Therefore, the above-mentioned techniques are now applied in our laboratory to kidney dynamic studies, such as perfusion, secretion, excretion and also difference in dynamics upon the postual change etc. And also these fundamental image processings are very useful and necessary for dynamic data processings.

A High Resolution Gammacamera

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A new Gammacamera with high position resolution capability is developed. The gammacamera is based on the delay line position computing circuit, and its out view is the same as standard type gammacamera GCA-101. Using the delay line position computing circuit, the output signals from PMT's which are far from the scintillation event in the NaI (Tl) crystal contribute very little to position signals and high position resolution capability can be obtainable. The intrinsic position resolution (FWHM) is 8.5 mm for ^{99m}Tc. Ordinal bar phantom studies for intrinsic resolution show this camera resolves 3/16 inch (4.7 mm) bars separated by a like distance.

The system resolution of a garmmacamera is determined by two factors, one is the intrinsic resolution of the detector and the other is resolution capability of collimator.

To improve the system resolution of the camera high resolution collimator for 140 KeV is developed. The optimum geometric structure is determined theoretically.

Applying new fabrication techniques, the collimator has the position resolution of 8 mm at 100 mm far from the collimator surface and exhibits the detecting sensitivity 1.25 times as great as ordinal 4000 hole collimator.

Combining the high resolution collimator to the new gammacamera system resolution of 11.5 mm is obtainable.

To clarify the performance of the camera and the collimator, scintigrams of IAEA Liver Slice phantom are taken.

Nonlinear Image Processing in Radioistope Scintigraphy

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The problem of increasing the resolution of a radioisotope scintigram can be formulated as the solution of a convolution type integral equation, but solving this integral equation is extremely difficult if noise is present in the data.

In order to overcome this difficulty, we previously investigated the "Least Squares Deconvolution Method" in which the expected squared difference between observed and processed image distribution was minimized.

In this report two practical nonlinear tech-