

# The Prevalence of Acquired Renal Cystic Disease by Ultrasound in Adults of Lahore City

S. Muhammad Yousaf Farooq<sup>1\*</sup>, Rana Muhammad Athar Azeem Shams<sup>1</sup>, Umm-e-Rubab<sup>1</sup>, Hamza Jabbar<sup>1</sup>

<sup>1</sup>University Institute of Radiological Sciences and Medical Imaging Technologies,  
The University of Lahore, Lahore, Pakistan

\*yousafgelani@gmail.com

## Abstract:

Thin-walled, anechoic fluid-filled sacs that are formed in the kidneys are simple renal cysts and those are abnormal findings. Simple renal cysts are different from the adult polycystic renal disease.

## Objective:

To determine the prevalence of acquired renal cystic disease by ultrasound in adults of Lahore City.

## Methods:

A Cross sectional study was conducted at Gilani Ultrasound Clinic, The University of Lahore Teaching Hospital and Jamiat Hospital, Gulshan e Ravi Lahore. All the adult patients above 18 years of age suffering with renal disease were included. Ultrasound machine Honda 2000 HS was used to perform this research to access the prevalence of acquired renal cystic disease in adults of Lahore City. Renal cyst was evaluated trans-abdominally by using curved array multi-frequency probe 2.5 to 5MHz.

## Results:

17250 patients visited in six months, among which 2760 patients came with renal diseases. The prevalence of renal cystic disease was 2.5%. Renal cystic disease was found in 69. The age between 36-55 years was more involved.

## Conclusions:

Most common cyst found was cortical cyst. Females were more involved in this disease than males. Study concluded that high blood pressure, hypertension and diabetes cause renal cysts. The prevalence of renal cysts increases with age and showed a remarkable difference in

type of cysts.

## Key words:

Ultrasound, Renal Cyst, Hypertension, Cortical Cyst

## Introduction:

Renal cyst is a membranous sac or cavity of abnormal nature in the body, containing liquid. They may be classified into "simple" or "complex." Simple cysts are best defined using sonographic standards.<sup>1</sup> The cyst is confidently characterized at ultrasound when it is anechoic, having a sharply defined imperceptible back wall is round or ovoid and enhances sound transmission. Sonography findings of complex cyst on ultrasound are: they may appear as round, oval or irregular shaped hypo echoic fluid-filled lesion infected cyst, Thick wall with scattered internal echoes  $\pm$  debris-fluid level representing pus.<sup>2</sup> The most common renal mass is a simple cyst. They are benign and fluid filled.

Their exact cause is unknown and most of them are without symptoms and may be solitary or multiple.<sup>3</sup> Cortical cyst, medullary cyst, para pelvic cyst, peri pelvic cyst and parenchymal cyst are types of renal cysts. Simple cortical cysts are the most kidney masses with a smooth thin capsule and a round appearance cover anechoic fluid. Posterior enhancement caused by cyst due to reduction of attenuation of the ultrasound within the cyst fluid. Simple cyst does not require further evaluation because it is a benign lesion.<sup>4</sup> Bladder collects urine until it is filled and the urine is removed from the body.<sup>5</sup> 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. Simple kidney cysts will be better represented by simple harmonic tissue imaging.<sup>6</sup> Simple cyst is a most common renal mass. They are fluid filled and benign. The exact development of this disease is unknown although they are probably acquired lesions and most of them are asymptomatic and may be solitary or multiple.<sup>7</sup> Complex cysts not have the strict ultrasound standard of a simple kidney cyst. Cystic nature in 50% of these lesions can be confirmed with the help of ultrasound especially if the lesion is larger in size.<sup>8</sup> The renal cysts which have milk of calcium will show different lay erring, dependent and echogenic material that could be moveable. Cysts with Milk of calcium are always benign. On ultrasound the ring down with bright echogenic foci, can be seen on septa and in the cyst walls.<sup>9</sup> Peri pelvic cysts are common and have been described as renal sinus cyst, para pelvic lymphatic cyst, para pelvic cyst<sup>10</sup>. ARPR disease is characterized by varying degrees of nephropathy and hepatic venous pressure gradient as a result of renal collecting tubules dilatation, periportal fibrosis and enlargement of biliary radicals.<sup>11</sup> In its extreme form, after birth kidney disease preponderance demonstrates itself immediately with the early difficulty of severe pulmonary failure. The diagnosis may be made at neonatal or fetal ultrasound. Bilaterally the renal are enlarged, Potter's facies and pulmonary complications may be encountered.<sup>12</sup> Parenchyma of the renal replaced by cyst are called parenchymal cyst. Parenchymal cyst of the renal is an innate or acquired lesion of the organ, which is characterized by the formation of the chamber directly in the renal tissue parenchyma. Hence the name of the disease is the parenchymal cyst. The cyst cavity is filled with contents mostly with serous. In appearance and composition, the serous content of the renal cyst resembles a blood plasma. It happens that in

the renal a solitary single cyst is formed, and there may be multiple cysts.<sup>13</sup>

