N. Kidney and Urinary Tracts

Renogram and Renoscintigram with $^{99m}$Tc-DTPA (5th)
—About Partial Renogram—

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We have made the diagnosis of kidney disease with the total renogram. But we often had the unsuccessful results in the correlation to the clinical findings, grasping the clinical situation and the decision of the healing. We have experienced the necessity of dividing the traditional renogram. So we made the partial renogram which divided the renogram.

We fractionated the kidney into the small parts by the digital switch and isolated some places on the kidney with light pen, and also we chose two parts on the kidney, that is, the renal cortec part and renal pelvis part. We obtained the partial renograms from each of these three methods. Consequently, we arrived at the result that the partial renogram that were obtained from the cortecs and pelvics part respectively, were the closest the clinical findings.

The cortical renogram and pelvical renogram were aquired from these field, that is, the renal cortics part is 1/3 outside and 1/2 of length of a long axis of the kidney, the renal pelvis part is 1/3 inside and 1/2 length of long axis.

We made comparison by putting square ROI to cortecs and pelvis with the digital switch, and by setting upround ROI along the parts corresponding cortecs and pelvics part with the light pen, there was no appreciable difference between them. On the occasion of designating ROI, we easily made square ROI with digital switch. The original data was stored on the magnetic tape and then typed out.

The partial renogram is carried from direct after admission into the cubital vein for 20 min. with the time frame of 10–20 sec.

And we showed the some cases which was effective in the partial renogram.

Computer-Assisted Renogram System

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Renogram is a popular examination in the field of nuclear medicine. But the analysis and interpretation of the renogram curves are time consuming and may sometimes not be impartial, and an "autocount and autoread" renogram system was developed and tested in our department using the minicomputer system which was interfaced to dual scintillation counters.

Results were displayed on CRT or typed on paper by a teletypewriter after calculating the parameters and type of the curve.

Programs used in these studies were:

1) Filing patient’s personal data.
2) Collecting data of the background and activities of kidneys, each 2.5 seconds in 20 minutes.
3) Output of renogram curves on CRT and copies on paper.
4) Calculation of parameters and type of the curve.

Four hundred and sixty-four cases were examined after the injection of 200 microcuries of Hippuran at prone position in hydrated status.

Thirty-nine parameters of the curve were calculated and studied, and five parameters of them:
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 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 calycectasis 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 99m-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

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