

secretory angle, maximum counts (peak counts, cpm), time from the injection to peak point, time from the injection to 75% of the peak and time from the injection to 50% of the peak were proved to be highly correlated for classifying the renograms into four types (N, M1, M2 and L-

type according to Dr. Machida's method).

The types selected by computer using these five parameters were agreed with those by observers in 86% of curves, and these studies were shown clinical usefulness of the system in routine examination.

Clinical Evaluation of Functional Imaging of the Kidney in Obstructive Renal Diseases

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We have previously reported on a method for functional imaging of the kidney using dynamic data after ^{131}I -Hippuran administration. In this study, this functional imaging was clinically evaluated in obstructive renal diseases and pyelonephritis especially in contrast with IVP findings. After intravenous administration of 300 Ci of ^{131}I -Hippuran, sequential frames were acquired at 3 per minute in a frame mode with 64×64 matrix, using a gamma camera and an on-line computer system [DAP 5000-N]. Each of the parameters of Tmax, T 1/2, T 2/3 and T 1/2 IDS (T 1/2 of initial descending slope of a time-activity curve plotted on semilog. paper) was calculated for all the time-activity curves on the elements of the matrix and displayed such that brightness is proportional to the calculated values. In normal kidney all the calculated values were less than 4 minutes in any of the parameters. In 7 cases of hydronephrosis with parenchymal atrophy on IVP, calculated values for all the parameters represented as brightness increased dif-

fusely. In contrast, in all 8 cases without parenchymal atrophy on IVP, there was found demarcation between enlarged pelvis with higher brightness and parenchyma with lower brightness. It represents that renal parenchyma is still functioning and the degree of damage is visualized as brightness. In all 7 cases with pyelonephritis with either focal parenchymal atrophy or cavity on IVP, functional images showed coincident areas with increased brightness. In 14 cases with pyelonephritis with focal caliectasis on IVP, there were found multifocal areas with increased brightness on functional images. Out of 10 cases with clinical diagnosis of pyelonephritis without any abnormal IVP findings, 3 cases showed normal functional images, while 7 cases showed focal areas with abnormally increased brightness which was especially noticeable on T 1/2 IDS images.

We believe that functional images are clinically very useful not only supporting IVP findings but also indicating the part and the degree of the diseases, those are not detectable on IVP.

Relation Between Intrarenal Urine Flow Process and Intrarenal Blood Flow Process

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It is well known that renal cortex consists of two anatomically and physiologically identifiable compartments according to the elaborate animal experiment. However, there is no report to identify this situation on the level of clinical medicine. Present report is concerned with clinical identification of these compartments in term of

intrarenal urine flow blood flow using radionuclide tracer and its external detecting device.

A bolus of ^{131}I Hippuran and $^{99\text{m}}\text{Tc}$ (sn) DTPA were introduced into a renal artery and subsequent transit process of these tracers through kidney was observed using scintillation camera and analyzed by a computer. On inspecting a

battery of time-activity curves selected from various parts of the kidney such as outer part of cortex and inner part of pelvis, any differences in the temporal events between these tracers were not evident, indicating such were tagged tubular fluid which ran preferentially down and up again along the course of nephrons. Impulse response of this tubular transit process of the parenchymal part of kidney revealed a bimodal distribution func-

tion.

On loading osmotic diuresis, the distribution function became unimodal with shortened spread, which corresponded with increased rapid flow component and reciprocal decrease of slow component, according to the radioxenon washout study simultaneously carried out, suggesting that the intrarenal urine and blood flow were invariably related.

Quantative Estimation for Results of Operated Obstructed Kidneys, Applying to Computer Analysis as Functional Image with $^{99m}\text{TC-DTPA}$

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RI-images on pre- and postoperative obstructed kidneys, hard to distinguish their functional improvements with IVP., were acquired as 45 pictures of each 20 sec. interval for computer analysis.

From regional renograms, functional images on both peak counts and its arrival times, some values for quantity were estimated in order to follow up the changes of the operated kidney.

Values from each 4 horizontal ROI of kidney were compared, resulting inversely related with counts and times in each region following to improve on operated kidney function.

Lated flow index value (LFI) as the expression

for dynamic function included each count and time were set up, and applied to the same follow up studies. That is:

$$LIF = \frac{1}{N} \sum_{i=1}^n \frac{\frac{PC_i}{BG} - 1}{\left(\frac{PT_i}{K}\right)^2}$$

where, $K=180''$ (DTPA), BG; background, PC; peak count, PT; peak time, showing gradation of kidney functions.

By this, in 7 of 10 cases, changes of kidney function were observed just as renal counter balance of Joelson, J.C. (1929).

A Study of the Diagnostic Usefulness of Serial Renal RI Images in Upper Urinary Tract Obstruction, Especially in Children

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Urinary tract obstruction and its complications occupy an important place in pediatric nephropathy. The nature and etiology of such obstructions are quite complex and the symptoms are most of such cases during in fancy and early childhood are considered as congenital. Stricture or obstruction at the ureteropelvic junction or at the lower end of the ureter is a congenital anomaly of relatively frequent occurrence which, even in mild cases, tends to be associated with flareups of urinary

tract infection, proves often to be therapyresistant and is likely to be overlooked at times. In the diagnosis of such upper urinary tract obstructions functional image by using renal scanning agents is of great use.

This radiodiagnostic procedure consists of taking serial scintiphotos of the kidneys in order, 4, 8, 12 and 16 minutes after the rapid intravenous injection of ^{131}I -hippurate using an Anger scinticamera which is placed externally against the