of focus, effects of separation wall, relation between a hole to a hole, and the leakage of gamma rays outside the collimation.

A hexagonal honey cone having 5 cm showed 6 beams of radiation corresponding to the largest gamma ray bundle in the direction of the 6 corners of the hexagonal space consisting of holes.

Angular dependence of the honey cone collimator as pointed out by Honda was found to be a phenomenon induced by the leakage of gamma rays through the separation walls of honey cone collimator.

Such leakage was not marked with hexagonal 10 cm focusing collimator, and the 5 cm collimator filled out it's holes with casted Pb bars.

This method is free from the mechanical condition of a scanner and can be applied for the examination of various types of collimators.

The hexagonal 5 cm honey cone collimator tested was not good for scanning. The round type collimator would have no such unhomogeneous angular leakage of gamma rays.

Stereoscanning for the Measurement of the Depth of Image

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It was not always easy to measure the depth of Scan-image so far. The speaker found a method of measuring the depth of image by stereoscanning.

A lead disc with a pinhole at the center was placed between the pinhole collimator and a subject. The pinhole collimator was made to suite the scanning of image through the pinhole disc.

After scanning from the first angle, the pinholed disc was shifted and then scanned again from the second angle. These two scintigrams showed the shift of image in proportion to the shift of the pinholed disc.

The following formula was used to calculate the depth (d) of an image (A) below the surface of the subject's body.

$$d = \frac{ph}{s - p} - g$$

where h = scan level of pinhole
g = pinhole to body surface
p = shift of pinhole
s = shift of image A.

Phantom experiments proved the accuracy of the above method. Therefore, the method was applied for the measurement of the depth of a metastatic spot of thyroid cancer. The spot was 6 cm below the body surface, probably at the anterior margin of vertebra.

If the scintillation camera is used, the stereoscanning will be more effective and much widely applicable.

Multi-Nuclide Scanning with MUHC

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Multi-nuclide scintiscanning is one of the important applications of MUHC.

With Alderson's organ scanning phantom which holds a liver, a pair of kidneys, a pancreas and a spleen, simultaneous four nuclides scintiscanning was performed successfully.

Since the depth of positions of the organs to be scanned differs the isosensitive scanning is really necessary to delineate the various organs almost in the same grade.

Among the photopeaks from the various nuclides available as commercial radiopharmaceuticals the photopeaks from ^{198}Au, ^{203}Hg, ^{75}Se and ^{197}Hg are little overlapping and to be easily separated from each other.

150 μCi /1500 cc of ^{198}Au was given to a liver phantom, 94 μCi /80 cc of ^{203}Hg to a kidney, 80 μCi /68 cc of ^{75}Se to a pancreas and 108 μCi /106 cc of ^{197}Hg to a spleen.

Four photopeaks are picked up by first to fourth spectrometer respectively, and then counts of each spectrum are multi-dotted on Duplograph carbon papers with master papers and master papers are transferred into a duplicating apparatus to be superimposed. Thus one can get a four nuclides scintigram.

The important thing is a choice of colour for each spectrum. Green is used for γ-rays of 0.412 MeV from ^{198}Au, red for 0.279 MeV from ^{203}Hg, violet for 0.138 MeV from ^{75}Se and blue for 0.077 MeV from ^{197}Hg.

The spectrum from ^{75}Se (0.27 MeV) might be picked up by the level of the spectrum for ^{203}Hg (0.279 MeV) and red for a delineation of the kidney delineates also the pancreas poorly. However, as violet is predominant over red in superimposition and violet is used for the dot recording of the spectrum of 0.138 MeV from ^{75}Se, the pancreas is completely distinguished from the kidney in color on the multi-nuclide scintigram.

Thus satisfactory result of multi-nuclide scintigram was obtained with use of adequate colors.

Lamino-Scanning with MUHC

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As one of the important application of the Medical Universal Human Counter (MUCH), lamino-and polylamino-scanning was conceived besides conventional, multi-nuclide and isosensitive scanning and the mechanism for it was constructed.

The purpose of lamino-scanning lies in detecting smaller focus and obtaining the topographical information and its necessity should be emphasized on the larger organ such as the liver or the lung.

The two detectors (3 $\times$ 2 inch NaI (Tl) crystal, 37 hole lead collimator) are placed over the bed and the another two beneath the bed. Two of four detectors were inclined with a suitable angle to cross in focus respectively over or beneath the bed and the signals from the two detectors are mixed to be fed to spectrometer, contrast amplifier and scintigram recording device.

Focus to be detected should be either hot or cold scintigraphically. Model experiments were carried out basically as in the following.

1. Positive delineation

A NV-shaped polyethylen tube containing the homogenous Na^{131}I solution was fixed with an incline of 45 degrees in water. The upper two collimators were focussed in N part and the lower two in V and then scanned. Polylamino-scanning images of this NV phantom were recorded as a line separately according to the layers scanned. And this is a good evidence in favor of the concept of polylamino-scanning.

2. Negative delineation

A liver phantom containing ^{198}Au colloid solution with various sized defects (4.5, 3.5, 2.5 cm in dia.) was fixed in water for lamino-scanning. In the lamino-scan all defects were detected whereas the defects smaller than 3.5 cm could not be seen in the conventional scan. Needless to say, the shape of the liver scan image differed from the conventional scan depending on the layer scanned.

As far as the detector-collimator system used is concerned, the best geometrical con-