Scientific Session

A. Instrument

1

PERFORMANCE OF THE SPECIALLY DESIGNED COLLIMATOR FOR THYROID IMAGING. H.Fukukita H.Oyamada,S.Terui,T.Nobata,H.Kawai and N.Wada. National Cancer Center Hospital and Kanematsu Electronics Co., Tokyo.

The purpose of this study is to evaluate the specially designed collimator for thyroid imaging, which was supplied by Nuclear Fields Co. through Kanematsu Elec. Co..The specifications are as follows; parallel holes with a diameter of 2.5 mm, septum thickness of 0.3 mm, and depth of 50 mm. One of the characteristic features of this collimator is the field of view which is designed to adapt to the shape of thyroid gland,having the area of 240 mm^2. Using ZLC-7500 gamma camera, the performance was checked with I-123 produced by p,2n reaction. The relative sensitivity to the Siemens made medium energy parallel hole collimator (MEPC) was found to be 1.86. The spatial resolution was 6.8 mm in FWHM at the distance of 5 cm from the collimator surface, whereas FWHM of 9.0 mm was obtained with the MEPC .

In conclution, it is thought that this newly developed collimator is suitable to obtain thyroid images in a high quality.

2

BASIC AND CLINICAL STUDY OF EXCUTIVE COLLIMATOR FOR Kr-81m. M.Ozaki, M.Moromizato, K.Miyakawa,H.Sueyama,T.Sekiya,Y.Ota, N.Katsuyama,M.Nakano,Y.Mori,Y.Mazima and K.Kawakami.Ryukyu University School of Medicine and Jikei Medical School.

Two New types of collimator for Kr-81m of which energy peak is 190 KeV were manufactured. One has relatively higher sensitivity and the other has relatively better resolving power. Basic and clinical comparison with lower energy collimator and Ga-67 collimator were done in bar phantom study. Both of new collimators had more sufficient resolving power than the others in contenuous absorption lung scintigram. But the high sensitivity type indecated interference fringe. More sharp image was gained with high resolving type Kr-81m collimator than with high sensitivity type. But both images were better than the others with low energy collimators. Scattering influence was noted in the image with Ga-collimator. There was no deffirence between the images of two collimators for Kr-81m in bolus absorption lung scintigram Therefore, it is thought that short scanning time of high sensitibity Kr-81m collimator was profitable. Using the two new-type collimators for I-123 which has relatively higher energy peak, 159 KeV than Tc-99m, better images were gained with new type collimators than the low energy collimators. Also in I-123 scanning, using of new type collimator was advantageous.

3

A BASIC STUDY ON ROTATING MULTIPLE-SLIT CODED APERTURE. K.Seto,H.Katsulai, H.Fujimoto,N.Arimizu,K.Uno,J.Okada, S.Uematsu. Department of Radiology, Faculty of Medicine,Chiba University and Department of Radiology,Chiba University Hospital.

The purpose of this study is to compare sensitivity and resolution of parallel-hole collimator with those of rotating multiple slit aperture. Experiments were performed with varied sizes of aperture, hights of the slit and slit widths. The results show that the efficiency of the aperture is about thirty times as high as that of parallel-hole collimator and the resolution of the aperture is comparable to that of parallel collimator. Thus it seems that with further improvements the aperture will achieve shorter imaging time than parallel-hole collimator under the same resolution.

4

CLINICAL EXPERIENCE WITH A NEW SCINTILLATION CAMERA HAVING DIGITAL CORRECTION CAPABILITIES (OMEGA 550). R.Sakai,Y.Ichihara,S.Takeda,Y.Kuniyasu*,M.Mori** and K.Kawamura**. Funabashi Central Hospital, Chiba. *Teikyo Univ. School of Medicine, **Aloka Co., Ltd.

Since March 1986, we have clinically used an Aloka scintillation camera with digital correction capabilities (OMEGA 550). This 16-bit microprocessor-based camera can correct for: (1) energy resolution (128x128 matrix); (2) linearity (128x128 matrix for either X or Y); and (3) uniformity (256x 256 matrix), while it collects data. Its energy resolution, linearity and uniformity are 10.9%, 0.3mm and 3%, respectively. It can also correct for rotation axis variation during ECT and store all the correction factors in a floppy disk for selective use.

We studied the effect of data correction on scintillation images. The energy resolution correction had the greatest effect on uniformity. We also studied the necessity of the uniformity correction data for each nuclide and their effects on the quality of ECT images.

This camera provided clearer images and shorter testing time owing to improved counting efficiency.