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MULTI-GATED CARDIAC BLOOD-POOL STUDY USING CONVERGING COLLIMATOR IN SMALL INFANTS. K. Takeda, H. Maeda, K. Matsumura, K. Nakamura, N. Yamaguchi and T. Nakagawa. Mie University. Tsu.

In general, the reliability of multi-gated (MUGA) cardiac blood-pool study seems to be poor in small infants. It is mainly because the objects are too small to provide clear cardiac images. In this study, MUGA studies with converging collimator were performed in 7 infants (ages 3m-4y, mean 1.9y) in order to obtain good quality images. Radionuclide ventriculogram using converging collimator provided improved magnification and resolution, so that left ventricle (LV)-right ventricle separation could be adequately performed even in small infants. Values of LV ejection fraction calculated by this method showed significant correlation with those obtained by contrast ventriculography ( $r=0.884$ ,  $p<0.01$ ). This method is highly valuable for improvement the diagnostic accuracy of MUGA study in small infants.

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EVALUATION OF A NEW ACQUISITION TECHNIQUE FOR MULTIPLE GATED IMAGES WITH REVERSE GATED AND MULTIPLE BUFFER METHOD. Y. Koga, H. Shinohara, K. Kume and H. Wani. Showa Univ. Fujioka Hp. and Shimadzu Corporation. Yokohama and Kyoto.

Multiple ECG gated blood pool scan (MGS) has an essential weak point to an arrhythmia. As its accuracy lowering as heart rate varies and as later as in phase of synchronized R wave. Usually, list mode data acquisition or multiple buffer technique adopt to reduce this weak point. But these technique requires us bulky data processing time and storage memory or data acquisition time. A new technique has been developed that enable to acquire the MGS reversely synchronized to R wave in image mode at the time of usual MGS simultaneously neglecting the arrhythmia. We examined the pts. with or without arrhythmia simultaneously with new reverse gating MGS and conventional one in two computer systems. These data was transferred to one of these system and processed in same program to comparison these clinical parameters. The new techniques improved the accuracy of these parameters especially in arrhythmic pts. And in late diastole phase the new technique was effective in both pts. with or without arrhythmia. We conclude that this new reverse gating technique is a useful tools for examine both pts. with or without arrhythmia in routine MGS.

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EVALUATION OF IVC AND HV REFLUX WITH USE OF PHASE AND AMPLITUDE ANALYSIS. K. Nishimura, M. Mashimo, T. Kato, T. Miyamae, M. Ide, S. Kinoshita, and Y. Dohi. Saitama Medical School. Moroyama, Iruma, Saitama

It was found from a computer analysis that the reflux to IVC and hepatic vein (HV) observed in the radionuclide angiographies varied with time periodically. The variation has often both respiratory and pulsation components. In the previous report we proposed a quantification method of the reflux in which the time-activity curve generated over the ROI of IVC and HV was subjected to Fourier transformation with the mean period over 5-20 pulsations. This method may be unreliable if there are arrhythmia, respiratory irregularity and large statistical fluctuation. In this study we tried to improve the method by performing the Fourier transformation beat by beat. We can obtain the sets of phase and amplitude, the number of which is the same as pulsations. The mean and standard deviation in the phase space are the good indices for evaluating the reflux. The first pass Fourier phase image shows the phase relation between the reflux and right cardiac chambers. The phase difference of 180 between the reflux and the right ventricle suggests the contraction timing failure of RV and RA. While, the inphase relation suggests the tricuspid regurgitation. The first pass method was found superior than equilibrium one in detecting the reflux.

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QUANTITATIVE ASSESSMENT OF REGURGITANT VOLUME IN PATIENTS WITH LEFT-SIDED VALVULAR REGURGITATION BY THE AMPLITUDE RATIO METHOD. S. Kosuda, J. Satoh, M. Nakamura, Y. Yonahara, T. Asata, M. Naito, H. Nakoshi, M. Honda, A. Kubo, S. Hashimoto. Ohkura National Hospital, The 2nd Tokyo National Hospital, Keio University School of Medicine. Tokyo.

Our group has reported the usefulness of regurgitant fraction (RF), derived from stroke count ratio (SCR) which determined from multi-gated equilibrium blood pool study. This SCR method is a noninvasive technique and is suited for serial studies, however, this has a drawback, that is, the overlap of the SCR values of control subjects and those of patients with valvular regurgitation.

Utilizing that total of the Fourier amplitude value of each pixel in the ROI on the ventricle would be proportional to the stroke volume, the comparative studies between the SCR method and ventricular amplitude ratio (VAR) method have been performed in 43 patients with miscellaneous heart diseases.

Our studies showed that the VAR values revealed less deviation than the SCR values in 30 patients without valve disease, and the VAR method more clearly distinguished the 13 patients with valvular regurgitation from the 30 patients without valve disease than the SCR method.

In conclusion, the VAR method appears to provide a more reliable means of identifying patients with valvular regurgitation.