

7) Kidney

The Clinical Appraisals of the Radioisotope Renal Scanning

T. MINAMI and T. MACHIDA

Department of Urology, Jikei University School of Medicine, Tokyo

Diagnostic advance in renal scanning depends mainly upon development of radioactive agent and upon improvement in the nuclear instruments. The desirable radioisotopes for the scanning should leave specific deposits in renal lesion without any side action to the human body. Although the radioisotope shows specific organ uptake, a rapid excretion makes renal scanning difficult with conventional automatic scintillation scanners. For this reason, ^{203}Hg -Neohydrin and ^{131}I -MAA have been employed with good scanning results. However they are not perfect agents for the renal scanning.

Instrument of the scanning is required to have a high resolution and should scan in shorten time. Our renal scanings have performed with cut off level at 30~50% and the time required was about 15-20 minutes.

Reviews of clinical materials at the Department of Urology, Jikei University School of Medicine, from 1964 to 1967, the excretory urographies and renal scanings were performed simultaneously on more than 300 cases.

The observations made on patients with renal diseases were discussed below:

1) The horseshoe kidney

Little finding could be obtained by the excretory urography because of few function at isthmus region of the horseshoe kidney, while renal scanning outlined the kidney and a functioning portion of the isthmus. It gave very useful informations for surgical procedure.

2) The renal cell carcinoma

Almost all the patients with tumor had been studied by both an arteriography and isotope scanning with clear diagnostic advantage. Unfortunately, renal tumor were usually large when symptoms brought the patient to seek medical attention.

Diagnosis of such large renal tumor was made satisfactorily by various radiological examinations. When the tumor was relatively small (less than 2cm in diameter) involving

cortical region of the kidney, the diagnosis was made accurately neither by excretory urography, arteriography nor renal scanning. But a single space-occupying-lesion over 2.0cm in diameter was better detected by renal scanning than by various urographies. Usefulness of the arteriogram in diagnosing the renal tumors was clear, but the scintigram might have shown some advantage over the arteriogram as far as convenience and versatility were concerned. However the scintigram failed to differentiate if the tumor was benign or malignant, solid or cystic.

In operations, patients with the tumor over 3cm in diameter have closely identification in the scintigram.

3) The polycystic kidney

The multiple cysts in the renal parenchyma can be diagnosed by excretory urography if renal calyces are deformed and elongated. The renal scanning on the other hand delineates size and location of the cysts. But the scanning is unable to make difference between a large single cysts and a collective lesion of the small multiple cysts.

4) The renal tuberculosis

Excretory urography made on the patients of renal tuberculosis demonstrates the transformation of calyceal patterns. In case the draining cavity is present, it is not clear if the renal parenchyma adjacent to the cavity is functioning or not, since the cavity is often filled with the contrast media. In tuberculosis damage to the proximal convoluted tubular was well shown by the isotope scanning. Thus the extent of the renal damage may be well assessed by combined information from the excretory urography and renal scanning.

Here the renal scanning is the most useful in assessing regional function of the kidney.

5) Renal insufficiency

The IVP is often dangerous when it is performed on the patients with renal insufficiency especially with blood urea nitrogen

over 50mg per 100ml. On such cases, the isotope scanning can be safely done.

When there is any doubt about the extent of the renal parenchymal damage, the radioisotope scanning supplies extra information unobtainable by the regular excretory urography.

6) Staghorn calculi

The patient with large cast stones in the kidney often shows reduced renal function and the renal pelvic becomes small. And it is often difficult to identify the focal lesion by the excretory urography. The renal scanning gives the extra information of the sites where the function is reduced. The scanning also help to decide where incision should be made to remove the stone.

7) Obstructive hydronephrosis of the upper urinary tract

Both an excretory urography and a retro-

grade pyelography fail to show exactly a renal obstructive disorder. In such cases, the renal scanning is helpful in discovering associated renal abnormalities.

Aortography and radiorenography beside the renal scintigraphy are very useful and provide better understandings in selecting palliative or radical method.

In conclusion:

This study was mainly undertaken to evaluate both the X-P urographies and subsequent radioisotope scannings, made on approximately 300 patients.

The scanning added new informations when destruction, displacement, or disturbance of the proximal convoluted mass were present. The scanning is characteristically simple method as a regional renal function test without any side effect.

T. MAEDA

Department of Radiology, Kyushu University Hospital

The author has studied comparative value of pyelography, renal angiography and renal scintiscan in renal disorders.

An attempt was made to determine in what situations the scan may contribute to the radiological evaluation of various renal diseases.

Mercury 203 or 197 (labelled) chlormerodrin was used. Scanning procedure was performed 1 to 2 hours following injection of mercury tagged chlormerodrin.

The results obtained from this study suggest clinical advantages of renoscintigram in the following conditions;

- 1) congenital abnormality
- 2) substandard rentgenographic examination
- 3) evaluation of recovery of involved kidney after surgical procedure for ob-

structive uropathy

- 4) vascular disorder
- 5) renal tumor (primary or metastatic)

In the detection of space occupying lesions of 2cm or less, using Alderson's phantom, the scintiscan appeared normal. In a patient with a solitary renal cyst of 2.5cm in diameter, the space occupying lesion was detected with some difficulty. One may conclude from this study that the renoscintiscan does not replace either pyelography or angiography in the evaluation of renal disorders. But the renoscintiscan is of significant value in detection of impaired renal function. It is another useful armamentarium of radiologists and in certain cases may be additional useful in information. Development and wide-spread use of stationary device (Scintillation camera) will improve clinical values of renoscintigram.