


Original Article

Evaluation of Renal Diseases using Isotope Renogram and Biochemical Test: A Correlative Study with 275 Cases

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Abstract

The study was carried out with an aim to make a correlation between radionuclide renography and biochemical test in the evaluation of renal diseases. A total of 275 patients with a history of low back pain were included in the study. Radionuclide renography and biochemical test were done in most of them in consecutive days. Among them, 241 patients were finally found to be positive. Available USG, X-ray, IVU, TC, DC, ESR and Hb% findings were also correlated well with renogram. Renal diseases like renal stone, acute glomerulonephritis (AGN), ureteric stone, renal abscess, chronic renal failure, end stage renal disease (ESRD) and renal trauma were found in most of the cases. In case of radionuclide renography, mild to severe renal insufficiency found in 87.64% cases (single & bilateral) in contrast to biochemical test where increased blood urea/ serum creatinine found in 30.91% cases. Our study focuses the importance of renogram technique over biochemical test for precise evaluation of differential renal function.

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Introduction

Low back pain is a very common problem in Bangladesh and may indicate a renal disease. Radionuclide renography is now very important diagnostic tool comparable to other diagnostic modalities for the evaluation of renal diseases. This technique causes a minimum of inconvenience to the patient and carries no appreciable radiation risk. The importance of isotope renogram for evaluating individual kidney's function were previously reported.^{1,2} Renogram curve can be revealed easily in patients with suspected renal diseases, with disturbances of

the renal circulation, with functional obstruction of the upper urinary tract, and specially in impairment of tubular function. This diagnostic technique is also useful for follow-up studies after drug treatment or surgery. Creatinine level analysis from blood sample gives a useful indication of the degree of renal failure. The blood urea, which is more readily affected by dietary protein, tissue breakdown and hydration, is a less reliable guide to overall renal function.³ The main aim of the study is to compare the sensitivity of radionuclide renography over biochemical test in the evaluation of suspected renal disease.

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Materials And Method

Two hundred and seventy five patients with suspected renal disease were evaluated by radionuclide renography and biochemical test. Of which 168 (61.09%) were male and 107 (38.91%) were female, age between 9-75 years had come at the CNMU, Rajshahi during the period of July 2001 to June 2003 for radionuclide renography. Radionuclide renography and biochemical test were done in most of them in consecutive days. According to age and body build, the dose of about 3-5 mCi ^{99m}Tc -DTPA were injected per patient intravenously and then immediately started the renography study continued for next 15-20 minutes. Diuretic was administered after 8-10 minutes during the study, when needed. Some patients were considered for DMSA renal scan for anatomical information. The renogram findings were then correlated with biochemical features and other available diagnostic parameters.

Results

The 275 patients, 168 males and 107 females, aging 9-75, had a history of low back pain. Among them, 241 patients were finally found to be positive. Mild to severe renal insufficiency was found in 87.64% cases (single & bilateral) in renogram whereas increased blood urea/ serum creatinine was found in 30.91% cases in biochemical test. The mean serum creatinine level found 1.40 ± 0.24 mg/dl for mild, 1.90 ± 0.28 mg/dl for moderate and 7.76 ± 2.35 mg/dl for severe renal insufficiency. The mean serum urea level found 33.65 ± 8.50 , 49 ± 9.85 & 145.64 ± 50.45 mg/dl respectively for mild, moderate and severe renal insufficiency.

Discussion

Kidney disease can occur at any age. Low back pain of a patient at any age may indicate kidney disease. We had carefully monitored blood urea and creatinine level for such patients before the renography did. Biochemical investigation like urea, creatinine etc, could not evaluate separately the functional status of individual kidney. Serum creatinine levels provide only a very gross indication of renal capacity. Only when more than half of glomerular function is lost does the

creatinine level change appreciably.⁴ It is well practiced among some clinicians that if biochemical study is normal they take it as normal for whole renal functional status even if there is functional impairment.⁵ Renogram technique is a very sensitive and non-invasive procedure for the renal function evaluation. In case of radionuclide renography, mild to severe renal insufficiency found in 85.50% cases in contrast to biochemical test where increased blood urea/ serum creatinine found in 37.30% cases.⁵ In our series, we found mild to severe renal insufficiency in 87.64% cases (single & bilateral) by renography whereas 30.91% cases found in biochemical test. A significant correlation found in this case.

Renal obstructive cases found more in the age range between 31 to 60 years. It was seen that the left kidneys were more affected than that of the right kidneys. Gross renal functional impairment was observed in 32.45% cases. These findings strongly correlated with our previous study.⁶ Available USG, X-ray, TVU, TC, DC, ESR and Hb% findings were also correlated well with renogram. Renal diseases like renal stone, acute glomerulonephritis (AGN), ureteric stone, renal abscess, chronic renal failure (CRF), end stage renal disease (ESRD) and renal trauma were found in most of the cases. Nephrons in both kidneys can able to maintain normal serum urea, creatinine level but still there is functional loss of affected kidney. So the biochemical study gives the false normal result regarding functional loss of individual kidney.⁷ The mean serum creatinine level monitored 1.4 ± 0.24 , 1.9 ± 0.28 , 7.76 ± 2.35 mg/dl and urea level 33.65 ± 8.50 , 49 ± 9.85 , 145.64 ± 50.45 mg/dl respectively for mild, moderate and severe renal insufficiency. Our findings were correlated well with the study.⁸ One of the more common causes of kidney trauma is injury can be serious and sometimes easily lead to death. In making this diagnosis, special USG might be needed for confirmation.

Conclusion

Our study revealed that radionuclide renography is specific, readily available, and noninvasive and is more reliable for the evaluation of renal functional

status. A comparative finding in the study focuses the importance of renogram technique over biochemical test in the evaluation of individual kidney function with maximum accuracy. Therefore, renogram should be used as a initial preferable technique for the diagnosis of renal differential function.

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