activity and on the organ in a human-sized manikin. This study suggests that by using radioisotope scanners, it is possible to quantitate the activity of organs, in addition to a thyroid gland, when the scan counts are summed and averaged over a selected area, and corrections are applied for nearby activity.

Differential Radioisotope Image

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The radioisotope image (area image) obtained with various imaging devices consists of an array of counting-rates in elemental areas over the entire image-plane. The counting-rate is an integral count during the unit time interval. So, the usual radioisotope image can be called as "integral image."

Here we present a new method of image visualization, "differential imaging," in which the rate of change in counting-rates in elemental areas is calculated from the "integral image" and plotted as a function of positions.

As an "integral image," the digital image obtained from a thyroid phantom using a rectilinear scanner was employed,(1) and differential calculation was carried out using a digital computer, Burroughs 5500.

The resulting digital "differential image" was smoothed by averaging the values in 9 neighboring areas, and then plotted as a function of positions using symbols of different densities.

The "differential image" thus plotted were compared with the "integral image," and the contour of the phantom was more clearly demonstrated.

Although there are several problems left to be solved, we think the "differential image" could be used together with conventional "ingral image" in actual clinical practice.

(1) T. Nagai, T. A. Iinuma, and S. Kida: J. Nucl Med. to be published.

The Differentiated Radioisotope Image

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The radioisotope scintigrams are constituted of basic points with variable amplitude in static scanning or variable density distribution in movable scanning, and have one to one correspondence to the radioisotope intensity distribution. Their image quality is basically worse than x-ray image qualtiy. Therefore, the former requires many displaying systems of radioisotope scintigrams; multi-scanning, re-scanning, photoscanning color-scanning and television-retrieving, etc. Now, I propose the differentiated radioisotope image as a method of reconstruction of radioisotope image.

The increasement ΔI of radioisotope in the range of $\Delta \times$ is proportional to the gradient of radioisotope intensity distribution:

However strong radioisotope intensity distribution may be, its gradient is zero if it is definite.