Sarcouncil Journal of Medicine and Surgery

ISSN(Online): 2945-3534

Volume- 04| Issue- 01| 2025

Research Article **Received:** 05-11-2024 | **Accepted:** 11-12-2024 | **Published:** 09-01-2025

Asses the Diagnostic Efficacy of Ultrasound in the Diagnosis of VUR

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Abstract: Background: Vesicoureteral reflux (VUR) is the retrograde pee stream from the urinary bladder to the upper urinary lot. It is frequently hereditary. VUR can be asymptomatic or related with serious nephropathy. The kidneys can be saved if VUR is diagnosed and treated early. Aim: The review planned to evaluate the symptomatic presentation of Ultrasound and Fluoroscopy in identifying Vesico-Urethral Reflex Sickness (VUR). Methodology: An illustrative (Field and viable review) was led to surveying the distinction in (assessment of the Exactness of) demonstrative execution among ultrasound and fluoroscopy in the finding of VUR among patients in the Clinical City Complex. A poll study was utilized to gather information from radiology reports for patients determined to have VUR. The overview contained information about age, sex, home, family background of VUR, side effects, UTI, U/S or VCUG, or both, the responsiveness of the difference, the conclusion of VUR, and grade. Results: As far as age conveyance, close to half of the populace falls inside the one month to 1 year age range (47%), trailed by the one year to 5 years age range (47%), and a more modest rate is short of what one-month-old (6%) (figure 1). The majority of people (57%) are male, while only 43 percent are female. As far as home is concerned, a bigger part of the populace lives in metropolitan regions (62%) contrasted with country regions (38%). Conclusion: After an intensive assessment of the information, a few significant ends can be drawn. Right off the bat, the segment profile of the members uncovers a transcendent presence of babies and small kids, with a somewhat higher extent in metropolitan regions. Male members dwarf females, and most people have no huge family ancestry.

Keywords: Kidney, Diagnostic, Efficacy, Ultrasound, Urea.

INTRODUCTION

The kidney and urinary systems help the body eliminate urea, maintain balance in chemicals, and remove waste products and drugs. Urea is produced from protein breakdown and is carried in the bloodstream to the kidneys, where it is removed in urine. The kidneys, located below the ribs, remove urea through nephrons, which consist of glomeruli and renal tubules. Urea, water, and waste substances form urine [Wan, J. *et al*., 2011].

Two ureters. These narrow tubes carry urine from the kidneys to the bladder. Muscles in the ureter walls continually tighten and relax forcing urine downward, away from the kidneys. If urine backs up or is allowed to stand still, a kidney infection can develop. About every 10 to 15 seconds, small amounts of urine are emptied into the bladder from the ureters [Spencer, J. D. *et al*., 2012]. This triangle-shaped, hollow organ is located in the lower abdomen. It is held in place by ligaments that are attached to other organs and the pelvic bones. The bladder's walls relax and expand to store urine and contract and flatten to empty urine through the urethra. The typical healthy adult bladder can store up to two cups of urine for two to five hours [Printza, N. *et al*., 2011]. Upon examination, specific "landmarks" are used to describe the location of any irregularities in the bladder. These are: (5)

- Trigone: a triangle-shaped region near the junction of the urethra and the bladder
- Right and left lateral walls: walls on either side of the trigone
- Posterior wall: back wall
- Dome: roof of the bladder

Two sphincter muscles. These circular muscles help keep urine from leaking by closing tightly like a rubber band around the opening of the bladder [Venhola, M. *et al*., 2009; Weikun, Z. *et al*., 2019; Papadopoulou, F. *et al*., 2014]

Nerves in the bladder. The nerves alert a person when it is time to urinate or empty the bladder. (6)

Urethra. This tube allows urine to pass outside the body. The brain signals the bladder muscles to tighten, which squeezes urine out of the bladder. At the same time, the brain signals the sphincter muscles to relax to let urine exit the bladder through the urethra. When all the signals occur in the correct order, normal urination occurs. [Ntoulia, A. *et al*., 2018; Yousefifard, M. *et al*., 2022]

The urinary system is a vital organ responsible for waste elimination, fluid balance, and electrolyte maintenance. Common diseases impact the kidneys, ureters, bladder, and urethra. Urinary

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DOI- https://doi.org/10.5281/zenodo.14617909

