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EVALUATION OF REGURGITANT FRACTION OF LEFT VENTRICULAR VALVULAR REGURGITATION BY GATED CARDIAC BLOOD POOL SCAN USING SPECT.
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Regurgitant fraction(RF) of 28 cases (14 cases of MR and/or AR, 14 cases without regurgitation) was evaluated by gated cardiac blood pool scan, using SPECT. Data was aquired from 32 views over 180° (LPO to RAO) for only end-diastolic(ED) phase and end-systolic(ES) phase. ED and ES short-axis tomogram was reconstructed simultaneously. And ejection count image of short-axis was obtained by subtraction of ES image from ED image. Atrium was erased in ejection count image because minus count was regarded as zero. LV ejection count(EC) and RVEC was calculated by summing up EC of each slice from apex to base. RF was gained from formula:(LVEC-RVEC)/LVEC.

RF of 14 control subjects was $5.8 \pm 5.9\%$ (mean $\pm$ SD), RF of 14 cases with regurgitation(R) was $42.4 \pm 15.8\%$. Sensitivity for detecting R was 93%, and specificity was 100%. RF of mild R(I or II: Sellers classification) was $24.6 \pm 10.1\%$ (n=4) and RF of severe R(III or IV) was $49.5 \pm 11\%$ (n=10). Sensitivity for detecting severe R from all R was 80%(8/10) and specificity was 75%(3/4).

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DETECTION OF ISCHEMIC MYOCARDIUM WITH SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY (SPECT).

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Tl-201 myocardial perfusion imaging is a useful method for diagnosis of ischemic heart disease. But there are some difficulty in interpreting rather small ischemic lesion in conventional planar scintigraphy as overrapping normal myocardium masks the lesion.

We assessed SPECT ability in detecting small lesion from following point of view.

(1)Circumferential prophile(CP) curve analysis of LV short axis tomogram of patients with myocardial infarction.

(2)Evaluation of images of Tl-201 filled myocardial phantom with defect, placed in human torso phantom.

The results are as follows.

(1)There was difference recognized with CP curve analysis between normal myocardium and ischemic lesion.

(2)However, in phantom study, the thickness of myocardium is much affected by count rate of the region, and there are limitation using SPECT in quantative evaluation of small lesion.

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DETECTION OF PERFUSION DEFECT IN THALLIUM MYOCARDIAL IMAGING, COMPARISON BETWEEN PLANAR AND SPECT IMAGINGS.
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The detectability of perfusion defect was compared between planar and single photon emission computed tomography(SPECT) image in phantom and clinical studies. We compared the detection of anterior and posterior myocardial perfusion defect. The detectability of perfusion defect was performed by quantitative analysis such as circumferential profile analysis and the ratio of defect count to normal count. In phantom study, the defect was imitated by placing a cylindrical plastic plug in the anterior and posterior wall of the phantom. They are three size plugs, that is, 2cm ϕ , 3cm ϕ , 4cm ϕ . All plugs have 0.5cm and 1.0cm of defect thickness.

As a result, first, the perfusion defect of SPECT had lower D/N ratio than those of planar images in phantom and clinical studies. Second, in phantom study, the anterior defect of planar and SPECT images had lower D/N ratio than posterior one. Third, in phantom study, if the defect volume is larger, the D/N ratio is lower without relation to the defect thickness. Forth, in clinical study, the anterior defect of planar image had lower D/N ratio than posterior one. Both of anterior and posterior defect of SPECT image were almost same as D/N ratio and had lower D/N ratio than those of planar images.

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RELATION BETWEEN SPECT AND ABNORMAL WALL MOTION IN MYOCARDIAL INFARCTION -SPECIALLY COMPARISON OF DATA COLLECTION FROM 180° (ANTERIOR PORTION) WITH THAT FROM 360°-
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Single photon emission computed tomography (SPECT) was performed in 62 patients with clinically diagnosed myocardial infarction at least 2 weeks after the attack by using Tl-201. The data were collected from whole round of the heart. Tomographic images were reconstructed by the data collected from the anterior portion (180° "view") and whole round of the body (360° "view") and investigated the relation between tomographic image and wall motion in the left ventriculogram (LVG).

After injecting 4 mCi of TlCl-201, collimator was rotated 360° at every 10° and the data was collected from 36 directions.

Tomographic images were judged with the 6 tomographic sectional views synthetically and visually by 3 investigators.

1) Sensitivity, specificity and accuracy of SPECT to LVG were 89%, 92% and 91%, respectively, in 180° "view" and 87%, 93% and 90%, respectively, in 360° "view". There was statistically insignificant difference between the image of 180° "view" and that of 360° "view".

2) The image of 180° "view" tended to detect a wider portion of the same region than that of 360° "view".