The study conducted by Tatar E *et al.*, showed that simple renal cysts in solitary renal patients with impaired renal function was associated with poor renal outcome.<sup>14</sup> A study conducted by Gamaraddin MB and Babiker MS, showed that gender and age were remarkable risk factors of kidney cysts Ultrasound plays an important role to assess and classify kidney cysts.<sup>15</sup> Terada N *et al.*, concluded that the prevalence of kidney cysts increases with age and showed a significant difference in incidence by gender. Kidney cysts increases in number and size, and grow more rapidly in young patients.<sup>16</sup> Al-Said J *et al.*, showed that the presence of kidney cysts, was associated with decrease in kidney function. In older patients this relationship may be obscured by the reduced kidney function and the high incidence of cysts. According to their results the acquired kidney cystic disease begin early in kidney disease.<sup>17</sup>

The aim of study was to provide the prevalence of cystic kidney in the studied population. The study proves that the prevalence of kidney cystic disease was 2.5%. It also reveals that the prevalence of kidney cystic disease was more in females than males.

#### Methods:

A cross sectional study was conducted at Gilani Ultrasound Clinic, The University of Lahore Teaching Hospital and Jamiat Hospital, Gulshan e Ravi Lahore. All the adult patients above 18 years of age suffering with renal disease were included. Ultrasound machine Honda 2000 HS was used to perform this research to access the prevalence of acquired renal cystic disease in adults. Renal cyst was evaluated trans-Abdominally by using curved array multi-frequency probe 2.5 to 5MHz.

#### Results:

According to Table 1, among 2760 patients, the prevalence of renal cystic disease was 2.5% and renal cystic disease was found in 69.

Sr. No	Patients	Frequency	Percentage (%)
1	Patient without renal Cyst	2691	97.5
2	Patient with Renal Cyst	69	2.5
Total		2760	100.0

**Table 1:** Patients with and without renal cyst

The age range more involved in cyst was between 36-55 years and persons under 35 years were less involved in renal cysts. The mean age was 53.0. Females were more involved than males. 36(52.2%) females were involved and 33 (47.8%) males were included in this study as shown in Table 2.

Gender	Frequency	Percentage (%)
Female	36	52.2
Male	33	47.8
Total	69	100.0

**Table 2:** Gender distribution in renal cystic disease

According to Table 3, the cortical cysts were very common in this study. Cortical cyst present in 28 (40.6%) patients, parenchymal cyst were present in 15 (21.7%) of patients, medullary cyst were present in 10 (14.5%) of patients, para pelvic cyst were present in 8 (11.6%) patients and peri pelvic cyst were present in 8 (11.6%) of patients.

Type of Cyst	Frequency	Percentage (%)
Cortical Cyst	28	40.6
Medullary Cyst	10	14.5
Parenchymal cyst	15	21.7
Peri Pelvic Cyst	8	11.6
Para Pelvic Cyst	8	11.6
Total	69	100.0

**Table 3:** Type of cysts

The mid pole is more involve then upper and lower pole. The ratio of mid pole cyst was 23 (34.8%) of patients, the ratio of lower pole was 20 (29.0%) and upper pole was 16 (23.2%).

Location of cyst	Frequency	Percentage (%)
Lower	20	29.0
Middle	24	34.8
Middle and Lower	4	5.8
Middle and Middle	1	1.4
Upper	16	23.2
Upper and Lower	2	2.9
Upper and Middle	2	2.9
Total	69	100.0

**Table 4:** Location of cyst

Out of 69 patients, 39 (56.5%) cysts were present in right kidney, 28 (40.6%) were present in left kidney and only 2 (2.9%) were present on both kidneys, Table 5.

Side of Kidney	Frequency	Percentage (%)
Both	2	2.9
Left	28	40.6
Right	39	56.5
Total	69	100.0

**Table 5:** Side of kidney more involve in cystic disease

### Discussion:

The prevalence of renal cystic disease increased with age. The age more involve in cyst was between 36-55 years and under 35 years was less involved in renal cystic disease. The mean age was 53.0. In a study conducted by Chang CC *et al.*, proved that prevalence of renal cystic disease increased with age. The incidence of renal cystic disease increases with age due to decrease in renal function. The presence of kidney cysts, even single cysts, is associated with reduced renal function in patients younger than 60 years. This relationship may be obscured by the reduced renal function and the high incidence of cysts in older patients. These results suggest that acquired cystic kidney disease may begin early in the course of renal disease and that underlying renal disease should be considered in individuals with renal cysts prior to age 60 years.<sup>18</sup> A study revealed that high blood



pressure, hypertension and diabetes cause renal dysfunction which leads to renal cysts.<sup>19</sup> The majority of cysts was located in right kidney, unilateral and solitary. The incidence of cortical cyst was common in this study and it was mostly present in females it can be caused by congenital abnormal structure of glomeruli and renal tubules or it can be caused by infections or injuries. Age was a significant factor of the kidney cyst and size of the cysts was not associated with age.<sup>15</sup> The study also revealed that the prevalence of renal cystic disease was more in females than males.<sup>20</sup> Ultrasound plays an important role to classify and assess kidney cysts that help in management and follow-up.<sup>15</sup>

### Conclusions:

2760 patients visited with renal disease. The prevalence of renal cystic disease was 2.5%. Renal cystic disease was found in 69. Most common cyst found was cortical cyst. Females were more involved in this disease than males. Concluded that high blood pressure, hypertension and diabetes cause renal cysts. The prevalence of renal cysts increases with age and showed a significant difference in type of cysts. Kidney cysts increase in size, number and tend to grow more rapidly in older patients.

