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## Original Article

### Assessment of Renal Stones with the help of Ultrasonography (USG) - A Diagnostic Study

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#### ABSTRACT:

**Background:** Renal stones are clinical disorder affecting up to 5% of the general population in the world. The present study was conducted to determine the cases of renal stones with USG. **Materials & Methods:** The present study was conducted on 58 cases of renal stones of both genders. General information such as name, age, gender etc was recorded. In all patients, symptoms, age wise distribution etc. were recorded. All were subjected to USG following standardized diagnostic procedure. **Results:** Out of 58 patients, males were 30 and females were 28. The difference was non- significant (P= 1). Age group 20-30 years had 7 males and 9 females, 30-40 years had 13 males and 12 females and 40-50 years had 10 males and 7 females. The difference was non- significant (P= 0.5). Common symptoms in males were pain in kidney in 25 males and 22 females, haematuria in 16 males and 14 females, dysuria in 12 males and 10 females and fever/ chills in 24 males and 21 females. The difference was significant (P< 0.05). Early calculi had pixel size of 22.1, medium had 25.3 and large calculi had 27.1. The difference was non- significant (P= 1). **Conclusion:** In present study maximum cases were seen in males as compared to females. USG is useful in detection of renal stones. Early diagnosis is essential to prevent complications.

**Key words:** Dysuria, Renal stones, USG.

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## INTRODUCTION

Renal stones are clinical disorder affecting up to 5% of the general population in the world. Stones in kidney and urethra are common nowadays. The prevalence of renal stone disease has been rising in both sexes. Renal stones are usually believed to be due to crystallisation of minerals inside urine, which act as the nidus for more sedimentation and finally the formation of a stone within the kidney. Calculi are due to abnormal collection of certain chemicals like oxalate, phosphate and uric acid.<sup>1</sup>These calculi can be present in kidney, urethra or in urinary bladder. A seasonal variation is also seen with high urinary calcium oxalate saturation in men during summer and in women during early winter. Stones form twice as often in men as women. The peak age in men is 30 years; women have a bimodal age distribution, with peaks at 35 and 55 years. Once a kidney stone forms, the probability that a second stone will form within five to seven years is approximately 50%.<sup>2</sup>The detection of renal stones is very crucial. Careful radiographic analysis is required for

the betterment of the patients. Ultrasonography (USG) is a diagnostic tool widely used in the detection of cases of renal stones. Ultrasonography is often preferred over other medical imaging modalities because it is noninvasive, portable, and versatile, it does not use ionizing radiations, and it is relatively low cost. However, the main disadvantage of medical ultrasonography is the poor quality of images, which are affected by multiplicative speckle noise.<sup>3</sup>The present study was conducted to determine the cases of renal stones with USG.

## MATERIALS & METHODS

The present study was conducted in the department of Radiodiagnosis. It comprised of 58 cases of renal stones of both genders. All were informed regarding the study and written consent was obtained. Ethical clearance was obtained prior to the study. General information such as name, age, gender etc was recorded. In all patients, symptoms, age wise distribution etc. were

recorded. All were subjected to USG following standardized diagnostic procedure. Results thus obtained were subjected to statistical analysis using chi-square test. P value less than 0.05 was considered significant.

**RESULTS**

**Table I distribution of patients**

Males	Females
30	28

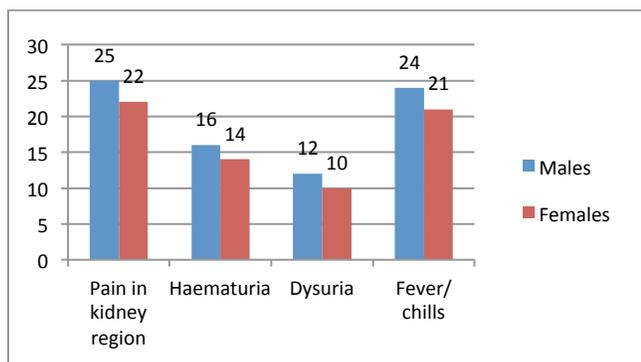
Table I shows that out of 58 patients, males were 30 and females were 28. The difference was non-significant (P= 1).

