scanning, which sharply resolve activity near each plane spaced at a few cm. intervals throughout the organ being scanned.

The gamma events localized at a certain depth in the body are pointed out on the film readout by electronically synchronizing the speed of the detector probes, the relative speed of the image exposure moving across the crystal diameter and electron beam in CRT.

In this communication, the clinical usefulness of the PHO/CON will be discussed and the advantages and limitations reviewed by comparative studies with a conventional camera. In order to assess the value of the PHO/CON, patients were selected at random for a duplicate examination with both devices and tomographic scans were randomly preceded or followed by camera studies. To date, over 150 sets of studies on various organs have been performed as outlined above. The diagnostic quality was discussed by three observers in the section of nuclear medicine.

BRAIN.

Brain images by the PHO/CON were compared with that of the camera in 30 cases of various brain lesions.

The tomographic scans detected abnormal accumulation in three cases with brain lesions which were not imaged by the camera. In two cases, an ill defined area of increased activity shown by the camera was clearly demarcated as two separate lesions with PHO/CON.

The tomographic property of the device results in separation of deep areas of interest from confusing, overlying foci of activity, such as transverse sinus or temporal muscles.

This appears to be particularly important in patients with lesions near the base of the skull.

LUNG.

Twenty-one samples of pulmonary perfusion abnormalities were imaged with both devices. Tomographic scanning more effectively detects small focal defects and the decreased activity along the fissure in chronic obstructive lung diseases than can be visualized using the camera.

LIVER.

Fifty examples of space-occupying liver lesions evaluated with camera imagings were compared with PHO/CON tomographic scans. This technique made it possible to clearly visualize the number and size of liver S. O. L. in 25 patients. In two cases reported as normal liver image on camera study, a definite focal defect was detected with PHO/CON.

BONE.

Duplicate examination with both techniques was performed on 25 patients suspected of various osseous abnormalities. Tomoscan shows lesions in 15 cases to better advantage than does the camera and particularly exhibits better demonstration of lesions in the pelvic region. In two cases, an area of abnormal accumulation was identified on PHO/CON study but was missed by the camera.

KIDNEY.

On comparative study between both methods in 26 cases of renal disease, tomoscan images were clearly superior to those of the camera.

The advanced clinical applications and effective practical uses of the PHO/CON were discussed and the diagnostic quality of this device beyond the conventional camera was recognized. Correlative studies with other imaging techniques remains to be done.

Correction of The Nonuniformity of Camera by A Digital Computer System

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In order to establish a useful method of correcting nonuniform response of the camera by a digital computer system, measurements of the uniformity were performed and the uniformity of the images obtained (flood) were evaluated quantitatively. The out-put from a commercial delay-line type camera (Toshiba GCA-202) was analyzed using the NIRS on-line computer system (TOSBAC-3400 Model 31). The flood data were collected in a 64 × 64 matrix without a collimator and with three collimators with respect to the point or the disc sources of ^{99m}Tc and ^{57}Co. Number of collected data were about

4×10^6 counts/total area. Changes in uniformity with time, and the effects of varying window settings (photomultiplier tube gain adjustment, window width selection), counts rate, and geometrical variations (without or with scattering medium) were detected and evaluated by the parameters expressing the quantity of nonuniformity of a flood image and the differences in the uniformity of the two. The quantity of nonuniformity was defined as, $\sigma u = \sqrt{\sigma^2 - \bar{C}/\bar{C}} \times 100$ (%), where σ was the standard deviation of counts in region of interest and $\bar{C}$ was the average counts per matrix element. It was confirmed by some experiments that even if number of collected data for the flood image varied from 10 to 5×10^4 counts per element, this parameter has a constant value as compared with those of others. After smoothing the flood image by the Gaussian filter, the differences in the pattern of nonuniformity defined as the correlation coefficient(r) between the two flood images were calculated. Experimentally and theoretically, it was proved that the distortion of the pattern of nonuniformity could be ignored and the statistical fluctuation in flood image became small much the same as a flood image with counts more than 10^4 per element by using the optimal smoothing procedures. Changes in uniformity with time (for three months) and with counting rates (from 10^3 to 2.5×10^4cps) were insignificant. It was found that nonuniformity of parallel hole collimators was negligibly small compared to those of flood. The nonuniformity (σu) of the images which were measured over the window from 20 % to 80 %, at the settings in clinical studies and the correction co-efficient (r) between a flood image of 20 % window and the others were almost unchanged with window width, but varied significantly with and without scattering medium. But using the energy window less than 15 %, samll variation of the photomultiplier tube gain resulted in increasing of nonuniformity (σu) and the significant changes of the pattern (r) of nonuniformity. We concluded as follows: (1) field flood data should be acquired at the settings approximating the energy spectrum seen in clinical studies, (2) in the case of the window width less than 15 %, correction of the nonuniformity was difficult, (3) but with respect to the window more than 20 %, a flood images made with a certain window width and if the nonuniformity of collimator could be ignored, without a collimator was sufficient to correct the nonuniformity by a digital computer system.

Study of Myocardial Imaging and Cardiac Function of Patients with Old Myocardial Infarction

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A nucleo-medical study was made of the myocardial function and cardiac function of patients in whom a long time had passed after an attack of myocardial infarction and who were then living a normal life.

The patients were infused intravenously with 2 mCi of ^{201}Tl; the frontal and left oblique image were recorded with the scintillation camera 30 minutes later, and input simultaneously into the medical computer, together with the ECGs for the data analysis. Continuously, to the same patients, 20 mCi of ^{99m}Tc human serum albumin was infused as bolus and the cardiac blood pool was input into the medical computer, together with the ECG, to obtain the end-systolic and the end-diastolic image by gated scintigraphy to calculate the left ventricular ejection fraction.

The subjects consisted of 40 patients with old myocardial infarction, five with relatively fresh myocardial infarction, 20 with hypertension and 10 normal as control.

The sites of myocardial infarction all appeared as defects on the scintigraphy (of 34 out of 45 subjects), which were well consistent with their ECGs. The abnormalities on the scintigraphy varied in degree, but were larger in many patients than on the ECGs. Of the patients whose ECG abnormalities had considerably decreased, not a few presented considerable abnormalities on their scintigraphys.

It was found that the contractile movement of the infarcted site was weakened in many patients, and there were some patients who presented abnor-