II. Apparatus

Evaluation of Scanning with Semiconductor Detector Ge (Li) (1st-Report)

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Recent developments in semiconductor detector technology have caused much interest. We have recently obtained a germanium detector with a capacity of 10cc with a full width at half maximum of 4.5 KeV for the ^{60}Co gamma-ray (1.33 KeV). This semiconductor detector Ge(Li) has a high-resolution for gamma-rays compared with a conventional NaI (Tl) detector. The use of these high resolution detectors should make it possible to map radioactive emission distributions from patients with minimum degradation due to scattered radiation.

Studies were made with a thyroid phantom to determine the relative ability of NaI and Ge(Li) detectors. The phantom was imbedded in water. Scanning time was adjusted so that equal counts were obtained with germanium detector and the NaI using the 37 holes collimator. In this case, the voids in the germanium image were slightly better resolved due to the increase in sharpness of the edges. When the scanning were made equal scantimes, the NaI image were better than germanium image.

From these studies, we have concluded that the imaging ability of semiconductor detector is superior to NaI (Tl) when equal counts are obtained. Small high resolution germanium detectors provide scans of high information content per photon. We feel that the use of germanium detectors for emission scanning in diagnostic Nuclear Medicine will be limited until such time as their sensitivity can be increased to the point when they can compete with NaI detector.

Studies on the Computer Processing of RI Image Using Scintiscanner

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The present report deals with the results in digital computer processing of the RI images obtained by scintiscanner (3×2 in. NaI (Tl) crystal×2) with 61 hole honeycomb collimator. Scanning was performed at a speed of 30 cm per minute, and counts in every 1 mm scan were stored into each channel of 1600 channel P.H.A. successively, and