The Use of Nuclear Angiocardiography in the Diagnosis of Congenital Heart Disease in Infancy

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Although nuclear angiocardiography is a non-invasive procedure applicable to a critically ill infant, its usefulness for definitive anatomical diagnosis has been seriously questioned because of poor visualization.

Therefore we undertook the present study to determine whether the following technical modification may provide clinically useful information in evaluating cyanotic infants of the various causes. It consisted of 1) intravenous injection of Pertechnetate as bolus, 2) use of D-V collimeter, and 3) introduction of modified softwear program; level cutting, 128×128 beampoints, and zooming.

Fourty children aged from 2 days to 1 year were studied. Most of them were cyanotic and in severe respiratory distress at the time of the study.

Results were as follows, definite anatomical diagnosis was established in 34 of 38 children with congenital heart disease and 2 children were correctly diagnosed as having no significant heart disease.

Computer Processed Myocardial Scintigraphy and Its Clinical Application: Diagnosis of Idiopathic Cardiomyopathy

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In this study, myocardial scintigraphic findings were compared with clinical and pathologic findings in 27 cases of idiopathic cardiomyopathy, using a computeraided scintigraphy.

Myocardial scintigraphy with 1 mCi of Cs-131 was performed in 7 healthy subjects, 17 cases of hypertrophic cardiomyopathy (HCM) and 10 cases of congestive cardiomyopathy (CCM).

In order to enhance the myocardial area of low uptake, scintigrams were reconstructed as binary images with stepwise increase of threshold level of count. In cases of CCM, a sparse pattern was clearly observed. This pattern was attributed to the diffuse fibrotic change of the myocardium at autopsy. In cases of HCM, no sparse pattern was observed at any threshold level. Mean count of

the scanned myocardium of HCM was significantly higher than that of healthy subjects, and that of CCM was lower than that of healthy subjects.

In order to examine asymmetric hypertrophy, the ratio of RI count of interventricular septum to the left ventricular wall was obtained. The raito of HCM was significantly higher than that of CCM and healthy subjects. And no difference in this ratio was observed between CCM and healthy subjects.

Furthermore, auto-correlation technique was applied for the quantitative evaluation of homogeneity of myocardial RI image. In healthy subjects and HCM, correlograms showed little randomness. But most cases of CCM revealed abundunt randomness.

Studies of Determination of Ischemic Myocardium by Surface Mapping Method —Using myocardial surface pH measurement and radioisotope detection (^{131}I-MAA)—

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The purpose of this study was the determination of the extent and size of ischemic myocardium produced by occlusion of experimental left anterior descending coronary artery (LAD).

The myocardial surface pH in nonischemic areas was 8.05 ± 0.27 in average. In the ischemic areas 15 min. after LAD occlusion, myocardial surface pH feel to 7.58 ± 0.25 ($p = 0.01$) in average.

The ST segment of ischemic areas 15 min. after occlusion was 6.25 ± 2.28 mV higher than nonischemic areas in average. There was a reasonable coefficient of correlation ($r = 0.767$) between myocardial surface pH and ST segment elevation.

The radioisotope (^{131}I-MAA, 50–100 μCi) was injected in the both coronary arteries through the baloon catheter after occlusion of LAD. The radioisotopic counting ratio in ischemic areas detected from the myocardial surface was $35.09 \pm 7.2\%$ ($p = 0.002$) of nonischemic areas (100%). The ratio between radioisotope counts and myocardial surface pH was $r = 0.8479$. This fact correlated well with surface pH and ST segment elevation.

We concluded that the extent and size of an area of ischemic myocardium may be defined by mapping of surface pH measurment and surface radioisotope detection as atraumatic method during surgery for acute myocardial ischemia.