determined as the time dividing the area under the waveform in two equal parts or as the time at the peak of the waveform.

Finally, directions of future development are suggested. They are 1) the production of cameras having larger field of view, 2) improvement of position signal computer, 3) automation or semi-automation of camera adjustment, 4) extending to low energy range, and 5) development of accessory instruments and data processor.

The Comparison of the Scintillation Camera with Other Procedures

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As the scintigram apparatuses, the scintillation camera is also popularized with conventional scanner in our country. There are some opinions that the scintillation camera is superior on the point of examination time, but not on the resolution of the scintigrams. To solve this problem, we compared the scintigram apparatuses mathematically.

For the first procedure, the response curves of each apparatuses are formulated as followings from the practical data not only for the scanner but also for the stationary apparatuses.

$$f(x, y, z) = k1 \cdot \exp\left\{-\frac{\ln 2}{k2^2}(z-k3)^2\right\} \cdot \exp(-k4z) \cdot \exp\left\{-\frac{\ln 2}{k5^2}(x^2+y^2)\right\}$$

In this formula kl means the count rate from the point (0, 0, k3), k2 the resolution width of the half maximum along the z axis, k3 maximum response point on z axis, k4 absorption coefficient and k5 the resolution width of the half maximum on x-y dimension.

When the radioisotopes are placed uniformly in the region surrounded by the coordinate x1, x2, y1, y2, zl and z2 in the water phantom, the count detected through the collimator detector system is calculated as the results of integration of the previous formula as followings when the collimator is placed at (x, 0, 0)

$$F(X) = \int_{x1-X}^{X-x2}\int_{y1}^{y2}\int_{z1}^{z2} f(x, y, z)\, dx\, dy\, dz$$

This calculation is performed easily by using analogue computer.

The supposed organs are calculated in each apparatuses, and the results is as followings. For the thyroid scintigram where the organs are thin and placed on the surface of the body, the pinhole collimator of the camera is superior than the others because the small k3 and small k2 is predominant on the scintigrams, but for the other organs, which are large and placed in the center of the body, most of the procedures show the same result on the detection capacity of the tumor according to the large k2 and k3 values except pancreas scintigram. The pancreas scintigram is in other categoly, because it is placed deep in the body but thin as figure. For the large organs, the count rate through the detector system is predominant comparing with the resolution of the x-y dimension in present.

The results are as followings.

Organ and radioisotopes	Selected apparatuses	Reason
Brain with TC-99m	camera	time, mobility
Thyroid with I-131	camera	resolution
Lung with I-131-MAA	equall	
Heart pool with I-131-HSA	scanner	isometric
Heart pool with Tc-99m	camera	dynamics
Liver with Au-198-colloid	scanner	area
Liver with I-131-RB	equall	

Pancreas with Se-75-SM	equall or camera	mobility, sensitivity
Spleen with Hg-203-MHP	scanner	isometric
Kidney with Hg-203-CM	scanner	area
Kidney with I-131-HA	camera	dynamics
Kidney with Tc-99m	camera	dynamics

The Comparative Study of the Scintillation Camera with Other Radiological Procedures The Study of Brain and Liver

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Radioisotopic imaging has been shown to be a sensitive and safe means of detecting and localizing intracranial and liver lesions. The present study deals with comparative evaluation of scintiphotography with conventional scanning and angiography of the brain and liver.

Brain: Because most focal intracranial lesions are vascular diseases or have abnormal vascular components, arteriographic visualization of the vascular nature of these lesions has aided greatly in diagnosis.

From this point of view, the intracranial angiography is the most useful radiological procedure, but unsuccessful cases may be encountered and mobidity can not be disregarded.

Conventional radioisotope scanning of intracranial lesions depends upon associated focal abnormalities of blood brain barrier, but sequential study of radioisotope distribution can not be obtained in the brain.

Scintillation camera have a potential of deriving information of localizing and making differential diagnosis of intracranial lesions from sequential scintiphotography by flow of ^{99m}Tc pertechnetate and ^{131m}In FeEDTA through these lesions. As an example, a sequential and 1 hour cranial scintiphotographic study in a patient with a left fronto-parietal meningioma was shown. At 1 minute, an area of excessive filling of activity is noted in scintiphotography. A sequential study in a patient with A-V malformation is noted in the sequential scintiphotography and arteriography, but conventional scintiscanning could not demonstrate focal lesions.

A sequential study in another patient with intracerebral haemmorrhagic cyst was performed. At 1 to 20 minutes, vascular equilibration is noted throughout the sequential study. At 40 minute after injection of ^{99m}Tc pertechnetate, an area of increased activity is well localized in right parietal region.

Representative studies from patients with a variety of intracranial lesions—primary neoplasm, cerebral cyst and A-V malformation—are shown to demonstrate vascular and other lesions and their relationship to studies of human liver scanning using radioisotopes, focal diseases are detected by their lower concentration of radioactivity than in the normal sourrounding liver tissue. As a result, defects in the liver are more difficult to visualize than focal diseases in other organs, such as brains, in which there is a higher concentration of activity in the lesion than in the normal tissue. Therefore, it is necessary to obtain most diagnostic scintigraphic images. The scintillation cameras are better units than the conventional scanners to obtain optimal images using the presetcounting system and standardized brightness of ossilloscopes to exposure. Scanning of the liver in the anterior-posterior and lateral view requires 1 to 1.5 hours using the connentional rectilinear scanner. Furthermore, there may be a possibility of decreasing dectectability of the small space occupying lesions in liver by breathing and movement of patient during scanning.

Scintiphotography can be performed with-