P<0.005$). Radionuclide left ventricular ejection fraction was more severely depressed ($28.7\pm13.4\%$ vs $41.2\pm12.7\%$, $P<0.005$) and defect score estimated from Tl-201 image was larger in pts with doughnut scintigrams (9.8 ± 4.5 vs 5.8 ± 3.4 , $P<0.001$) when compared with pts with nondoughnut scintigrams. Although doughnut pattern uptake identifies severe left ventricular dysfunction and large myocardial infarct, there is considerable overlapping of these parameters between pts with and without doughnut scintigram, thereby making it difficult to determine the precise prognosis.

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SEMIQUANTITATIVE ASSESSMENT OF INFARCT SIZE BY Tc-99m-PYP MYOCARDIAL SCINTIGRAPHY IN ACUTE MYOCARDIAL INFARCTION.

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Technetium-99m-PYP myocardial scintigraphy was performed in 38 patients (pts) with acute myocardial infarction which included 20 pts with anterior myocardial infarction (A-MI) and 18 pts with inferior myocardial infarction (I-MI). There were evidenced by the clinical, electrocardiographic and enzyme studies. To estimate infarct size, we studied and compared two methods 1) Area method: pixels of MI-ROI 2) Count method: MI counts/mean Rib counts (MI counts was total counts which was subtracted background and rib counts within MI-ROI).

We obtained the following correlations.

| | A-MI | I-MI |
|--------------|---------------|--------------|
| Peak CK vs | $r=0.68$ | $r=0.53$ |
| Area method | ($P<0.001$) | ($P<0.02$) |
| Peak CK vs | $r=0.77$ | $r=0.65$ |
| Count method | ($P<0.001$) | ($P<0.01$) |
| EF by RNA vs | $r=-0.38$ | N.S. |
| Count method | | |

In conclusion, MI counts/mean Rib counts (Count method) was more useful to estimate infarct size than Area method.

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QUANTITATION OF MYOCARDIAL INFARCT VOLUME USING Tc-99m-PYROPHOSPHATE AND EMISSION COMPUTED TOMOGRAPHY.

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Tc-99m-pyrophosphate (PYP) myocardial emission computed tomography (ECT) was performed in 40 patients (pts) with acute myocardial infarction (AMI) and tried to measure the infarct volume. Forty pts had clinical, electrocardiographic and enzymatic evidence of AMI. The transaxial images were reconstructed by filtered back projection with attenuation correction of thorax. The voxel counts were calculated in a region of interest (ROI) around the myocardial Tc-99m-PYP uptake for each tomographic slices. The threshold level was defined as 65% of the maximal counts with the ROI as determined in the phantom volume experiment. The total number of voxels in all slices were then added together and multiplied by a volume constant. Average infarct volume was 101.4 ± 36.7 ml (range 45 to 198). Infarct volume was correlated with radioactivity over the myocardium according to Parkey et al. Infarct volume was correlated with Σ CPK ($r=0.71$, $P<0.001$) and left ventricular ejection fraction ($r=-0.58$, $P<0.01$), while not correlated with Peak CPK. In conclusion, infarct volume estimated by Tc-99m-PYP myocardial ECT provides useful informations in pts with AMI.

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CLINICAL SIGNIFICANCE OF RE-STUDY TC-99m PYROPHOSPHATE MYOCARDIAL SCINTIGRAM IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION. K.Matsumita, K.Nakai, M.Sato, T.Koeda, T.Suzuki, M.Kato, S.Katuragawa, T.Takahashi and T.Yanagisawa Iwate Medical University, Morioka. A.Kawamura Red Cross Hospital, Hachinohe.

In order to evaluate the clinical significance of time-course of positive technetium 99m-pyrophosphate (Tc-99m PYP) myocardial scintigram, Tc-99m PYP myocardial scintigraphic findings were obtained in 30 patients with acute myocardial infarction (AMI) at the 4th and 10th days after onset of AMI. Scintigraphic findings were compared with changes of the serum transaminase such as LDH, CPK and the left ventricular performance determined by gated cardiac pool imaging. At the first Tc-99m PYP scintigraphy, there was a good correlation ($r=0.79$) between the value of peak CPK and the number of pixels of positive PYP accumulation. At the second (re-study image) scintigraphy, 33% of patients had a persistently positive scintigram. The value of LDH in patient with positive Tc-99m PYP scintigraphy were higher than that of negative study ($p=0.05$). The left ventricular ejection fraction in patient with positive Tc-99m PYP study at the second restudy were lower than that of patient with negative Tc-99m PYP study. We conclude that the persistently at the second study suggested an existence of a decrement of LV performance and irreversible myocardial damage.