



Case Report

Perirenal Lucency (Kidney Sweat) A New Sign of Renal Failure

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Abstract

This prospective study was designed to find out the sensitivity, specificity and predictive values of ("kidney sweat") sign in the sonographic diagnosis of renal failure and carried out in the department of radiology and imaging BIRDEM, Dhaka and BSMMU, Dhaka. For this purpose 146 patients referred for renal sonogram were examined. Out of which 50 patients did not have clinical or laboratory evidence of renal failure and did not show "Kidney sweat" sign (Perirenal hypoechoic rim) in their sonogram. In this work out of 96 renal failure patients eleven (11.46 percent) showed "Kidney sweat" sign in their sonogram. This might be an additional sonographic finding of chronic renal failure patients.

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Introduction

Chronic renal failure (CRF) is irreversible in renal function, the ensuing impairment of the excretory, metabolic and endocrine functions of the kidney leads development of the clinical syndrome of uremia. CRF may be cause by any condition which destroys the normal structure and function of the kidney. In many patients the condition progresses insidiously over a number of years and frequently it is possible to determine the underlying renal disease¹.

Acute renal failure (ARF) is characterized by an acute and usually irreversible deterioration of renal function, which develops over a period of days or rarely weeks & results in uremia. A marked reduction in urine volume is usual but not invariable. Renal failure is diagnosed by clinical findings, biochemical values and histopathological correlation¹.

Ultrasonography (USG) examination of the kidney permits identification of the cortex, medulla and

arcuate vessels within the renal parenchyma and the calyces and renal pelvis within the renal sinus. This ability to visualize normal renal anatomy has enhanced the value of ultrasound as a complement to the standard urologic studies. This modality is also considered as an accurate tool to evaluate renal size. Unlike urography sonogram dose not suffer the disadvantage of magnification². As a rule of thumb, 9 cm may be taken as the lower limit of normal bipolar renal diameter corresponding to a urographic measurement of 11.0-11.5³.

Contrast medium used in intravenous urography (IVU) is more or less nephrotoxic. Contrast-medium-nephrotoxicity (CMN) is a condition in which an impairment in renal function (an increase in serum creatinine by more then 25% or 44 u mol/L occurs within three days following the intravascular administration of a contrast medium (CM) in the absence of an alternative etiology⁴.

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Sonography of the kidney plays an important role in the examination of the patients with renal failure. It is also used to examine patients for obstruction as a cause of or contributing factor to renal failure. In patients with renal parenchymal disease, the kidneys may be small and show increased echogenicity through out the renal parenchyma, with loss of cortico-medullary differentiation. Sonography is quick, inexpensive and harmless and portable equipment is available to investigate seriously ill patients.

On the basis of above facts, it has been hypothesized in the present study that, perirenal lucency or Kidney sweat” sign is a specific additional sonographic finding in patients with renal failure

Materials and Methods

This prospective study was comprised of 146 patients from 15 years to 76 years of age referred for ultrasonography (USG) examination of renal system. Out of these 146 patients 50 did not have clinical or laboratory evidence of renal failure (RF). Rest of the 96 patients revealed clinical and laboratory (Serum creatinine) level ≥ 2 mg/dl findings of renal failure were included in this study.

This study has been conducted in the Department of Radiology & Imaging, BIRDEM with the help of Department of Radiology & Imaging, BSMMU, Dhaka.

Sonograms of all the patients were performed by siemens sonoline SL-1 real time Scanner. Selection of probe and frequency was dependent on the physical built of the patient and according to this 2.5 and 3.5 MHz transducers were used.

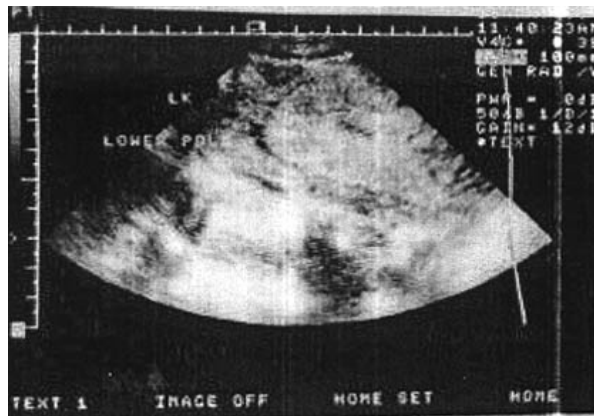
all the statistical analysis was performed by simple statistical methods.

Results

The study included 146 patients who underwent ultrasonogram examination for KUB region, of which 96 (65.75%) were renal failure (RF) and 50 (34.25%) were non-renal failure. Out of 96 patients of renal failure 11 (11.46%) patients showed the ‘kidney sweat’ sign in their sonograms and in non renal failure group (n=50) none

revealed this sign, this deference was statistically significant ($P < .05$).

Kidney sweat sign was not found related to age & sex of the patients statistically. It has also no relation with small kidney or association of ascites.



Renal scan of CRF with kidney sweat sign.

In this study shows with increasing serum creatinine level percentage of halo sign is increasing and this is shown in Table I.

Table I: Distribution of “kidney sweat” sign in relation to serum creatinine level

Serum creatinine level (mg./dl)	No of patients	percentage	kidney sweat sign	percentage
2-4	51	53.13	5	9.80
>4 to 6	18	18.75	2	11.11
>6	27	28.12	4	14.81
Total	96	100%	11	(11.46)

“Kidney sweat” is valuable diagnostic sign in the diagnosis of renal failure. The sensitivity, specificity, positive predictive value (PPV), negative predictive values (NPV) were 11.46%, 100%, 100%, 37.03% respectively. This results are shown in Table II.

Table II: Shows the sensitivity, specificity, PPV, NPV of ‘Kidney sweat’ sign in renal failure patients (n=96)

Diagnostic accuracy	Percentage
Sensitivity	11.46%
Specificity	100%
PPV	100%
NPV	37.03%

Discussion

Ultrasonography has maintained a prominent role in uro-radiology. Sonographic diagnosis of renal parenchymal disease is bases on, among other findings, renal size. Cortico-medullary differentiation and echotexture related to adjacent organs. In addition to this findings an extracapsular hypoecghoic rim, (Kidney sweat” sign) may also present in renal failure.

In this study out of ninety six RF patients ‘kidney sweat’ sign was present in eleven cases (11.46 percent). Out of eleven, six were male and five were female. This findings almost to the findings of patients in chronic renal failure.⁵ In their study ‘kidney sweat’ sign was found in fourteen percent patients of renal failure.

In the present series it was observed that presence of ‘kidney sweat’ sign in renal failure patients did not correlate with the age of the patient. This finding is well matched with the observation of patients in chronic renal failure⁵.

In this study 45-84 percent patients were female and 54.16 percent were male, Presence of ‘kidney sweat’ sign observed in this study had no male or

female preponderance. This findings is also consistent with the findings of patients in chronic renal failure.⁵

The main purpose of the present study was to evaluate the new sonographic findings in renal failure patients: Perirenal lucency or halo sign or ‘kidney sweat’ sign. It was observed that this newly recommended sonographic sign renal failure was 11.6 percent sensitive, and 100 percent specific. Its positive predictive value was 100 percent and negative predictive value 27.03 percent. Thus ‘kidney sweat’ sign is an additional sonographic findings in patients with renal failure.

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