

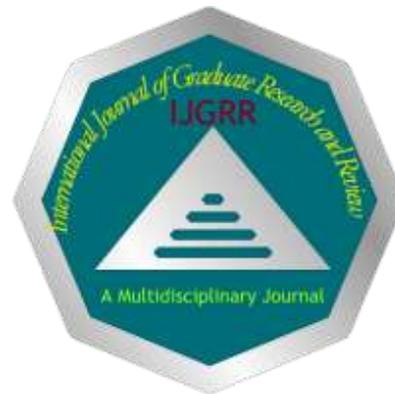


ISSN: 2467-9283

INTERNATIONAL JOURNAL OF GRADUATE RESEARCH AND REVIEW

Indexing & Abstracting

Open Academic Journals Index (OAJI), InfoBase Index, Cosmos, ResearchGate, CiteFactor, Scholar Stear, JourInfo, ISRA: Journal-Impact-Factor (JIF), Root Indexing etc.



Impact Factors*

IBI factor: 3

Impact factor (OAJI): 0.101

*Kindly note that this is not the IF of Journal Citation Report (JCR)

Vol-5, Issue-2

May 2019



Sonographic Association of Renal Stones in Adults with Family History

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Abstract

Background: Renal stones are a stand out amongst the most widely recognized persistent kidney disease in Adults. Long term inconvenient consequences for the kidneys of the adult is one of the significant reasons for mortality. Ultrasonography (US) can recognize 90% of stones present in the kidney; although the sensitivity for distinguishing ureteral calculi and smaller calculi (<5mm) is poor. Ultrasonography is quite often a decent introductory decision and, in uncomplicated circumstances, might be all that is required. **Objectives:** To Determine the sonographic Association of Renal Stones in Adults with Family History. **Materials and Methods:** Cross sectional analytical study were carried out at the Department of Radiology in Mansorah Hospital Lahore, Pakistan. Duration of study were from April 2018 to Sep 27, 2018. 100 adults coming to the radiology department. Transabdominal ultrasound was carried out in supine position. All data was analysis by Statistical Software for Social Sciences (SPSS version 24). Mean and standard deviation (SD) were calculated for continuous variables. Frequency and percentages were calculated for continuous variables. **Results:** Total number of patients taken in this study were 100. Among them, patients with renal stones were 81(80.2%). There were 56(55.4%) females and 45(44.6%) were males. In 12(11.9%) stones were present in both kidneys, 30(29.7%) stones were present in left kidney and 46(45.5%) stones were present in the right kidney. In 21(20.8%) patients, hematuria is absent and in 80(79.2%) patients, hematuria is present. Patients with a positive family history were 81 (80.2%) and those with negative family history were 20(19.8%). The mean age was 36.18. **Conclusions:** Ultrasound is a valuable diagnostic imaging technique for the assessment of kidney stones in the patients having flank pain. It is very reliable in the diagnosis of renal stones in adults.

Keywords: right kidney, left kidney, ultrasound, nephrolithiasis, autosomal dominant polycystic kidney disease.

Introduction

The term nephrolithiasis refers to the formation and passage in the urinary tract of crystals called stones or calculi. Renal calculi are crystalline structures composed most commonly of calcium oxalate salts. They form when the concentrations of these ions, as well as solutes such as hydrogen ions, sodium ions and uric acid are present in the filtrate in higher than normal amounts. Renal calculi are crystalline

structures composed most commonly of calcium oxalate salts. They form when the concentrations of these ions, as well as solutes such as hydrogen ions, sodium ions and uric acid are present in the filtrate in higher than normal amounts. The prevalence is increasing due to environmental cause and genetic predisposition (Bhalla *et al.*, 2010). When both genders are analyzed separately, female patients tend to have higher rate of family history positivity than male. On an average 6% woman and 12% men are affected with

Cite this Article as:

V. Zulfiqar et al. (2019) Int. J. Grad. Res. Rev. Vol 5(2): 166-170.

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Peer reviewed under authority of IJGRR

