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QUALIFICATION AND QUANTIFICATION OF INFERIOR VENA CAVA AND HEPATIC VEIN REFLUX BY USING PHASE ANALYSIS OF FIRST PASS GATED IMAGE OF RIGHT CARDIAC SYSTEM. K.Nishimura, M.Mashimo, T.Miyamae, S.Kinoshita, and Y.Dohi. Saitama Medical School. Moroyama, Saitama.

Reflux to inferior vena cava (IVC) or hepatic vein (HV) was observed in 9% of the cases on which the radionuclide heart angiographies were performed. The reflux is affected by the state of relevant vessels, the intrathoracic pressure, the pulsation or the shape of bolus. The time activity (T/A) curve generated over the ROI of IVC and HV varies with pulsation and/or with respiration. With the use of ECG and respiration monitor we can determine which is the main cause of periodic change of reflux. In order to clarify the interaction between the reflux and the right heart system, the phase image is constructed from the first pass ECG gated images of the right heart system including IVC and HV. There is no phase difference between IVC system and the right atrium (RA) for the patients with tricuspid regurgitation. The phase difference of 180 between the reflux and RA is suggestive of contraction-timing-failure between RA and right ventricle. Quantitative evaluation is carried out with the Fourier transformation of the T/A curve of reflux normalized by the T/A curve of RA divided by the number of pixels. With this method the pulsation and the inspiration components can be treated separately.

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IMPROVED ANALYSIS OF RIGHT VENTRICULAR FUNCTION BY RADIONUCLIDE ANGIOGRAPHY USING RI BOLUS INJECTOR. K.Hayashida, T.Nishimura, T.Uehara, H.Ohmine, M.Kimura, and T.Kozuka. National Cardiovascular Center, Department of Diagnostic Radiology. Osaka.

Right ventricular ejection fraction (RVEF) showed good indicator for right ventricular function. We made portable syringe injector (RI bolus injector) for steady injection to evaluate RVEF by radionuclide angiography using RI angioset.

In 10 cases of normal right ventricular function, we injected Tc-99m with flush of 20 cc saline by RI bolus injector at the rate of 2 cc/sec, 4 cc/sec and 6 cc/sec. RVEF was  $59.8 \pm 1.9\%$  at the rate of 4 cc/sec,  $54.7 \pm 3.6\%$  at the rate of 2 cc/sec and  $52.6 \pm 3.6\%$  at the rate of 6 cc/sec. In addition, time activity curve of right ventricle showed most beautiful at the rate of 4 cc/sec. In cases of tricuspid valvular disease, rapid injection (6 cc/sec) was need to evaluate RVEF because of slow procession of Tc-99m into right ventricle.

We concluded the proper injection speed by RI bolus injector was 4 cc/sec to evaluate RVEF routinely.

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EVALUATION OF RIGHT VENTRICULAR FUNCTION BY KR-81M GENERATOR. Y.KAWAMURA, T.MUTO, I.OKUZUMI, S.IIDA, J.HIRAI, T.MORISHITA (1st Dep. of Int. Med., Toho Univ. Tokyo) M.TAKANO, Y.MIURA, K.KOZAKAI, Y.MARUYAMA, Y.SAKAI (Dep. of Radiology, Toho Univ., Tokyo)

Kr-81m is suitable for the measurement of the right ventricular and pulmonary functions because of its ultra-short half life (13 seconds) and less exposure dose, and is therefore applicable for repeated examination. In 75 patients with mitral stenosis, atrial septum defect (ASD), coronary heart disease and chronic obstructive disease (COD), the measurement of right ventricular function, ejection fraction, was performed by double first-pass method using two Rb-81-Kr-81m generator to maintain high radio activity in the heart. The reproducibility of this method was sizable ( $r=0.93$ ) and the correlation between Kr-81m RVEF and Tc-99m RVEF was significant, ( $r=0.86$ ) RVEF in mitral stenosis, ASD, COD, decreased significantly comparing with normal cases.

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EVALUATION OF RIGHT VENTRICULAR FUNCTION IN VALVULAR DISEASES. T.Uehara, T.Nishimura, K.Hayashida, H.Ohmine, M.Kimura and T.Kozuka. National Cardiovascular Center. Osaka.

Right ventricular ejection fraction (RVEF) is one of the most suitable index of right ventricular function. RVEF calculated from the initial passage of Tc-99m injected rapidly was compared with mean pressure of pulmonary artery (m-PA) obtained from the examination of cardiac catheter in valvular diseases. As the result, RVEF decreased according to the increase of m-PA in the mitral valvular diseases which gave pressure overload to the right ventricle, and the correlation coefficient between RVEF and m-PA was  $R=-0.75$  ( $n=49$ ). On the other hand, although the increase of m-PA (the pressure overload to the right ventricle) was scarcely shown in the aortic valvular diseases, the value of RVEF was significantly low. However, RVEF correlated well with left ventricular end diastolic volume index (LVE-DVI) ( $r=-0.87$ ) in 8 patients with aortic regurgitation and m-PA under 15 mmHg. The decrease of right ventricular contraction seems to be derived from right ventricular compression and deformity according to left ventricular enlargement.