1505

HEART AND LUNG OF FUNCTIONAL IMAGE BY STATISTICAL VARIANCE METHOD.

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To investigate of functional image to heart and lung applied with method of variance or another mathmatical methods. The image element is described by V(i,j). The mathmatical equation describing variance method is $\Sigma(V-\overline{V})^2$ where the $\overline{V}$ is used to mean image . Another mathmatical methods are describing $\Sigma(V-S)^2$where the S is standard image, $\Sigma(V-S)$, and $(V(1)-V(2))^2+.....+(V(n-1)-((n))^2)$ where V(1) is the first image, V(n) is the last image. The image were smoothed before applying the calculate. Functional image of ECG gate radinuclide angiocardiography by variance method is simular amplitude image by fourier analysis. Functional image of lung is obtainded by inhalation excise study with KR-81m gas. The lung of functional imge showed good positional accuracy as well as infuluenced region by excise of the house dust. The squer of subutraction image is obtained simultaneously with the variance method.

1506

DATA COMPRESSION OF ECT IMAGES USING THE QUADTREE REPRESENTATION.

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This report describes an attempt to compress the data of RI Emission CT (ECT) images using a quadtree representation. The quadtree for representing a picture is a tree in which successively deeper levels represent successively finer subdivisions of picture area. An algorithm is given for subdividing a ECT picture to a set of tiles which corresponds to a set of nodes in a quadtree. The algorithm tests a hypothesis which every pixel in a tile is a sample from a same population whose mean is equal to its variance. And if the hypothesis is rejected then the subdividing process is continued to deeper level. If not, all the pixels are merged in one tile, which results a decrease in total number of tiles.
Then, a compact internal expression of the quadtree in a computer memory is proposed. Using the expression, ECT data are effectively compressed.
Examples which include a computer simulation, a phantom study and several real ECT pictures show a sufficient data compression ratio (compressed/original) over 1/4 maintainning fine picture quality as good as the original one.

1507

A COMBINED METHOD OF SCINTIGRAM AND ECHOGRAM AS A TRIAL OF INTEGRATED IMAGE DIAGNOSIS.

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Our system is composed of a scintillation camera (Ohio Nuclear 410S) attached with a Toshiba gamma imager and an ultrasound diagnosis equipment (Aloka Echo Camera). At one end of the reverse side of the transducer there is a point source which can be observed through a monitoring CRT. A hand-made angle indicator is also attached to the transducer together with a potentiometer. When we think that there are areas to be examined more in details on the original scintigrams, the second scintigram is taken at the certain direction, which is not developed until the next step is completed. Then, the detector is slightly lifted up to allow the transducer to be inserted into the space between the detector and the patient's body. After an echogram is taken, an anatomical mark "X" of the scintillation camera is moved to overlap with the point source by handling the Joy-stck. Deflection from the body axis is obtained by the angle indicator through the potentiometer, and is sent to the imager. Finally, a dotted line originating from the center of the "X" mark is overlapped with the second scintigram. This line indicates the line through which the echogram has been obtained. This method was found to be very helpful to interpret scintigrams more in details.

1509

EVALUATION OF SEQUENTIAL SUBTRACTION PROCESSING ON RADIONUCLIDE ANGIOGRAPHY.

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Sequential subtraction processing of successive time frames of image acquired by radionuclide angiography was evaluated quantitatively. And, an appropriate procedure for this processing was established which produced sequential blood flow images with low background and high signal-noise ratio and time activity curves with high quantitative accuracy. Upon preliminary processing for preparation of minuend and subtrahend frames, original ones were added together every two to four neighborsin order to decrease counting error when avarage matrix counts of original frames in equilibrium phase were less than 5, and then processed sequentially with nine-points smoothing. And, multiplication of smoothed frames with a constant multiplier prepared minuend ones. Upon subtraction, smoothed frames revealed higher response to reasonable reduction of matrix counts than non-smoothed ones. Areas under first-pass curves were approximately equal to each other among all regions of the same subtracted frames when frame intervals between minuend and subtrahend frames were significantly narrow or altered for every region with different half-peak time of counts. And, system flow values calculated by Stwart-Hamilton's method were approximately equal to each other among serial regions of right ventricle, lung and left ventricle even in congestive heart failure.

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