The Automatic Diagnosis of Renogram by Minicomputer System (Third Report)

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According to the method which we had already reported at the meeting of Nippon Societas Radiologica and the Japanese Society of Nuclear Medicine in 1972, we observed the change of R.O.I. renogram curves and their same transformation curves in the various conditions of the same patient. (i.e. hydration, dehydration and injection of Lasix 20 mg intravenously)

The transformations we used, were considered to be able to obtain the curves that would be after the injection or R.I. into the area, i.e. Region in Interest (R.O.I.) in this report were cortex areas and pelvis areas.

The results were as follows:

These three conditions in two cases (case 1: man, 23 years, I-hydronephrosis, case 2: woman, 45 years, 1-renal calculus and tumor of r-kidney) were studied. The obvious change of the renogram was looked in B-segment and C-segment. And in those three conditions, maximum shortening of T_max. and T/2 was observed after the injection of Lasix 20 mg intravenously.

In those cases after analysising the curves, we observed that cortex area curves were slightly changed and pelvis area curves were more changeable than cortex area curves.

And as far those transformed curves, the obvious changes were chiefly observed at pelvis area curves.

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Renal Scanning with Tc-99m Penicillamine Acetazolamide Complex (TPAC)

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Tc-99m labeled penicillamine acetazolamide complex (TPAC), introduced by S. Halpern as a new renal scanning agent in 1972, is superior in scan image and in radiation dose to the other Tc-99m compounds or mercurial radiopharmaceuticals. A characteristic advantage of TPAC is that even in the case with severely impaired renal function, the kidney image is fairly well

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delineated when the blood circulation is maintained. The transplanted cadaveric kidneys were chosen as the objects of TPAC application. Sixty to ninety minutes after intravenous administration of 1-3 mCi of TPAC, anterior and lateral views of renal transplants were scanned with scintillation camera. A cadaveric kidney, transplanted to a 36 year old female, was clearly delineated by TPAC even though her scan was performed on the second postoperative day when urine volume was only 77 ml/day. A renogram of I-131 iodo-hippurate performed on 14th postoperative day only suggested the accumulation of radioisotope in the kidney with very little function. It has been difficult to prove the patency of major vessels during anuric or oliguric phase, which has often been experienced in cadaveric renal transplantation. TPAC scan has a great value to ascertain the blood circulation in the graft even in the anuric period. An infarction in the transplanted cadaveric kidney of 47 year old male was clearly demonstrated by TPAC. His Hg-203-chloromerodrin scan, performed prior to TPAC, showed reduced accumulation of radioisotope in the upper part of the graft, but poor delineation of kidney image prevented us from definite interpretation of infarction. Another advantage of TPAC, superiority in scan images among renal scanning agents, was applied to polycystic kidneys. Comparing TPAC with Hg-203-chloromerodrin scans of polycystic kidneys, TPAC is better in quality of scan images. The lateral views of polycystic kidneys in TPAC camera imaging give additional informations to scan interpretation. TPAC was selectively applied to the cadaveric renal transplants and the polycystic kidneys, and proved to be an useful scanning agent.

a Clinical Evaluation of the $^{99m}$Tc-penicilamin Acetozolamide for Renal Scanning

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Various radiopharmaceuticals are now in use as a renal scanning agent. Clinical evaluation was made on images obtained by $\gamma$-camera scan using $^{99m}$Tc-pencilamine acetozolamide complex (TPAC) developed by S. Halpern.

Four to eight mCi of TPAC was administered intravenously to seven cases with normal renal function and 23 patients with urological renal disorder, and $\gamma$-camera imaging was performed.

Results:

1) In the case of patients with normal renal function, RI perfusion in renal blood was observed within one minute after injection.
2) Even in the case of markedly impaired renal function such as uremia, TPAC-scintiphotos showed visual images for morphological findings.
3) In differential diagnosis of renal mass, TPAC scanning is advantageous in that the perfusion phase and the functional phase can be obtained simultaneously.
4) In clinical evaluation, the image by TPAC is different from that by Chlormelodrin and RI-Hippuran, so that careful attention must be paid to interpretation of images.
5) Enabling distinct renal images to be obtained at a low radiation dose, TPAC is an excellent scanning agent although its preparation involves complicated procedures.