An Approach for Automatic Analysis of Radioisotope Images with Multi Frame Data

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The system utilized the Hybrid Image Processor with a small computer interfaced to a gamma camera. Each frame image was digitalized by a dual high speed analog to digital converter. Matrix size of an image was composed of 64×64 points. Serial frames were recorded on magnetic tape, and data were processed as a series of image, treated by a format of the motion image. Change of time and concentration after the injection of radioisotope agent were calculated, for the extraction of feature image data of a certain function on the liver and kidney. Images were play back one by one; change of the time and the counts in all regions were graphic displayed frame by frame. Two parameters, in a time came to peak count and its counts indicated the function of the organ. The peak count image showed a thickness of functional region by a radioisotope, space occupying lesion has been identifyed as a change of the count distribution on the image. In the time distribution image, it indicated the both appearance and the transit time of each region. These functional images were automatically analyzed by the computer programs made by authors. These quantitative data showed cirtain feature of organ functions by using the radioisotope imaging with multi frame of the patient.

An Automatic Analysis System for Regional Cerebral Blood Flow Measurement with 16-Channel Equipment

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The system for the 16-channel measurement of the regional cerebral blood flow (rCBF) using a Cerebrograph Model 165 was reported. After intra-carotid ^{133}Xe injection, signals measured by 16 detectors, each of which consists of a collimator 12 mm in inner diameter 45 mm in length and an NaI crystal 1/2 inch in diameter 10 mm in thick, were recorded on a digital magnetic tape cassette, and then were fed into a small computer. The instrument has a honeycomb holder into which the detectors can be arranged to fit any desired interesting regions of the brain. From the ^{133}Xe cerebral clearance curves, rCBF were calculated by the height over area method and by the initial slope method described elsewhere in detail. However, in order to correct the disadvantage due to small size of the each

detecting field, which as a matter of course gives good spatial resolution, several improvements were made based on the results of digital simulations on the ^{133}Xe cerebral clearance curves as follows: The initial height of the curve was determined by extrapolation with a monoexponential function fitting the initial parts of the curve to eliminate a shunt peak appearing on the large arteries; and the standard error of calculated rCBF caused by the statistical fluctuations was evaluated from the initial counts to estimate a possible error due to low count rates. All the results outlined above were designed to print or to display on a CRT corresponding to the location of the 16 detectors.

A Heart RI Angiography by the Nuclear Medicine Data Processing System in our Hospital

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The purpose of the study

The nuclear medicine data processing system is constructed of JAC 120M (Aloka), a monitorscope with a light pen and a consol display with a keyboard possessing a hardcopy unit. As a scinticamera, GCA 102 (Toshiba) is used with 20,000 H collimetor for ^{99m}Tc use.

By this method some interesting heart RI angiographies were reported.

The methods used

A dose of 10 mCi ^{99m}Tc was injected from cubital vein using the concentrated bolus injection technique.

The consol display with a keyboard is used as the center consol of the man machine communication medium. As RI angiographic image, it displays gray graphic modes, then those image are instantly copied with the hard copy.

The oscilloscope is used as the monitor display. It makes cine action for multiframes (start, stop, forward and backward).

Inflow and outflow of RI in heart are recorded by the collection of multiframe matrix image at every 0.5 second. Each frame size is 32×32 and this size can be converted into 64×64 as occasion demands.

The region of interest (ROI) are designated by a light pen or lead buttons of digiswitches. As far as 8 regions can be designated simultaneously. By the input of the consol, the total of the counts in the all elements of the designated regions is printed on the consol. In case of multiframes, changes of totals of counts are also described as graphs.

The results

The collection of 16 patients data were exact and easy. The images of graphic mode of patient data were excellent, and were copied instantly with hard copy. Superior vena cava, right antrum, right ventricle and biginning part of pulmonary arterium in the right heart and left antrum, left ventricle and thoracic aorta in the left heart were designated, then each ROI obtained easily as tables and curves.