The Check Investigation of Characters from Multidimensional Radioisotope Images

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Dynamic images, as multi-dimensional image, from radioisotope study on kidneys for the check investigation of subjective information were examined on following points:

1) 14 sequential regional renograms at 64 × 64 matrices were printed out and observed.

2) Two functional images from both peak counts and peak arrival times were composed.

3) Characteristic parameters calculated from automatic division of two functional images were adopted.

4) Subjective evaluation of function, applied principal component analysis to the functional image matrix, was tried.

It was concluded that the possibility for condensation on data of dynamic images and picking out of their characters was raised, and that estimated parameters were varied with each pathologic change to which applied principal component analysis.

Functional Imaging of the Thyroid using $^{99m}$Tc-Pertechnetate by Means of an On-Line Computer System

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Functional imaging of the thyroid reported here is an integrated data-processing method by which regional dynamic function of the thyroid can be visualized in a form of an image.

The joint camera-computer system in this studies consists of a GCA-202 gamma camera with a pin-hole collimator and a DAP-5000N computer system. After an intravenous injection of about 5 mCi of $^{99m}$Tc-pertechnetate, sequential 30 second frames of data were acquired for a period of 10 minutes in a 64 × 64 matrix form utilizing the computer system. Automatic computation of a new parameter, which was considered to be related to the thyroid function, was done for each element of 64 × 64 matrix. This new parameter is as follows:

$$\text{Sum T}_e \ 10 \ \text{Ratio} = \sum_{t=1}^{10} \left( \frac{C_{10}}{C_t} - 1 \right)$$

where $C_{10}$ and $C_t$ represent count-rates at 10 and $t$ minutes after injection respectively.

Producing clinically applicable images, various data-processing procedures which determine the quality of the image have been investigated. Namely, preliminary back ground subtraction was proved to be of no effect on the functional image. In view of the geometric resolution and statistical fluctuations, the time interval of one minute, twice