

Sonographic Features of Urinary Tract Infection in Both Gender Of Various Age Groups

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ABSTRACT

Background and Objectives: One of the most prevalent illnesses that people might get is urinary tract infections. primarily elderly people and women. Age and gender are two of the risk factors for acute UTIs, and clinical criteria are the main basis for diagnosis. However, ultrasonography is frequently required as part of the therapy workup to assess complex infections, chronic presentations, and contributing or causative variables. Clinical therapy, including aggressive and emergent therapies, is guided by a proper understanding of the most pertinent sonographic characteristics in urinary tract infections, which also give pertinent differential diagnosis.

METHODOLOGY: The current study is a mere descriptive research which has been reviewed and approved by the ethical committee of the University of Lahore, Pakistan. Data was collected from Shalimar Hospital Lahore. Under this group, 136 adults had positive UTI laboratory findings and had abdominal ultrasound. Patients with abnormal urinary tract disease or immunocompromised illness were not included. All data were done in Excel while data analyses were done in SPSS version 21.

RESULTS: This study collected data from 136 patients, with a minimum age of 14 years and a maximum age of 44 years. Of these, 48 (35.3%) were female and 88 (64.7%) were male. All patients had normal Blood perfusion of the right and left kidney. Urinary bladder echoes found in 37 (27.2%) in which 08 patients of 14 to 21 (40%) years had Urinary bladder echoes, 24 patients of 22 to 29 (25.5%) years had urinary bladder echoes, 3 patients of 30 to 37 (17.6%) years had urinary bladder echoes, 02 patients of 38 to 44 (40%) years had urinary bladder echoes.

CONCLUSION: Age and gender contribute to UTI occurrence with male individuals being more susceptible to the condition. Sep 6 2011 Bladder echoes are noticed in 14-21 years and 38-44 years and pyelonephritis in adults. USG is pragmatic in the formation of UTI images.

KEYWORDS: Hematuria, ultrasonography, renal Doppler, Urinary tract infection

INTRODUCTION

Infections in the human population frequently occur in the urinary tract. Pediatric urinary tract infections (UTIs) are known to induce acute morbidity and chronic medical disorders, including hypertension and renal insufficiency in adulthood, in contrast to the largely benign course of UTIs in the adult population (1). Therefore, to effectively treat children with UTI, it is essential to have a thorough awareness of the pathophysiology of UTI, risk factors, diagnostic test indications, and the proper applications of antimicrobial medicines.

The most frequent bacterial infection in children is a UTI, and within the first six to twelve months after

illness, up to 30% of babies and kids have it again. UTI symptoms in very young newborns are significantly different from those in older infants and children (2).

When a patient has symptoms of pyelonephritis, ultrasonography (US) may be used as a first-line diagnostic technique to examine the urinary system. Interstitial nephritis in adulthood is unfortunately not well represented by standard grey-scale figures (3). Consequently, most patients with clinically suspected pyelonephritis have negative US results. According to one prospective study, just 24% of patients in the US had abnormalities; other studies showed as low as 20% (4). Ultrasonography (USG) is an important modality for

How to cite this: Ullah I, Bacha R, Ahmad S, Haroon M, Zafar R, Ijaz T, Zahoor A, Majid F, Ali S A. Sonographic Features of Urinary Tract Infection in Both Gender Of Various Age Groups. International Journal of Healthcare Profession. 2024; 1(2):31-36

imaging of the urinary tract. The study was undertaken with the objectives of determining the urinary tract disorders affecting the urinary tract and correlating the USG findings (5). Urinary tract diseases are the common cases, where 30% of cases do not show any symptoms (6). Before the discovery of ultrasound scans physicians were mainly dependent on history, physical examination etc. However accurate diagnosis was not 100% (7). However ultrasound scans may be helpful in the evaluation of different diseases related to the urinary tract. Ultrasound (US) allows visualization of renal parenchyma in real-time with the multiplanar ability and also has advantages over IVU in the assessment of the lower urinary tract, including a measure of volume after micturition and size and projection of the prostate in males (8). The early and accurate diagnosis of etiological factors is crucial for early and effective management. The ability of ultrasound to evaluate the renal parenchyma as well as the urinary tract in a single investigation also provides insight functional urinary system which may help the physician in better treatment and management of their patients (8).

METHODOLOGY

This descriptive study was conducted at Shalimar Hospital Lahore after approval of the ethical review board of the faculty of allied health sciences, at the University of Lahore (9). Based on diagnosis inclusion criteria all adult patients of both genders visited to perform abdominal ultrasound and had positive lab reports for urinary tract infection. Patients present with any known pathologies related to urinary tract infection and immunosuppressed (10). Data were collected with the help of a convenient sampling technique according to the age, gender and sonographic findings of patients. The total sample size was 136. After collection data were managed in a Microsoft Excel sheet and were analyzed SPSS version 21 was used for data analysis (11).