Tract Infections (UTIs) are common, causing pain and frequent urination. Kidney stones, formed due to mineral and salt accumulation, can cause severe pain. Chronic Kidney Disease (CKD) is a progressive condition causing kidney function loss. [Darge, K. *et al*., 2008; Linlin, X. *et al*., 2020] Glomerulonephritis, inflammation of kidney glomeruli, can lead to proteinuria and impaired kidney function. Urinary incontinence, caused by factors like age, childbirth, obesity, and neurological disorders, can lead to involuntary urine leakage. Bladder cancer, benign Prostatic Hyperplasia (BPH), and Interstitial Cystitis (IC) are other conditions associated with the urinary system. Diagnosis and management often involve lifestyle changes, medications, and sometimes surgery. [Darge, K. *et al*., 2005; Drudi, F. M. *et al*., 2022]

PATIENTS AND METHODS

A study collected 53 participants aged 0-5 years from Medical City Complex (Children Welfare Hospital, Baghdad Teaching Hospital, Surgical Speciality Hospital) between December 2023 and February 2024.

The current standard of care for children under five years old with a culture-proven UTI requires ultrasound and VCUG investigations. A renal ultrasound is considered suggestive of VUR if dilatation of the pelvis-calyces, ureters, or collecting system of one or both kidneys is reported. All ultrasound scans and VCUGs are performed at the hospital, with results reported by staff radiologists. Vaginal cystourethrograms are performed using a flexible catheter and hypaque 18% contrast material. Ultrasound scans are performed using Acuson Sequoia and ATL 5000 equipment, and ultrasonography is performed using the GE Voluson Expect 6 brand.

RESULTS

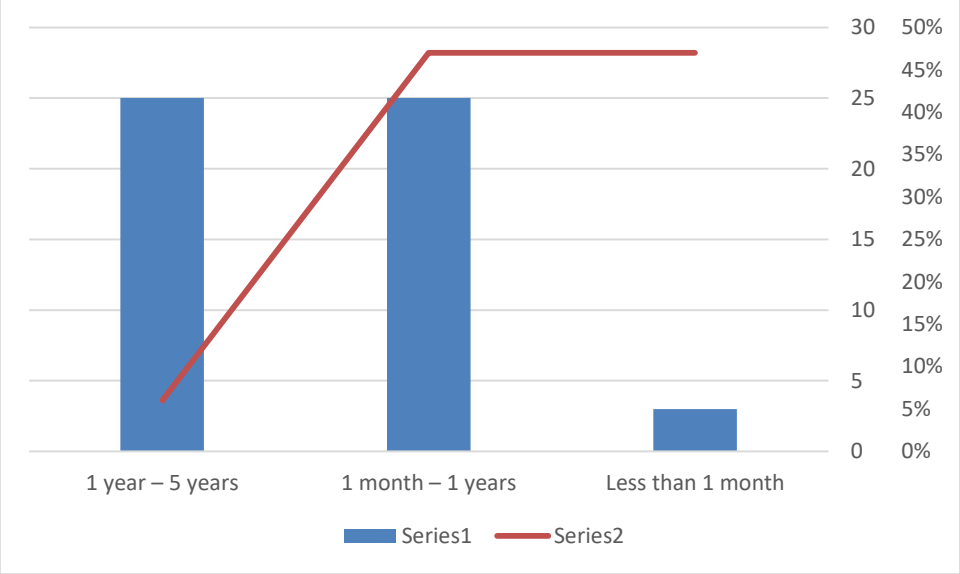

Fig 1: Age state of the participants

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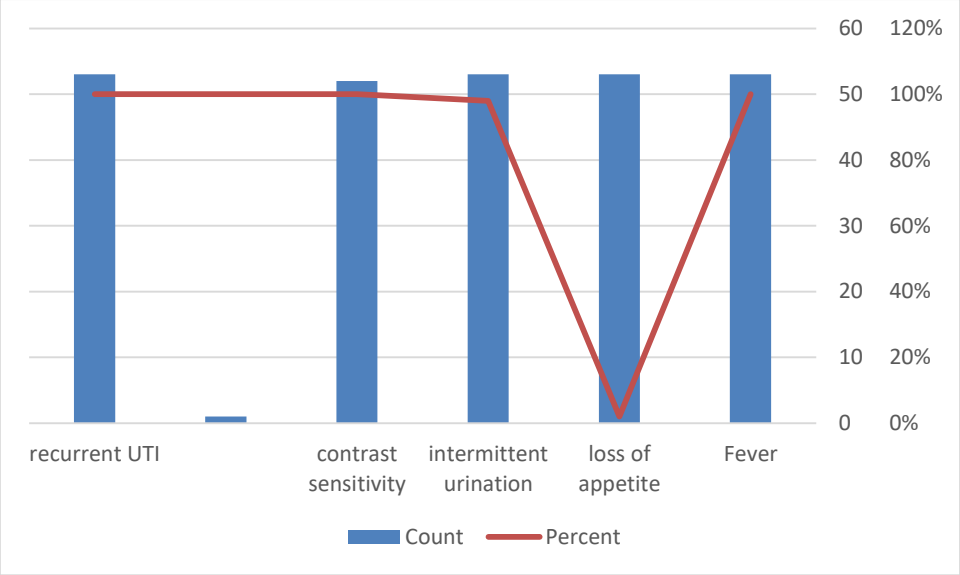

