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MEASUREMENT OF THE LV VOLUME AND LVEF, USING ECG GATED BLOOD POOL SPECT. --FUNDAMENTAL STUDY--. T.Mochizuki, T.Toyama, I.Shinohara, Y.Hujiwara, K.Murase and K.Hamamoto. Ehime Imabari Hospital and Ehime University School of Medicine.

There are several factors which affect the accuracy in the measurement of the LV volume. We tried to study how much they affect the measurement accuracy, using 120, 80 and 40 ml balloon phantoms and clinical data. The investigated factors are as follows; (1) cut off level Δvol/Δcut off level, (2) quantity of the information (RI count, acquisition time), (3) section (transaxial, short axial and long axial tomogram), (4) volume size and form, (5) respiratory movement and (6) about LVEF.

The result are as follows:

(1) If the cut off level was changed 5%, the volume changed 10-13% in the phantoms and clinical data.
(2) Quantity of the count did not affect so much within the clinical use.
(3) Every section could be avairable without a significant affection.
(4) Volume size and form affected a little, but not significantly.
(5) The respiratory movement within 2cm did not affect the measurement accuracy.
(6) Although the cut off level was changed 5%, the LVEF changed only 1-2% in the phantoms and clinical data.

Therefore, it suggests that we can measure the LVEF stably and exactly by using ECG gated blood pool SPECT.

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MEASUREMENT OF LEFT VENTRICULAR VOLUME USING Tc-99m CARDIAC BLOOD POOL SPECT. T.Kurihara, M.Narita, K.Murano, M.Honda, M.Tomomobu, K.Kanao, and M.Usami. Sumitomo Hospital, Osaka.

Left ventricular volume was measured using Tc-99m ungated cardiac blood pool SPECT. Tomographic images were acquired over 360 degrees in 64 even angular intervals. Transaxial tomographic images were reconstructed at pixel inteval slices. Threshold activity was determined for a slice at mid-ventricular level, using profile and its first derivative curves. Volume estimation was made for each slice, by counting the numbers of voxels containing activity that exceeded a threshold. Voxel counts from all slices were summed, converted to mililiters. Basic evaluation with cardiac phantom of varying volumes showed excellent accuracy independent of background activity ($r=0.98$). For clinical evaluation, 18 patients with or without cardiac disease underwent gated and ungated planar images and ungated SPECT, followed by echocardiography. End-diastolic volumes (EDV) were derived by multiplying the tomographic volume by the ratio of the activity in the left ventricle of gated end-diastolic image and ungated image. Tomagraphic EDV correlated well with echocardiographic EDV ($r=0.97$). It is concluded that this voxel counting method can accurately measure the left ventricular volume.