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A STUDY ON THALLIUM-201 KINETICS. IN SPECIAL REFERENCE TO TRANSIENTLY MYOCARDIAL PERFUSION DEFECT IMAGE.

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In order to evaluate the pathophysiological significance of transiently perfusion defect image in relation to Thallium-201 (Tl-201) kinetics, stress Tl-201 myocardial scintiscans were performed at exercise and redistribution phase at 3h after esercise in 13 healthy subjects and 53 with ischemic heart disease (IHD) including 39 with previous myocardial infarction (MI), 14 with effort angina pectoris (EA). Radio-activity in normal myocardium decreased further by 31 %(mean) from exercise to redistribution phase but activity in the transiently ischemic myocardium shown in EA increased by 2% (mean). Perfusion defects appeared on exercise images and "filling-in of the defects" were observed on redistribution images in EA. Activity in the infarcted myocardium increased by 7%(mean) in 22 cases with MI and perfusion defects of these images became larger after excercise than that at rest. This result might be due to a presence of transiently ischemic myocardium. Thus, extreme low activity of Tl-201 due to a transient ischemia produced perfusion defects, while "filling in of the defects" were related to absolute increase of Tl-201 activity in the transiently ischemic myocardium.

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QUANTATATIVE ANAYLSIS OF EXERCISE 201Tl MYOCARDIAL SCINTIGRAPHY —— CONCERNING THE PARADOXICAL REDISTRIBUTION.

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29 patients (OMI 6, IHD without OMI 19, HCM 4) were studied by bicycle ergometer exercise Tl myocardial scintigram and 12-leads Master's double two step ECG (DM-ECG). A total of 400 kct. images of routine 3 projections were obtained on 10min and 4hr after exercise. In some cases, defect was observed on 4hr image in spite of homogenous distribution on 10min image, and it was named "paradoxical redistribution(PR)" distinguished from usual redistribution(R) and unchanged(UC).

A total of 17 subsegments was set up for calculation in each projection. After calculation of subsegmental uptake indices, the indices which represented redistribution patterns were taken by subtructing 4hr images from 10min images. Redistribution patterns were classified into 3 groups (R, UC, PR) by these indices. On the other hand, in each lead, patterns of DM-ECG were classified into 3 types(elevation, unchanged, depression) by ST segment or T wave deviation.

In PR group, T wave elevation and ST elevation from below the iso-electric line at rest were highly observed. PR group was highly ditected in HCM cases. Thses results may lead one of the suggestion of redistribution mechanism.

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QUANTITATION OF THALLIUM-201 MYOCARDIAL WASHOUT AND ITS APPLICATION TO EXERCISE STRESS MYOCARDIAL IMAGING.

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The purpose of this study is to determine the myocardial washout rates of Tl after exercise to distinguish among ischemic myocardium, infarction and normally perfused myocardium. In 23 patients with coronary artery disease, myocardial images following exercise stress were obtained at 10 min, 1 hr, 2 hr and 3 hr after Tl injection. Myocardial images obtained in 2 projections were divided into 5 segments and myocardial Tl uptake index was calculated in each segments.

Out of 44 coronary stenosis, defect developed in 32 stenotic coronary region (diagnostic accuracy 73%), and in 13 regions, which corresponded to infarction, defect persisted, while defect was transient in 19 regions. In normally perfused and infarctional myocardium, myocardial Tl decreased rapidly after exercise stress, and half washout time (t 1/2) was 3.8 ± 0.6 hr and 3.6 ± 0.9 hr respectively. On the contrary, in exercise induced defective segments, myocardial washout of Tl was very slow and t 1/2 was 9.0 ± 1.8 hr. By using prolonged Tl washout rates as a criteria of exercise induced ischemia, diagnostic accuracy of exercise stress myocardial imaging was raised from 73% to 87% without sacrificing of specificity.

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A CLINICAL STUDY ON ^{201}TL STRESS MYOCARDIAL SCINTIGRAPHY IN OLD MYOCARDIAL INFARCTION.

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The present study was made for assessment of clinical usefulness and significance of increased ^{201}Tl activity in the lung (back ground activity) in old myocardial infarction. Scintigraphic infarct size(SIS) and percent change of background activity in the lung from redistribution to exercise image (B.G. ratio) were determined from ^{201}Tl stress myocardial scintigraphy(SMS). In 33 patients with OMI, findings of coronary artery documented by selective coronary angiography and ejection fraction(EF) determined from left ventriculography were compared with that of SMS. Following results were obtained. There was good correlation between SIS and B.G.ratio,and also EF, while large SIS was closely associated with number of involved vessels. B.G. ratio was higher significantly in multivessel involved than that in normal and single vessel involved and B.G. ratio showed a correlation with ejection fraction. From those results, it was proved that percent change of background activity was useful for assessment of the severity of OMI.