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renal stone. Positive family history has been reported to be present in 17–37% of patients with stone disease when compared with 4–22% of normal healthy control subjects. The overall incidence of positive family history in stone-forming patients is 27%. Approximately 75 percent of patients with nephrolithiasis form calcium stones, most of which are composed primarily of calcium oxalate or, less often, calcium phosphate (Coe *et al.*, 2011). The scanning method is essential for the demonstration of renal masses with Ultrasound. Renal parenchyma should be scanned in different positions of the patient, including supine, lateral decubitus, and sometimes oblique or prone positions. The renal mass must be evaluated using an appropriate central area (Farooq *et al.*, 2018). About half of the people have the tendency to develop another stone within 10 years after the development of the first renal stone. About 1%–15% of people affect with the renal calculi globally at any point in their lives and according to a survey in 2015, 22.1 million cases are found and become a cause of death in 16,100 worldwide (Manzoor *et al.*, 2018; Farooq *et al.*, 2018). The renal stones are more commonly found in the Western world since 1970 and men are affected more as compared to women (Male gender tend to be afflicted by the disease at younger ages than females, which is more pronounced for the cases revealing a positive family history. This finding is important because the involvement of one or more members of the family with stone disease may be a good predictor for the onset of the disease at younger ages in next generations. Evaluation of the patients with positive family history clearly show that these patients tend to have higher recurrence rates in relatively shorter periods. Patients with positive family history have more than two stone episodes at the same period which is significantly higher than the patients without any family history. Early onset of urinary stone formation along with the frequent stone episodes in such cases may make the positive family history predictive of the course of the stone disease and, therefore, these patients should be followed up closely to prevent future recurrences. Renal stones may contain various combinations of chemicals. The most common type of stone contains calcium in combination with either oxalate or phosphate. These chemicals are part of a person's normal diet and make up important parts of the body, such as bones and muscles (Curhan *et al.*, 2010). Renal replacement lipomatosis is a severe loss of renal parenchyma with massive deposition of fat and fibrous tissue in the sinus and the peri renal space (Bacha and Gilani, 2017). A less common type of stone is caused by infection in the urinary tract. This type of stone is called a striate or infection stone. Much less common are the uric acid stone and the rare cystine stone (Schlechte, 2012). A person with a family history of renal stones may be more likely to develop stones. Urinary tract infections, kidney disorders such as cystic kidney diseases, and certain metabolic disorders such as are also linked to stone formation. In addition, more than

70 percent of people with a rare hereditary disease called renal hyperparathyroidism bular acidosis develop kidney stones (Stamatelou *et al.*, 2013). Hypercalciuria is inherited, and it may be the cause of stones in more than half of patients. Calcium is absorbed from food in excess and is lost into the urine (Portis and Sundaram, 2011). This high level of calcium in the urine causes crystals of calcium oxalate or calcium phosphate to form in the kidneys or elsewhere in the urinary tract. Other causes of renal stones are hyperuricosuria (a disorder of uric acid metabolism), gout, excess intake of vitamin D, and blockage of the urinary tract. Certain diuretics (water pills) or calcium-based antacids may increase the risk of forming renal stones by increasing the amount of calcium in the urine (Curhan *et al.*, 2011). Calcium oxalate stones may also form in people who have a chronic inflammation of the bowel or who have had an intestinal bypass operation, or ostomy surgery (Taylor *et al.*, 2014). As mentioned above, struvite stones can form in people who have had a urinary tract infection. Usually, the first symptom of a renal stone is extreme pain. The pain often begins suddenly when a stone moves in the urinary tract, causing irritation or blockage (Lemann Jr *et al.*, 2016). Typically, a person feels a sharp, cramping pain in the back and side in the area of the kidney or in the lower abdomen. Sometimes nausea and vomiting occur. Later, pain may spread to the groin. Sometimes "silent" stones--those that do not cause symptoms--are found on x-rays taken during a general health exam. These stones would likely pass unnoticed (Saucier *et al.*, 2010). More often, kidney stones are found on an x-ray or sonogram taken on someone who complains of blood in the urine or sudden pain in flank. These diagnostic images give the doctor valuable information about the stone's size and location. Blood and urine tests help detect any abnormal substance that might promote stone formation. Ultrasonography is the procedure of choice for the visualization and diagnosis of renal stones. It is our routine observation that renal stones are commonly associated with family history. This research is therefore intended to determine association of renal stones with family history by sonography. It will add useful information to the medical sciences on one hand and on the other hand physician will be able to determine high risk individuals. Moreover, it will help improve differential diagnosis for flank pain. (Frassetto and Kohlstadt, 2014).

