The quantitative analysis of Tc-99m DTPA Attenuation corrected coronal section for 25 cases of normal and 23 cases with Nakagawa and T. Ito. Mie University School of Medicine, M. nakagawa and S. matui. Toshiba corporation, Nasu. 25 cases of normal and 23 cases with hydronephrosis were studied. Following intravenous bolus injection of 10mCi of Tc-99m-DTPA, sequential ECT data were obtained by rotating opposed gamma cameras. Attenuation corrected coronal section for 1-2 min was used for uptake imaging. The uptake ratio for total kidney (TUR) and partial mean uptake ratio (PUR) were calculated by the quotient of respective total and regional mean counts over the kidneys divided by the inserted dose. Normal values for TUR and PUR ranged 3.22±0.94% (mean±SD) and 421.194±107, respectively. A combination of these two values for each diseased kidney introduced the classification of the following three groups. 1) Normal group in which both TUR and PVR are within normal range. 2) Group of compensatory increased volume in which TUR is normal and PUR is decreased. 3) Group of contracted kidney in which both TUR and PUR is decreased.

The quantitative analysis of Tc-99m-DTPA ECT images was considered to be useful for evaluating regional and total renal function.

Functional images and regional renograms using I-123-OIH were evaluated by comparing with patients' clinical courses, intravenous pyelographies (IVP) and Creatinine clearances. 21 patients with obstructive Uropathy, mainly with renal and ureteral stones were studied. Functional images were processed in three parameters of Tmax, T1/2 and ERBF (effective renal blood flow). ERBF images were composed of regional counts in early blood flow phase of renograms. Regional renograms were produced on renal parenchyma and pelvis. ERBF images represented the functioning distributions of renal tissue after the surgery and the recoveries in the renal parenchyma from the operation. Tmax, T1/2 images and pelvic regional renograms showed good correlations with IVP findings which presented the dilatation of pelvis and the delay of excretion. Parenchymal regional renograms showed poor correlations with Creatinine clearances and caused sometimes errors in ROI settings, therefore the evaluation of renal function only by the parenchymal regional renogram seemed inappropriate.

Deconvolution analysis of whole kidney and renal parenchyma on renogram Tc-99m DTPA renography was examined to evaluate the functional impairment of the renal parenchyma secondary from the obstruction in the urinary tract. The deconvolution analysis was done with the method of matrix algorithm by Diffey et al. (J.N.M. 17:352,'76). The mean transit time(MTT) and maximum transit time(T20%) in normal renal parenchyma was 2.46±0.47 min and 3.48±1.00 min, respectively. Therefore, the prolonged MTT more than 3.5 min, was accepted to be an impairment of renal parenchymal function secondary from the urinary tract obstruction. Although the measurement of transit time was unreliable in the severe functional impairment, the transit time study was the most sensitive for the evaluation of functional impairment in obstructive uropathy. Moreover, the relative GFR ratio obtained from the ratio of retention function at zero time of each kidney was well correlated from the ratio of integral activity of whole kidney from 60sec. to 140sec.

From the present results, the deconvolution analysis of Tc-99m renography was the useful study for the evaluation of renalparenchymal functional impairment secondary from obstruction.