### References:

- 1- Weber TM. Sonography of benign renal cystic disease. *Radiologic Clinics*. 2006 Nov 1;44(6):777-86.
- 2- Rumack CM, Wilson SR, Charboneau JW. *Diagnostic ultrasound*. 2011; 4<sup>th</sup> Ed; 367-9.
- 3- Whelan TF. Guidelines on the management of renal cyst disease. *Can Urol Assoc J* 2010; 4(2):98-99.
- 4- Kristoffer H, Michael N, Caroline E. "Ultrasonography of the Renal: A Pictorial Review". 2015, 6 (1): 2.
- 5- Guyton, Arthur C.; Hall, John E. *Textbook of Medical Physiology*. Philadelphia: Elsevier

### References:

- Saunders. 2006; 310.
- 6- Schmidt T, Hohl C, Haage P, Blaum M, Honnef D, Weiß C, Staatz G, Gunther RW. Diagnostic accuracy of phase-inversion tissue harmonic imaging versus fundamental B-mode sonography in the evaluation of focal lesions of the kidney. *American Journal of Roentgenology*. 2003 Jun; 180(6):1639-47.
- 7- Bates, Jane. A, *Abdominal Ultrasound How Why and When*. 3rd Edition, 2011; 200-201
- 8- Israel GM, Bosniak MA. Follow-up CT of moderately complex cystic lesions of the kidney (Bosniak category IIF). *American journal of roentgenology*. 2003 Sep; 181(3):627-33.
- 9- Harisinghani MG, Maher MM, Gervais DA, McGovern F, Hahn P, Jhaveri K, Varghese J, Mueller PR. Incidence of malignancy in complex cystic renal masses (Bosniak category III): should imaging-guided biopsy precede surgery?. *American Journal of Roentgenology*. 2003 Mar; 180(3):755-8.
- 10- Rha SE, Byun JY, Jung SE, Oh SN, Choi YJ, Lee A, Lee JM. The renal sinus: pathologic spectrum and multimodality imaging approach. *Radiographics*. 2004 Oct; 24(suppl\_1):S117-31.
- 11- Dimitrakov JD, Dimitrakov DI. Autosomal recessive polycystic renal disease. Clinical and genetic profile. 2003; 45:5-7.
- 12- Consugar MB, Anderson SA, Rossetti S, Pankratz VS, Ward CJ, Torra R, Coto E, El-Youssef M, Kantarci S, Utsch B, Hildebrandt F. Haplotype analysis improves molecular diagnostics of autosomal recessive polycystic kidney disease. *American journal of kidney diseases*. 2005 Jan 1; 45(1):77-87.
- 13- Judit Varkonyi . Renal cysts and tumors. 3<sup>rd</sup> department of internal medicine. 2010.
- 14- Tatar E, Ozay E, Atakaya M, Yeniyay PK, Aykas A, Okut G, Yonguc T, Imamoglu C, Uslu A. Simple renal cysts in the solitary kidney: Are they innocent in adult patients?.

- Nephrology. 2017 May 1;22(5):361-5.
- 15- Gameraddin MB, Babiker MS. Renal cysts: Sonographic evaluation and classification in Sudanese adults. *Journal of Health Research and Reviews*. 2016 Sep 1;3(3):111.
  - 16- Terada N, Ichioka K, Matsuta Y, Okubo K, Yoshimura K, Arai Y. The natural history of simple renal cysts. *The Journal of urology*. 2002 Jan 1;167(1):21-3.
  - 17- Al-Said J, Brumback MA, Moghazi S, Baumgarten DA, O'Neill WC. Reduced renal function in patients with simple renal cysts. *Kidney international*. 2004 Jun 1;65(6):2303-8.
  - 18- Chang CC, Kuo JY, Chan WL, Chen KK, Chang LS. Prevalence and clinical characteristics of simple renal cyst. *Journal of the Chinese Medical Association*. 2007 Nov 1;70(11):486-91.
  - 19- Kim SM, Chung TH, Oh MS, Kwon SG, Bae SJ. Relationship of simple renal cyst to hypertension. *Korean journal of family medicine*. 2014 Sep 1;35(5):237-42.
  - 20- Mousavi SS, Sametzadeh M, Hayati F, Fatemi SM. Evaluation of acquired cystic kidney disease in patients on hemodialysis with ultrasonography. *Iranian journal of kidney diseases*. 2010 Jul 1;4(3):223-6.