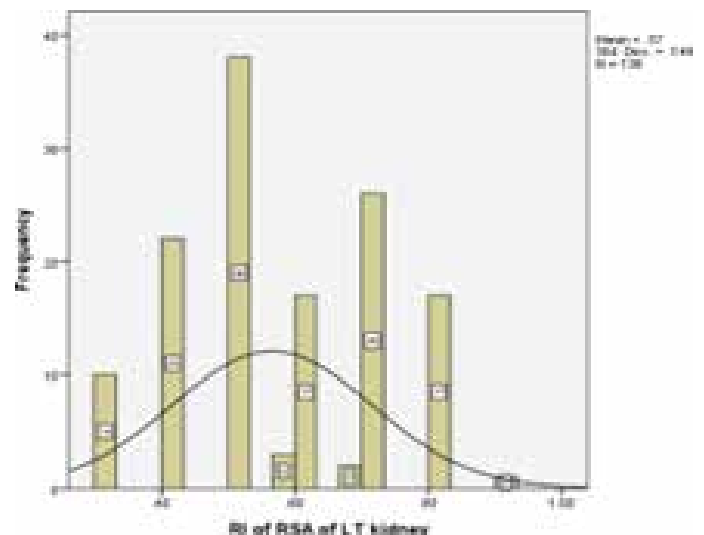
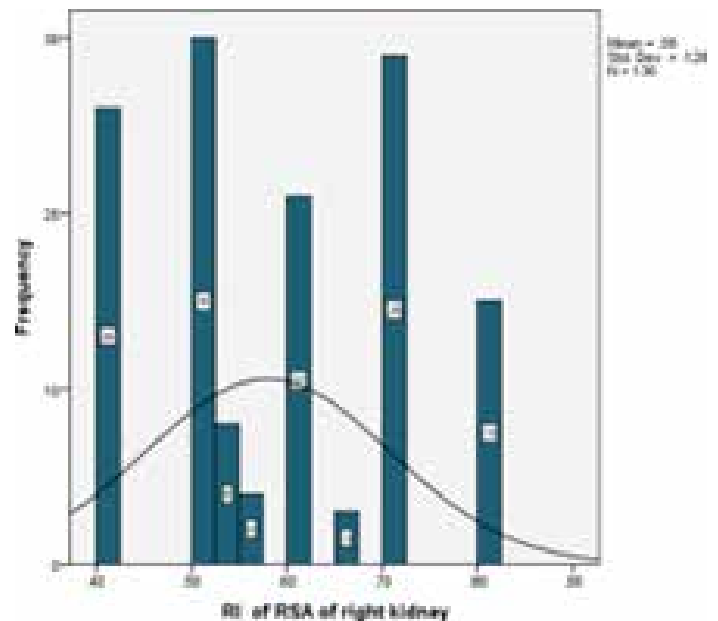
RESULTS

This study collected data from 136 patients, with a minimum age of 14 years and a maximum age of 44 years. Of these, 48 (35.3%) were female and 88 (64.7%) were male.

All patients had normal Blood perfusion of the right and left kidney (12). Urinary bladder echoes found in 37 (27.2%) in which 08 patients of 14 to 21(40%) years had Urinary bladder echoes, 24 patients of 22 to 29 (25.5%) years had urinary bladder echoes, 3 patients of 30 to 37 (17.6%) years had urinary bladder echoes, 02 patients of 38 to 44(40%) years had urinary bladder echoes (8).

Table 1: Cross-tabulation between age group and urinary bladder echoes

Age group		Urinary bladder echoes		Total	
		No	Yes		
Age	14-21	Count	12	8	20
Group		% within AG	60.0%	40.0%	100.0%
	22-29	Count	70	24	94
		% within AG	74.5%	25.5%	100.0%
	30-37	Count	14	3	17
		% within AG	82.4%	17.6%	100.0%
	38-44	Count	3	2	5
		% within AG	60.0%	40.0%	100.0%
Total		Count	99	37	136
		% within AG	72.8%	27.2%	100.0%



Graph No 1

- a) RI of right renal artery
- b) RI of left renal artery

Table 2: Cross tabulation shows the site of calculi and gender, in which mid ureter is the more prevalent site of calculus.

		Gender		Total
		F	M	
Site of calculi Level of ureter	DISTAL	4	8	12
	MID	16	20	36
	NO	22	46	68
	PROXIMAL	6	14	20
Total		48	88	136

Table 3: cross-tabulation shown between cystitis and gender, 18 females had cystitis and 33 males had cystitis.