Material and Methods

Cross Sectional Descriptive study was carried out at the Department of Radiology in Mansorah Hospital Lahore, Pakistan. Duration of study was from April 2018 to Sep 27, 2018. Mindray 1100 with convex probe of 5 to 7Mhz. Transabdominal ultrasound was carried out in supine position. In larger patients' decubitus positioning with intercostal scanning is more helpful.

Data will be evaluated and analyzed with Statistical Software for Social Sciences (SPSS version 24), Microsoft Excel 2013. Descriptive analyses will be performed to investigate the distribution of data. Mean and standard deviation (SD) will be calculated for continuous variables. Frequency and percentages will be calculated for categorical variables

Results

Total number of patients taken in this study were 100. Among them, patients with renal stones were 81(80.2%).

There were 56(55.4%) females and 45(44.6%) were males (Table 1). In 12 (11.9%) stones were present in both kidneys, 30 (29.7%) stones were present in left kidney and 46 (45.5%) stones were present in the right kidney (Table 3 & 4). In 21 (20.8%) patients, hematuria is absent and in 80(79.2%) patients, hematuria is present. Patients with a positive family history were 81 (80.2%) and those with negative family history were 20(19.8%) (Table 2). The mean age was 36.18. Fig. 1 shows ultra-sonogram carried out in supine position of kidney



Fig. 1: Ultra sonogram carried out in supine position of kidney

Table 1: Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Female	56	55.4	55.4	55.4
Male	45	44.6	44.6	100.0
Total	101	100.0	100.0	

Table 2: History

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid No	20	19.8	19.8	19.8
Yes	81	80.2	80.2	100.0
Total	101	100.0	100.0	

**Table 3:** Frequency and percentage of side of stone

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Both	12	11.9	11.9	11.9
Left	30	29.7	29.7	41.6
No	13	12.9	12.9	54.5
Right	46	45.5	45.5	100.0
Total	101	100.0	100.0	

Table 4: Frequency and percentage of stone

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Absent	12	11.9	11.9	11.9
Present	89	88.1	88.1	100.0
Total	101	100.0	100.0	

Discussion

It was a cross-sectional analytical study. The main aim of my research was to evaluate the sonographic association of renal stones in adults with family history. Renal stones are the formation of stones in the kidney. Imaging is frequently used to direct the diagnosis and management of renal stones. The choice for assessing the renal stones include KUB x-rays films intravenous cystourethography (IVUP), Ultrasound and CT. My study included 100 patients with complain of flank pain. The mean age of patients was 36.19. Males and females both were included in the study. 88.1% patients had stones out of 100%. All the patients had flank pain. In the cross sectional study conducted by Mohammad Reza Tamadon *et al.* (2013), 102 male patients with kidney stones and 121 healthy control subjects were evaluated. The mean (\pm SD) age of patients was 42.5 ± 14.1 years and the controls were 42.8 ± 16.1 and showed no significant difference ($P = 0.870$). Twenty-seven (26.5%) of the patients with stones and eighteen (14.9%) of the control group were current cigarette smokers. Findings showed that smoking significantly increases the risk of nephrolithiasis (OR = 2.06, 95% CI: 1.06-4.01, $P = 0.034$). There was no significant difference in the number of cigarettes smoked ($P = 0.830$) and years of smoking ($P = 0.536$) between subjects with and without stones ($P = 0.536$). In another study conducted by E Tatar, sixty-five solitary kidney patients were included. The remaining kidneys after indication nephrectomy (IN) were evaluated with urinary system ultrasound. The primary outcome of the study is the progression of kidney failure during follow-up which was defined as: 25% decrease in glomerular filtration rate (GFR)

and / or the need for renal replacement therapy (RRT) (Tatar *et al.*, 2017).

The mean age of the patients was 55 ± 14 years and mean follow-up was 53 ± 27 months. Renal cysts were present in 30.7% of patients. 33.8 percent of patients had kidney disease progression and 10.7 % required RRT. Those with progressive disease were older (61 ± 13 , 52 ± 14 ; $P = 0.011$), had lower baseline GFR (30 ± 11 , 39 ± 18 ; $P = 0.035$), higher proteiuria (2.84 ± 0.58 , 2.47 ± 0.57 ; $P = 0.031$) and frequently harboring cysts in the solitary kidney (52.3%, 20.4%; $P = 0.006$). Progression to kidney failure and RRT requirement in cases with or without renal cysts was (60% vs. 22%; $P = 0.004$) and (20% vs. 6.6%; $P = 0.123$), respectively. Acquired cysts in solitary kidney was independently associated with progression to kidney failure and RRT respectively (Exp(B) 3.173; $P = 0.01$ and Exp(B) 12.35; $P = 0.04$) (Tatar *et al.*, 2017).

