67

THE EVALUATION OF LEFT VENTRICULAR DIASTOLIC FUNCTION WITH ECG REVERSE GATED MULTI BUFFER MULTI GATED STUDY. S.Masumi, H.Tohaya, K.Harumi, H.Matsuo,H.Shinohara, Y.Koga, M.Katayama Cardiology Int. Med. and Radiology Fujigaoka Hp. Showa Univ.Yokohama

There are few report of the study of late diastolic phase by RN study. In arrhythmia LV volume curve by conventional ECG gated multiple blood pool scan(MGS) are inaccurate as far as from synchronized R wave. In this report to evaluate the late diastolic phase function in ischemic heart disease by new technique that enables acquire the MGS reversely synchronized to R wave in image mode neglecting the irregular pulses. In ischemic heart disease R-wave reverse gated MGS was quantitatively analyzed at 10msec interval to evaluate the rate of LV filling during the time of atrial contraction .When corrected for EDV,atrial -dV/dT/EDV was significantly depressed (1.68+-0.69) and %atrial-dV/dT/EDV was higher than max.dV/dT/EDV at rapid filling phase (mean value 1.10+-0.53) in patient with large myocardial infarction size estimated by TL-201 scan.In conclusion Reverse gated Multi-buffer MG are useful technique to evaluate the LV diastolic function during the time of atrial contraction.

68

STUDY OF BACKGROUND CORRECTION IN THE MEASUREMENT OF LEFT VENTRICULAR EJECTION FRACTION. S.Inagaki, H.Adachi, H.Sugihara, H.Katsume,H.Ijichi,K.Okamoto, and N.Tabata. Kyoto Prefectural University of Medicine

Background (BKG) correction is important but debatable in the measurement of left ventricular (LV) ejection fraction (EF) by radionuclide. 30 patients were studied within three weeks of contrast ventriculography to evaluate the effects of various BKG corrections on LVEF using ECG gated equilibrium blood pool scan.

Four different BKGs were tested as follows (1) no BKG subtraction, (2) BKG subtraction with ROI outside the lower left quadrant of LV image at end-diastole, (3) BKG subtraction with ROI between end-diastolic and end-systolic LV images, (4) a constant fraction of the end-diastolic count rate (EDC) is assumed as BKG and subtracted (Fixed BKG ratio method). These four methods to correct BKG were applied in "Fixed" and "Variable" LV ROI, and the results were compared with LVEF by contrast ventriculography.

LVEF calculated using the fixed BKG ratio of 0.64 (BKG/EDC) with "Fixed" LV ROI was correlated best with LVEF obtained with contrast ventriculography. The fixed BKG ratio method simplified the process in the LVEF measurement because another ROI assignment for BKG is unnecessary.

69

FREQUENCY CHARACTERISTICS OF TEMPORAL FILTER USUALLY USED IN CARDIAC ECG-GATED BLOOD POOL SCINTIGRAPHY. Y.Futamura,T.Furuta,K.Sakakura,J.Sakurai. Dept. of Cardiology,Meitetsu Hospital. M.Senda. Dept. of Radiology,Meitetsu Hospital.

It is important to utilize an adequate temporal filter to analyze the information involved in ECG-gated blood pool scintigram. The purpose of this study is to determine the frequency characteristics of the usually used temporal filter. Filters studied in this report are following: 1 X'n=¼Xn-1+½Xn+¼Xn+1 2 Fourier's transformation(analysis and reconstruction) 3 differential filter Sinusoidal waves(1 16Hz) were created in the digital computor and digitized in 32 segments a second(sampling frequency:fo). Then each sinusoidal wave was filtered by temporal filter(1 3). As frequency response of digitalization, amplitude ratio of input and output sinusoidal wave(I/o) was almost flat from DC to 1/8fo. Above 1/8fo, I/o was oscillated. Filter1 had the ability to eliminate this oscillation effectively and I/o was 0.9 at 1/8fo. Using filter2, I/o was 0.9 at 1/4fo and differential characteristic was excellent in comparison with other differential filters. Five to six harmonics were able to be utilized in normal subject without the effect of the sampling noise. But in most of instances with congestive heart failure, only three to four harmonics were able to be used because of relatively low signal to noise ratio. It was suggested to be important to select adequate temporal filters according to the purpose of analyzing the gated study.

70

QUANTITATIVE ASSESSMENT OF LEFT VENTRICULAR REGIONAL WALL MOTION BY NEW MATRIX DIVISION METHOD WITH VARIABLE CO-ORDINATE SYSTEM. R.Futatsuya, H.Seto, T.Kamei, M.Kakishita and J.Yamanishi. Toyama Medical and Pharmaceutical University. Toyama.

Quantitative assessment of left ventricular wall motion has been done, using time-activity curve of fixed matrix. However in this method, the part of left ventricle visualized through one matrix is not constant through cardiac cycle because of its contraction. Moreover matrix time-activity curve is not parallel with regional motion of the specific part of the wall accurately,and increase of regional ejection fraction and delay of phase value in the peripheral regions are seen.

We divide left ventricle by variable co-ordinate system based on ventricular edge and aortic valve plane. Though accurate ventricular edge detection is critical in this method, we used first-pass cardiac data with a multi-crystal camera whose statistical accuracy is high and background count is low. From comparative matrix counts through cardiac frames, time-activity curves parallel to the specific parts of the wall were generated. Some type of functional images were also generated and compared with functional images by fixed matrix method.

Parameters of time-activity curve by this matrix division method and regional wall motion can be compared more accurately than conventional fixed matrix method.