		Gender		Total
		F	M	
Bladder Wall Thickness	Cystitis	18	33	51
	Normal	30	55	85
Total		48	88	136

DISCUSSION

Ultrasonography (USG) is an important modality for imaging of the urinary tract. The study was undertaken with the objectives of determining the urinary tract disorders affecting the urinary tract and correlating the USG findings (13). Urinary tract diseases are the common cases, where 30% of cases do not show any symptoms. 9 Before the discovery of ultrasound scans physicians were mainly dependent on history, physical examination etc. However accurate diagnosis was not 100% (13). However ultrasound scans may be helpful in the evaluation of different diseases related to the urinary tract. Ultrasound (US) provides advantages over intravenous ultrasound (IVU) in the evaluation of the lower urinary tract, including the measurement of volume after micturition and the size and projection of the male prostate. It also enables the multiplanar viewing of the renal parenchyma in real-time (13).

The early and accurate diagnosis of etiological factors is crucial for early and effective management. The ability of ultrasound to evaluate the renal parenchyma as well as the urinary tract in a single investigation also provides insight functional urinary system which may help the physician in better treatment and management of their patients (14).

The goal of the current investigation was to identify

sonographic characteristics of UTIs in both sexes and across a range of age groups. The variables—age, gender, renal pathology type, and sonographic appearance—were taken into consideration when gathering data. This study comprised data from 136 patients, with a minimum age of 14 years and a maximum age of 44 years. Of them, 48 patients (35.3%) were female, and 88 patients (64.7%) were male. The RT and LT kidney blood perfusions were normal in every patient (15).

Wilches et al determine whether particulate echoes found on urinary tract ultrasound correlate with urinary tract infection. In the results seventy per cent of the patients with UTI were older than 65- 56.5% of patients with a finding of particulate echoes in the bladder on ultrasound had urinary tract infection and 34% had a urinary tract infection but did not show particulate echoes(15). Particulate echoes within the bladder are frequent in ultrasound reports and they should be correlated with urinalysis results to rule out a urinary tract infection. However, in the literature, this finding is not considered as an indication of infection (16). In their case series, particulate urine had low specificity and intermediate sensitivity, indicating that this finding is not a diagnostic criterion for UTI. As compared to our study, out of 136 patients, 37 patients (27.2%) had urinary bladder echoes; 08 patients of 14 to 21 years (40%), 24 patients of 22 to 29 years (25.5%), 3 patients of 30 to 37 years (17.6%) and 02 patients of 38 to 44 years (40%) had urinary bladder echoes. According to gender in our study out of 48 females, 14 patients (29.2%) and in 88 males, 23 patients (26.1%) had Urinary bladder echoes. Sundar S et al in 2017 conducted a descriptive study in which 100 children aged 1 month-12 years with documented urinary tract infection (UTI) were included. Forty-three children underwent both DMSA and follow-up VCUG (15). Ultrasonograms picked up acute pyelonephritis (APN) in 7.1% of children with UTI while 31.1% had pyelonephritis on DMSA. The overall incidence of VUR was 16.3%. The sensitivity of USG for VUR detection was only 14.2%. The sensitivity of USG as a screening test for APNs is 7%. All children less than five years old with UTI must undergo DMSA and VCUG. Ultrasonography is less sensitive in detecting VUR and acute pyelonephritis. 11 Compared to our study, out of 136 patients 16 patients (11.8%) had complained of Pyelonephritis-Right, in which 03 patients of 14 to 21 years (15%), 12 patients of 22 to 29 years (12.8%), 01 patient of 30-37 years (5.9%) & no patients of 38 to 44 years had Pyelonephritis- right. According to

gender in our study out of 48 females, 03 patients (6.3%) and in 88 males, 13 patients (14.8%) had Pyelonephritis – Right. 10 patients (7.4%) had Pyelonephritis – Left. 3 patients of 14 to 21 years (15%), 7 patients of 22 to 29 years (12.8%), no patients of 30-to 37 years & 38-to 44 years had left-sided pyelonephritis. According to gender in our study out of 48 females, 05 patients (10.4%) and in 88 males, 5 patients (5.7%) had right-sided pyelonephritis (15).

In another study by Cheng et al they studied that Urine cultures were performed on 157 patients (79 in the ALN group and 78 in the APN group). Of these 157 patients, 65 (30 in the ALN group and 35 in the APN group) had no apparent organism that could be isolated from urine culture, and 92 had positive urine cultures. Among these 92 patients, *Escherichia coli* was the most common urinary pathogen. In result of my study shows out of 138 patients 67 patients were with lab findings that support pyelonephritis and in 71 patients there were no lab findings (17).