**Table II Age wise distribution of patients**

Age group	Males	Females	P value
20-30 years	7	9	0.5
30-40 years	13	12	
40- 50 years	10	7	
<b>Total</b>	<b>30</b>	<b>28</b>	

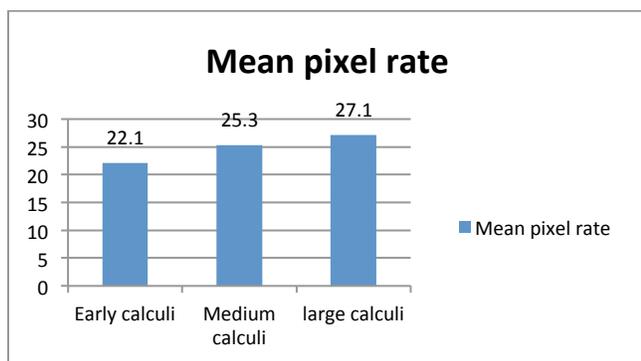
Table II shows that age group 20-30 years had 7 males and 9 females, 30-40 years had 13 males and 12 females and 40-50 years had 10 males and 7 females. The difference was non-significant (P= 0.5).

**Graph I Symptoms in patients**



Graph I shows that common symptoms in males were pain in kidney in 25 males and 22 females, haematuria in 16 males and 14 females, dysuria in 12 males and 10 females and fever/ chills in 24 males and 21 females. The difference was significant (P< 0.05).

**Graph II Distribution of cases based on pixel rate**



Graph II shows that early calculi had pixel size of 22.1, medium had 25.3 and large calculi had 27.1. The difference was non-significant (P= 1).

**DISCUSSION**

Kidney stones are broadly categorized into calcareous stones which are radio-opaque and non-calcareous stones. Investigators found that formation of kidney stones is a result of a nanobacterial disease akin to Helicobacter pylori infection and peptic ulcer disease. Nanobacteria are small intracellular bacteria that form a calcium phosphate shell (an apatite nucleus) and are present in the central nidus of most (97%) kidney stones and in mineral plaques (Randall's plaques) in the renal papilla. Further crystallisation and growth of stone are influenced by endogenous and dietary factors.<sup>4</sup>In present study, out of 58 patients, males were 30 and females were 28. We found that age group 20-30 years had 7 males and 9 females, 30-40 years had 13 males and 12 females and 40-50 years had 10 males and 7 females. This is similar to Sanjuta et al.<sup>5</sup>Michael et al<sup>6</sup> in their study found that 71 stones were present in 41 patients, including 47 intrarenal stones, 5 stones in the renal pelvis, 8 stones at the ureteropelvic junction, 5 ureteral stones and 12 stones at the ureterovesical junction. Based upon gray scale sonography, the diagnosis of stone was made with confidence in 66% of locations. Based upon Doppler sonography using the twinkling sign, the diagnosis of stone was made with confidence in 97% of locations. Chronic metabolic acidosis can result in protein metabolism and thus increased excretion of urate and formation of kidney stones. Pure uric acid stones are rare but recur frequently.

Low urinary pH is the most common and important factor in uric acid nephrolithiasis in normouricosuric stone disease the primary defect seems to be in the renal excretion of ammonia and is linked to an insulin resistant state. We founds that common symptoms in males were pain in kidney in 25 males and 22 females, haematuria in 16 males and 14 females, dysuria in 12 males and 10 females and fever/ chills in 24 males and 21 females. Similar findings were seen in study by Sheofor et al.<sup>7</sup>Other factors leading to renal stones are family history of kidney stones, insulin resistant states, a history of hypertension, primary hyperparathyroidism, a history of gout, chronic metabolic acidosis and surgical menopause. Pure uric acid, cystine and infection stones are less common. Although composition of each stone correlates with supersaturation values in the urine, calculi are seldom found without an admixture of many salts and not every passed stone can be retrieved for chemical analysis.

Patients may have multiple stones and in case of persistence of small and unobstructive calculi after spontaneous elimination or surgical removal, the calculi might not present exactly the same admixture as the voided or removed ones.<sup>8</sup>In this study we found that early calculi had pixel size of 22.1, medium had 25.3 and large calculi had 27.1. Rahmouni et al<sup>9</sup>. suggested that the artifact could be influenced by ultrasonic beam attenuation of tissues interposed between the probe and a calcification. Vasenet al<sup>10</sup> reported that 3 of 22 renal stones and 4 of 18 ureteral stones did not show any twinkling sign. They suggested that ureteral stones may be influenced more than renal stones by ultrasonic attenuation of interposed tissues because the ureter is deep-seated below abundant fatty tissue without a proper acoustic window.

## CONCLUSION

In present study maximum cases were seen in males as compared to females. USG is useful in detection of renal stones. Early diagnosis is essential to prevent complications.

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