

also tested. These tests were performed in the air and water.

Resolution: the best resolution was obtained with a pinhole collimator, and the second best was with the converging collimator.

Sensitivity: the least decrement of sensitivity by increasing the collimator-source distance was demonstrated with the converging collimator.

No noticeable change in gamma-ray spectra was observed in the air and water, and specially the decrease of photopeak area was small in the converging collimator.

No noticeable change in gamma-ray spectra was observed in the air and water, and specially the decrease of photopeak area was small in the converging collimator.

Fundamental Study on the Performance of Scintillation Camera Based on Delay-line Time Conversion

M. MATUMOTO and K. KATAYAMA

Department of Radiology, Kumamoto University Medical School, Kumamoto

The performance (uniformity, potential resolution and detectability of space occupying lesion) of the delay-line scintillation camera were studied.

Uniformity of sensitivity

The uniformity of sensitivity was satisfactory in regard to ^{57}Co , ^{203}Hg and ^{198}Au , but not to ^{125}I . In case of ^{57}Co , the uniformity was $\pm 10\%$ within 22.5 cm diameter along X and Y axis of the crystal area.

Potential resolution

In case of $^{99\text{m}}\text{Tc}$, the resolution distance (F W H M) obtained with 4000 hole collimator were 8 mm on the surface of collimator, 12 mm at 10 cm's distance, and 17 mm at 20 cm's distance. Similarly, as to ^{203}Hg , the resolution distance were 8 mm, 13 mm, and 18 mm, respectively. The resolutions of ^{131}I by the use of 1000 hole

collimator at the distance of 5, 10, and 20 cm were 14, 18, and 25 mm along X and 13, 16, and 24 mm along Y axis, respectively. The resolutions of ^{198}Au likewise studied at the distance of 5, 10, and 20 cm were 14, 18, and 26 mm along X and 13, 17, and 26 mm along Y axis.

Detectability of space occupying lesion

An experiment was done using 4 kinds of nuclide ($^{99\text{m}}\text{Tc}$, ^{203}Hg , ^{131}I and ^{198}Au). Detectability of $^{99\text{m}}\text{Tc}$ was best of four nuclides. In a water phantom of 5 cm deep, spherical defect of 1.0 cm diameter was detected at the phantom surface, and 1.5 cm diameter at the phantom bottom as for $^{99\text{m}}\text{Tc}$. In a water phantom of 10 cm deep, defects of 1.5 cm and 3.0 cm diameter were detected at the phantom surface as well as bottom.