External Measurement of Kidney Function

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The comparison of PAH concentration in arterial and venous blood showed the discrepancy of peak time which was observed the delay of 6 min. in venous one. The use of pressure band promoted the decrease of concentration of PAH in venous blood.

For the purpose of accurate and dynamic measurement of kidney function, we have been using with four channel renogram which might be improved above mentioned probleme. The use of 2 inch crystal probe for heart tracing has increased the sensitivity of assay in blood level. 30 μc ^{131}I PAH injection after loading with 500-1000 mg PAH and continuous tracing with our renogram give the good correlation with the half-time which was calculated with electric computer and the half time from blood levels. Next, the relationship between our value and RPF from usual method has been tested in this report and good results were obtained.

It has been concluded that the use of 4 channel renogram with improved heart probe has many benefit for assay of kidney function.

Radiosotope Renogram in Children (2nd Report)

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Ninety-eight radioisotope renograms were obtained from 74 children between 2 and 15 years of age of various diseases including some renal disorders.

Several investigators have used 0.4 μCi of ^{131}I-Hippuran per kilogram of body weight, but this dosis has not been proved to be appropriate. In order to investigate the adequate dosis, 71 renograms from 59 children in our series were obtained with the uniform dosis of 10 μCi or radio-hippuran. The other children were administered various dosis according to the body weight or body surface area.

The radioactivities for the Wenzl's index-points ("Ac", "Bc", "Cc" and "Dc") were not always related to the body weight (these values were somewhat higher than expected in children of low body weight), but closely related to the body surface area. Therefore the dosis should be decided according to the body surface area such as 10 μCi/m^2, but a uniform dosis such as 10 μCi to all the children is also available if we evaluate the results from the relationship between the radioactivity and the body surface area.

Some parameters concerning the duration time (Winter's "At", "Bt" and "Ht") were not influenced by administered dosis. The normal values calculated from 123 kidneys classified as normal pattern (N-type by Machida's classification) were obtained as follows: "At" was 0.37±0.14 min. (mean±SD), "Bt" was 3.64±1.21 min. and "Ht" was 5.64±1.72 min.

Virtually it is not always easy to explain the meanings when we observe some abnormal values. Therefore, we tried to interpret the renogram curve as the remainder of the excreted parts from the accumulated ones which can be plotted as straight lines on semilogarithmic scale. These straight lines are expressed with each half value period ("T½" for the parameter of excretion from the kidney and "t½" for the accumuration to the kidney) and the value of zero time ("T o") obtained from extrapolation of the part of

Winter's "segment c".

The normal value for "T½" was 4.98±1.76 min. and that for "t½" was 1.32±0.53 min. Very high reproducibility was observed in this method. Moreover the original renogram curve can be almost completely simulated with these three parameters (i.e. "T½", "t½" and "T o").

Intravenous injection of Furosemide influenced on renogram curve immediately. Administration of Furosemide a few minutes before the radio-hippuran injection, resulted in obvious shortning of "Bt" and "t½". When we administered this substance 20 minutes after radio-hippuran injection, an obvious improvement was resulted in some cases with abnormal record probably due to over-dehydrasome extent upon the renal reserve function. tion. It seems this improvement depends to So that such application of Furosemide to renogram is very useful to distinguish some false positive patterns from true abnormalities.

Evalution of Renal Scanning, Radioisotope Renaography and Renal Angiography on Renal Tuberculosis

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Radioisotope renography, renal scanning, and renal angiography were performed on a total of 47 cases of renal tuberculosis: unilateral renal tuberculous, 34 cases, bilateral, 5 cases; and that of solitary kidney 8 cases.

The diagnostic efficacy of these three methods were compared and following results were obtained.

1. The diagnostic rates of tuberculosis obtained by these three methods were: radioisotope renography, 92%; renal scanning, 96%; and renal angiography 88%.

2. The affected kidneys were devided into 4 groups: Group 1 of the kidney with normal pyelographic appearance, Group 2 of the kidneys with localized tises, Group 3 of desolute kidney and Group 4 of the kidney with stenosis of the upper urinary tract.

Radioisotope renography was found effective in diagnosis of renal tuberculosis of Group 4, and renal scanning and renal angiography were effective in that of Group 2, all these methods were found effective.

Clinical Application of Renoscintigram

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There have been various papers reperting the value of the renoscintigram by ^{203}Hg, ^{197}Hg-Neohydrin and MAA. The purpose of this paper is to report its fundamental analysis and its application to a case of pyelonephritis.

Method:

1) Renal macroautogram of the rabbit was made using ^{203}Hg-Neohydrin and MAA.

2) MAA was injected to the pyelonephritic kidney selectively at the time of selective renal angiography. Renoscintigram of ^{203}Hg-Neohy-