Conclusions

Ultrasound is a valuable diagnostic imaging technique for the assessment of kidney stones in the patients having flank pain. It is very reliable in the diagnosis of renal stones in adults. It is therefore ultrasound is recommended for adults having flank pain. So it is concluded that among one hundred patients with flank pain, eighty –nine have renal stones. Mostly renal stones were present in right kidney. Males were more involved in this disease.

References

- Bhalla V, Grimm PC, Chertow Bacha R and Gilani SA (2017) Ultrasound Diagnosis of Spontaneous Nephrocutaneous Fistula. *Ultrasound quarterly* 33(4): 293-295.



- Coe FL, Parks JH and Asplin JR. (2011) The pathogenesis and treatment of kidney stones. *New England Journal of Medicine* **327**(16): 1141-1152.
- Curhan GC, Willett WC, Rimm EB and Stampfer MJ (2010) A prospective study of dietary calcium and other nutrients and the risk of symptomatic kidney stones. *New England Journal of Medicine* **328**(12): 833-838.
- Curhan GC, Willett WC, Speizer FE and Stampfer MJ (2011) Twenty-four-hour urine chemistries and the risk of kidney stones among women and men. *Kidney international* **59**(6): 2290-2298.
- Farooq SM, AzeemShams RM, Rubab U, Jabbar H. (2018) The prevalence of acquired renal cystic disease by ultrasound in adults of Lahore city. *AJAHS* **3**(2): 24-28
- Frassetto L and Kohlstadt I. (2011) Treatment and prevention of kidney stones: an update. *American family physician* **84**(11): 1234.
- GM and Pao AC (2010) Melamine nephrotoxicity: an emerging epidemic in an era of globalization. *Kidney International* **75**(8): 774-779.
- Lemann Jr J, Pleuss JA, Worcester EM, Hornick L, Schrab D and Hoffmann RG (2016) Urinary oxalate excretion increases with body size and decreases with increasing dietary calcium intake among healthy adults. *Kidney International*. **49**(1): 200-208.
- Manzoor I, Bacha R, Gilani SA, Malik SS, Fatima M, Farooq F and Ashraf R. (2018) Sonographic evaluation of urolithiasis formation with positive family history in the population of Lahore. *Journal of medical ultrasound* **26**(4): 181.
- Portis AJ and Sundaram CP (2011) Diagnosis and initial management of kidney stones. *American family physician* **63**(7): 1329-1340.
- Saucier NA, Sinha MK, Liang KV, Krambeck AE, Weaver AL, Bergstralh EJ, et al. (2010) Risk factors for CKD in persons with kidney stones: a case-control study in Olmsted County, Minnesota. *American Journal of Kidney Diseases* **55**(1): 616-8.
- Schlechte J (2012) A Prospective Study of Dietary Calcium and other Nutrients and the Risk of Symptomatic Kidney Stones. *The Endocrinologist* **3**(5): 375.
- Stamatelou KK, Francis ME, Jones CA, Nyberg LM and Curhan GC (2013) Time trends in reported prevalence of kidney stones in the United States: 2012. *Kidney International* **63**(5): 1817-1823.
- Tamadon MR, Nassaji M and Ghorbani R. (2013) Cigarette smoking and nephrolithiasis in adult individuals. *Nephro-urology monthly* **5**(1): 702-705.
- Tatar E, Ozay E, Atakaya M, Yeniay PK, Aykas A, Okut G, Yonguc T, Imamoglu C and Uslu A. (2017) Simple renal cysts in the solitary kidney: Are they innocent in adult patients? *Nephrology* **22**(5):361-365.
- Taylor EN, Stampfer MJ and Curhan GC (2014) Dietary factors and the risk of incident kidney stones in men: new insights after 14 years of follow-up. *Journal of the American Society of Nephrology* **15**(12): 3225-3232.