Our study was designed to compare sonographic findings and routine urine examinations in patients with acute pyelonephritis. On the basis of diagnostic performance and comparison of sonographic findings and routine urine test and detection ultrasonography is a reliable method for assessing patients with acute pyelonephritis (18).

A comparison between normal urine exams and sonographic findings in patients with acute pyelonephritis was attempted in the current investigation. Variables such as age, gender, clinical history, greyscale and Doppler ultrasonography results, and laboratory results were taken into consideration when gathering data. To reveal their abdomen, the patient will be requested to lie down. These individuals will have both Doppler and greyscale renal ultrasonography. In group 1, the patient arrived for an abdominal ultrasound. Urine samples will be sent to the lab for routine urine investigations if any abnormal kidney findings have been noted (19).

Data of 138 patients we collected 77 were males and 61 were females. Out of 138 patients, 75 (54.3%) patients had a clinical history of pyelonephritis, 67 patients had lab findings that supported pyelonephritis and 71 patients had no lab findings. Out of a total number of 138 patients 67 (48.6%) patients had right kidney pyelonephritis and 65 (47.1%) had left kidney acute pyelonephritis. The maximum age of patients was 77 years and the minimum was 18 years (20).

Cheng et al. examined urine cultures taken from 157 patients in a different research (79 in the ALN group

and 78 in the APN group). Of these 157 individuals, 92 had positive urine cultures, while 65 (30 in the ALN group and 35 in the APN group) had no discernible organism that could be isolated from urine culture. *Escherichia coli* was the most prevalent urinary pathogen among these 92 patients. Out of 138 patients, 67 had lab results supporting pyelonephritis, while 71 patients had no lab results, according to the results of my study.

According to a 2005 study by Ramakrishnan K et al., 98% of young and middle-aged women who arrived at an emergency room with fever, pyuria, and other upper urinary tract infection symptoms had acute pyelonephritis. 16 percent had different diagnoses when there was no fever. However, gastrointestinal or pulmonary symptoms are the most common in 20% of older individuals with acute pyelonephritis, and up to one-third of these people do not have a fever. In patients with indwelling bladder catheters, fever and leukocytosis are not very useful in identifying acute pyelonephritis, particularly when infections are brought on by gram-positive cocci or *Candida*. Pelvic inflammatory disease, cholecystitis, appendicitis, lower lobe pneumonia, perforated viscus, and the prodrome of herpes zoster are among the conditions that can be used to differentiate acute pyelonephritis. Gram stain examination of urine can help determine the beginning antibiotic therapy in some complex diseases. The antibody-coated bacteria assay is an additional choice that could aid in the localization of asymptomatic upper UTIs. as a result of my research into people' medical histories.

In a study conducted by Ramakrishnan K et in 2005 in which they studied young and middle-aged women presenting to an emergency department with fever, pyuria, and other features of upper UTI, 98 per cent had acute pyelonephritis. In the absence of fever, 16 per cent were given alternative diagnoses. However, up to one-third of elderly patients with acute pyelonephritis have no fever; in 20 per cent of elderly patients, the predominant symptoms are gastrointestinal or pulmonary. Imaging is required if complication is suspected in UTI to assess the nature and extent of the lesions and to detect underlying causes. The current imaging modality of choice in clinical practice is computed tomography. Because of associated radiation and potential nephrotoxicity, ultrasound is an alternative that has been proven to be equally accurate in the detection of underlying causes of UTI been proven to be equally accurate in the detection of underlying causes of UTI. Overall, ultrasonography is a great tool for diagnosing complex UTI causes, thus it could be the preferred imaging

method for evaluating and monitoring these patients, many of whom are very young, in order to reduce radiation exposure.

CONCLUSION

Urinary tract infections are significantly influenced by the age and gender of the patient. Males are more susceptible to UTIs than females. Pyelonephritis is more common in adulthood, and patients between the ages of 14 and 21 and 38 and 44 are more likely to have bladder echoes than others. One crucial technique for visualizing urinary tract infections is ultrasound (USG).

Funding Source: No Funding Source.

Conflict of Interest: No Conflict of Interest.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None

GRANT SUPPORT AND FINANCIAL DISCLOSURE: None.

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Authors Contributions:

Inam Ullah, Raham Bacha and Sheraz Ahmad: Substantial contributions to the conception and design of the work.

Muhammad Haroon, Rabia Zafar and Tehreem Ijaz: Design of the work and the acquisition.

Aizza Zahoor, Faryal Majid, Syed Abbas Ali: Drafting the work. Final approval of the version to be published.

Submitted for publication: 20-08-2024

Accepted after revision: 16-09-2024