hole. The image characteristics of the converging collimator were investigated for a Toshiba scintillation camera utilizing a 15-1/4 in.-diameter NaI crystal.

The field of view of the converging collimator decreased with increasing the distance while that of a pin-hole increased. The magnification of images was observed by increasing the object-to-collimator distance, producing the image distortion. The response for the plane sources was not so changed with the distance. A bar-phantom display obtained with Co-57 showed the distinct separation of the 6.3 cm bars at 10 cm and 9.5 cm ones at 15 cm. The improvement in resolution was observed in the selected clinical images, for instance, of the deep-seated lesion in the brain and of third or forth ventricle in the cysternogram. However, the magnification of images of the converging collimator was reverse to that of the pin-hole with regard to the object-to-collimator distance, suggesting the requirment of different practices for the interpretation of clinical images.

High Sensitivity Imaging by a Rotating Slit Collimator

E. TANAKA and T. IINUMA

National Institute of Radiological Sciences, Chiba

With conventional pin-hole or multi-parallel-hole collimators, high resolution is attained at the cost of detection sensitivity, and accordingly a collimator suitable for the detection of small lesions yields low signal to noise ratio in the detection of larger lesions unnecessarily. This paper presents a new method of imaging which has a better compromise between sensitivity and resolution than the conventional one. Instead of a pin-hole collimator, a rotating slit aperture of a certain length is placed between an image detector and an object, and, for every count, a line image representing the probability distribution of the source position is displayed on a CRT or stored on an image memory of a computer. The line image corresponds to the projection of the slit aperture onto the object plane from the point of detection. A point source is recognized as the crossing point of a number of the lines. The counting rate increases with the increase of the slit length while the resolution is kept fairly high. A theoretical consideration and a computer simulation showed that the signal to noise ratio in the detection of lesions in a large background organ increases with the increase of the slit length, but the use of a too long slit tends to blur the obtained image. The length of the slit should be such that the length of the displayed line is of the same order of the size of the largest lesions to be recognized.

Tomographic effect is expected by off-center rotation of the slit aperture. Similar imaging can be realized by rotating a multi-parallel-slit collimator in front of an image detector.