The system is now used in clinical routine in which many cases are being accumulated and processed.

A program for iso-count contour display of radioisotope image by a digital computer of medium size

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We have reported several methods of radioisotope image display by peripherals of a digital computer in the previous work. In this report, programs for iso-count contour display are discribed with a CRT display unit and a curve plotter.

In order to obtain co-ordinates of points of an equal count level, interpolation of image cells are inevitable due to relatively small number of image cells. As a means for interpolation, Lagrangean interpolation or linear interpolation are often utilized, but difference between the two methods was within $\pm 2\%$ for the most of radioisotope images used, and no significant difference was observed in view of image visualization by human. Since the linear interpolation resuleted in faster speed of calculation and in use of smaller number of core memories than the Lagrangean, we have used the former method for the display of clinical image.

The program for CRT display unit consists of two subprograms linked in on-line, in which values of iso-count levels can be varied arbitrarily up to 8 levels. During the search and calculation of display point for iso-count levels, the letter "N" is shown on the CRT, but it is erased when all data points are searched and displayed.

The program for curve plotter is made to produce linearly interpolated points of smaller intervals than those of CRT display and to plot an iso-count contour by tracing a point of equal count at minimum distance from the present point. In this program, co-ordinates of the traced points are packed into one record and thus an image up to 128×128 cells can be processed.

We are also investigation on the applicability of the iso-count contour to the automatic recognition of lesions in the radioisotope image.

Practical Significance of "Counting Loss" in the Use of the 4096 Channel Analyzer with Scinticamera

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On the daily use of the scinticamera and data-processor for the clinical radioisotope dynamic examinations, particularly when relatively a large dose is applied, we have recognized that an effect of counting loss caused by the apparatus can not be ignored and should be corrected to obtain accurate data.

The followings are our conclusions produced by the serial analytical studies on this subject.

1) The value of counting loss varied depending on the apparatus used; the TOSHIBA register matrix type, the Picker-the PhoGAMMA H. P., and the TOSHIBA delay line type.

2) Counting loss also varied depending on what kind of isotope was used: the higher the energy of the isotope was, the more counting loss

developed.

3) Counting loss was also directly correlated with shifting of the energy-peak of each isotope.

4) Counting loss was correctable to some extent by calculating the measured resolution-time of each apparatus.

5) When counting loss was excessive, there developed a critical gap of the position between the anatomical image and the camera image, and correction of the data became impossible. On the measurement of the actural distance of 15 cm, for instance, the measured data increased into 17.7 cm under the high count rate (29,000 cps), as it did not reveal any difference under the low count rate (2,000 cps).

6) It was therefore, conceivable that the isotope-dose should be determined so as to minimize this gap of the position between both images.

7) In our studies, on the use of ^{99m}Tc for RI angiography, the isotope-dose less than 12 mCi (20,000 cps) yielded practically no significant interference with counting loss.

Studies on the Digital Computer Processing of Photo-scintigrams

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The effect of computer processing of photoscintigrams is examined.

Method The configuration of the examined system is that, a photoscintigram is measured by a scinti-scanner (SHIMADZU SCC-230S-A) with densitometric attachment, the signal from the scanner is amplified and fed to IBM 1130 computer through the multi-purpose interface (made by SHIMADZU), the signal is converted to digital data and read into the core memory. These datas are relocated as the scintigram image and displayed on a line-printer and X-Y plotter, also punched on a paper tape, the data passed to a nuclear medical data processing mini-computer (SHIMADZU SCINTIPAC-200). The scintigrams are displayed on a CRT with various form such as intensity profile, intensity mapping, three dimensional, isocount display and contour map display. On a contour map display a CRT displays the boundary of density from an appointed position, and the inside area and the size of boundary (X, Y axis).

Result The use of a computer with smoothing, logarithmic enhancement, the enlargement of partial image and the quantitation of density, gives a precise diagnosis especially on the diagnosis of a bone or a joint, because these processing define the area of the abnormal concentration of RI on a diseased part.

And we are planning a method of a statistical relation studying with past scintigrams.