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EQUIBRIUM METHODIC "REAL TIME" STUDY IN EXERCISE. (A NEW METHOD OF ASSESSING LEFT VENTRICULAR FUNCTION).

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We have presented a new nuclear imaging system which enables the real time study of cardiac functions in exercise study. At every 30 beats, the cardiac functional parameters such as the ejection fraction (EF), the heart rate (HR), the relative cardiac output (CO), and the relative end-diastolic volume (EDV) are caluculated and displayed along with the averaged volume curve. Though some problems must be further investigated and improved, we have proven to be useful for its ability of fast prosessing, and good correlation existed between scintigraphic and direct Fick's methodic cardiac output measurements. ($y=0.966\ x+24.7$, $r=0.82$)

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GATED MYOCARDIAL TOMOGRAPHY BY ROTATING BILATERAL COLLIMATOR ---BASIC AND CLINICAL EVALUATION---.

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A new software for ECG gated myocardial tomography was developed based on the CMS BEST SYSTEM that construct axial tomography by rotating bilateral collimator. Reconstruction of sagittal and frontal slice was also achieved. Basic and clinical evaluation of this new technique was carried out and compared with the 7-pinhole tomography.

In a phantom study FWHM of planar and axial component were measured. The defect-to-normal count ratio as an axial profile curve were also obtained using cylindrical hot phantom. In the comparison of the 7-pinhole tomography, the rotating bilateral tomography(RBT) was slightly inferior in planar resolution but much superior in axial resolution. The profile curve of the defect-to-normal count ratio also revealed that RBT displayed more accurate form and size of the simulated defect. In the clinical study data was acquired at 10 frames per a heart beat after 2mCi of Tl-201 injection. It was required only 16min. for data acquisition to obtain 200 counts per a pixel of each frame at the matrix size of 64x64.

These results suggest that ECG gated myocardial tomography by rotating bilateral collimator was much superior especially in the axial resolution and then more effective technique in the clinical evaluation compared with the 7-pinhole tomography.

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COMPARISON OF CIRCUMFERENTIAL PROFILE METHOD AND THRESHOLD METHOD FOR THE INTERPRETATION OF Tl-201 MYOCARDIAL 7-PINHOLE TOMOGRAPHY.

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Diagnostic efficiency of circumferential profile (CFP) and threshold (TH) methods for quantitative interpretation of Tl-201 myocardial 7-pinhole tomography (7P) were compared in conjunction with qualitative visual interpretation (VI). 32 patients including 16 with documented myocardial infarction (MI) and 16 without ischemic heart disease were studied. CFP was protted using mean counting ratio of 3 pixels in the 60 myocardial segments crockwisely from center of the anterior wall. CFPs of lower middle and upper middle slices corresponding lower 1/3 and upper 1/3 of the long axis of the left ventricle were used for evaluation. Mean-2S.D. of the 16 nonischemic hearts was used as lower limits of the normal range for CFP. Myocardial segments showing counting ratio of less than 70% which continued more than 3 segments were considered as abnormal for TH. True positive rate for CFP and TH were 88% and 81%, respectively. True negative rate was 94% in each instances. Overall accuracy for CFP and TH were 91% and 88%, respectively. These differences were not significant. True positive rate, true negative rate and accuracy for VI were 72%, 94% and 84%, respectively. Although CFP and TH showed superior diagnostic efficiency compared to VI, the differences were not significant. Localization of MI was correctly interpreted in 94% of detected cases with CFP and 87% with VI.

In conclusion, CFP showed the highest diagnostic efficiency, and was useful for the evaluation of the 7P. TH was simple and had comparable diagnostic efficiency with CFP.

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COMPARATIVE STUDY OF OBSERVER VARIABILITY AND ITS CHARACTERISTIC FOR Tl-201 7-PINHOLE AND MULTIPLANAR MYOCARDIAL IMAGING.

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Observer valiability and its characteristic were evaluated in Tl-201 7-pinhole (7P) and multiplanar (PL) myocardial imaging. Diagnostic efficiency for 7P and PL were also evaluated. 34 patients including 17 with documented myocardial infarction (MI) and 17 without ischemic heart disease were studied. 7P and PL were separately interpreted visually by 4 experienced staffs (St) and 4 freshmen (Fr) without any clinical information. Interpretation was repeated 2 months later. Both 7P and PL were also interpreted simultaneously. Intraobserver variability and disagreement points for 2 separate interpretations were significantly low in St compared to Fr ($p< 0.005$). However, no significant difference was observed between 7P and PL. Although St or 7P showed slightly lower interobserver valiability, the difference was not significant between observer groups and imaging modalities. Fr tended to make positive decision than St ($p< 0.005$). Although difference was not significant, St tended to make confident decision than Fr. St correctly interpreted localization of MI in about 90% of cases for 7P and PL, however, Fr correctly interpreted in only 50% of cases for PL. 7P showed better diagnostic efficiency in both St and Fr.

In conclusion, intraobserver valiability was not affected by imaging modality but by observer experience. However, 7P improved true positive rate in St and true negative rate in Fr, and was able to decrease the difference of diagnostic efficiency between observer groups.