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STUDY OF CLINICAL UTILITY OF TL-201 WHOLE BODY SCINTIGRAPHY.

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We evaluated clinical utility of whole body scintigraphy(WB-S) in various cardiac diseases.Whole body imaging was performed using gamma camera OMEGA 500 and analized by ADAC SYSTEM Ⅳ. We estimated the following indications in each organ from WB-S:% distribution(%D),concentration ratio(CR) and washout rate(WR).

1)Rest study

We studied 5 normals(N) and 45 with cardiac diseases(ischemic heart disease,valvular disease,congenital heart disease,cardiomyopathy). %D of heart and CR of lung in myocardial infarction(MI) with cardiac failure increased more than in N,AP and MI without cardiac failure. %D of heart correlated significantly with CR of lung. We presumed that CR of lung represents the severity of left cardiac failure and %D of liver of right.

2)Exercise study

We studied 12 N and 19 patients with AP,and 18 pts with MI.In exercise,%D of heart slightly increased,%D of lung and liver decreased and %D of thigh remarkably increased than at rest. WR of heart in AP and MI was significantly lower than N and further related to the number of stenotic coronary arteries. WR of lung in MI was higher and WR of thigh in AP was lower compared with N.

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EVALUATION OF ORGAN BLOOD FLOW AND ITS DISTRIBUTION DURING EXERCISE BY TWO-DOSE THALLIUM-201 SCINTIGRAPHY.

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Owing to the methodological limitation, the evaluation of blood flow distribution of whole body organs in man appears to be difficult, especially simultaneous and less invasive evaluation is. We evaluated organ blood flow and its distribution during exercise using two-dose Thallium-201(TL) scintigraphy. Since the organ distribution of TL almost parallels to the blood flow to that organ at the time of TL injection, we injected TL two times each during exercise and at rest to detect the change of blood flow distribution. Exercise was performed with supine ergometer upto submaximal limit and then whole body was scanned with anterior and posterior projections by dual head scintillation camera. From the change of the radioactivities derived from ROI on organ image, the change of fractional distribution(ΔFract) was obtained, and then the change of blood flow(ΔFlow) was calculated from both ΔFract and ΔCO(the change of cardiac output). ΔFract was increased in the myocardium and leg muscle but decreased in the head, abdomen and kidneys. ΔFlow was increased in the all these organs.

These results with simultaneous and less invasive method provide a lot of useful information in human physiology.

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MEASUREMENT OF REGIONAL MYOCARDIAL BLOOD FLOW USING XENON CLEARANCE METHOD: SOME PROBLEMS AND COUNTERPLANS IN CASE OF MYOCARDIAL INFARCTION.

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There are some problems in measuring regional myocardial blood(rMBF) flow using Xe-133 clearance method in the case of myocardial infarction due to the difficulties in separating the infarcted zone from intact myocardium by this method. Moreover, rMBF of infarcted zone shows only ischemia of residual myocardium, which makes it impossible to measure the volume of residual myocardium.By comparing early phases with late phases, this paper presents a new method of measurements of rMBF and residual myocardium.

In 15 cases of myocardial infarction, the measurement of rMBF and exercise thallium-201 scintigraphy were performed. The rMBF was calculated by the initial slope method, and the images were gotten after a few seconds(Xe-1) and 60 seconds later(Xe-2) from Xe-133 injection. The defect of image Xe-1 was larger than that of Tl-201 scintigraphy. The image Xe-2 was similar to delayed image of Tl-201 scintigraphy. The sensitivity of detection of transient ischemia was higher in Tl-201 scintigraphy.

The separation of necrosis from intact myocardium can be done using image Xe-1. Image Xe-2 is suitable for drawing the outline of the heart. Thus, rMBFcan be measured even when the heart size changes after nitroglycerin administration etc.

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ANALYSIS OF PAPILLARY MUSCLE IMAGE ON TL-201 MYOCARDIAL SCINTIGRAM IN VARIOUS HEART DISEASES.

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We analyzed Tl-201 myocardial scintigrams from 20 normal subjects, 81 IHD, 11 HCM and 13 DCM for evidence of activity consistent with the anterolateral(APM) and posteromedial papillary muscle(PPM). The patients with DCM had only rest imaging, while the remaining patients had exercise studies and immediate and delayed images were obtained. The positive image of the papillary muscle was defined as the localized protruding figure from the LV wall into the cavity and/or local tracer accumulation corresponding to the anatomical site of the papillary muscle. The serial papillary muscle image was classified to immediately enhanced,unchanged or delayed enhanced pattern.

The prevalence of the positive APM was not high(9-23%) and there was no significant difference among groups. The PPM was seen only 15% of normals and in 18% of HCM, while the prevalence was high in IHD(36%) and DCM(53.8%). In IHD group, the positive images for the PPM were largely in the subgroup with 1 vessel LAD disease, particularly accompanying the LAD ischemia(15/19,79%). However,even if the presence of the LAD ischemia, the patients with multivessel disease did not tend to disclose the PPM(8/26,30.8%). The DCM group had higer incidence of positive PPM than the patients with ischemic cardiomyopathy(defined as multivessel disease with LVEF≦40%)(53.8% vs 20%,NS).

Thus, exercise stress would bring about the positive PPM image on scintigram in the patients with 1 vessel LAD disease by increased Tl uptake of the PPM (to which the RCA and/or LCx supply the coronary blood flow) and decreased Tl uptake of the superimposing portion of the anterior LV wall over the PPM.

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