Fig 2: Health state of the participants

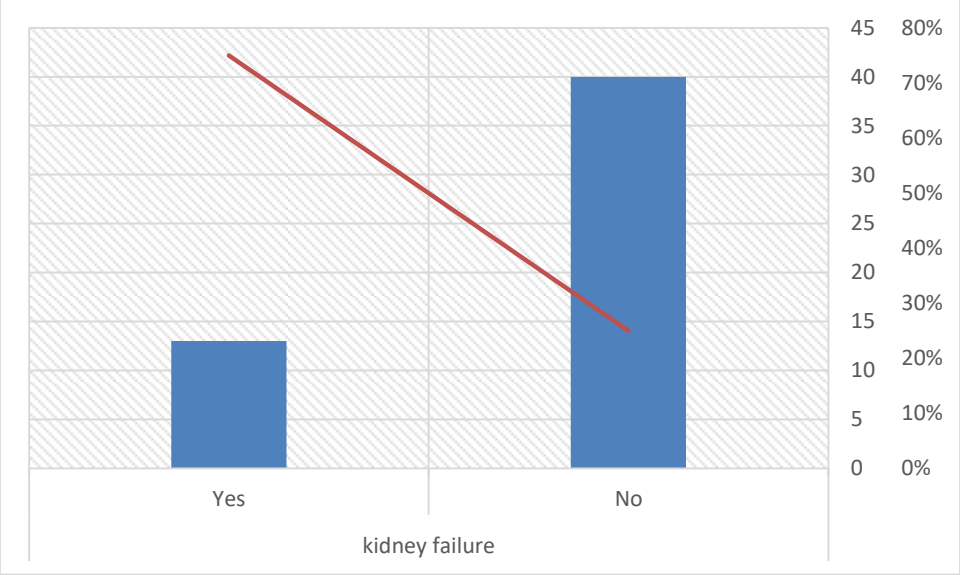

Fig 3: Relationship between kidney failures with Complications of VUR

DISCUSSION

In terms of age distribution, almost half of the population falls within the one month to 1 year age range (47%), followed by the one year to 5 years age range (47%), and a smaller percentage is less than one month old (6%) (figure 1). Regarding gender distribution, the majority are male (57%), while 43% are female. In terms of residence, a larger portion of the population resides in urban areas (62%) compared to rural areas (38%). Family history shows that a significant majority have a negative family history (92%), while only a small percentage have a positive family history (8%)

All 53 individuals in the dataset report experiencing fever, loss of appetite, and intermittent urination, accounting for 100% prevalence in each of these symptoms. Contrast sensitivity is predominantly unaffected, with 98% reporting no issues, while only 2% note a positive indication. Additionally, all participants report experiencing recurrent urinary tract infections (UTI).

The data indicates that 11% of the population surveyed have hypertension, while the majority (89%) do not. In terms of kidney failure, a quarter of the individuals (25%) report experiencing it, while the majority (75%) do not have kidney failure.

Reflux affects 1 and 18.5% of children and is more common in girls (85%). In children, there are two main causes.

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The first is a congenital defect at the junction between the ureter and the bladder, causing primary reflux.

The second is an obstruction of the lower urinary tract, leading to secondary reflux. The obstruction may be a valve in the posterior urethra (obstruction of urine flow at the level of the urethra), bladder dysfunction (neurogenic bladder), bladder diverticulum (diastasis of the bladder wall), or previous bladder surgery.

Prenatal ultrasound allows the detection of dilated renal pelvises and suspicion of vesicoureteral reflux even before symptoms appear.

Cystoscopy: consists of placing a bladder probe, filling the bladder with contrast medium, and taking some X-rays while filling with the bladder. It also makes it possible to study the anatomy and function of the bladder and urethra.

Cystoscopy: uses radiolabeled materials. It is indirect if it is injected intravenously, while direct imaging of the cystoscin is performed if it is implanted in the bladder via a catheter. Compared to cystography, these methods give the child a lower dose of radiation, do not allow the study of the urinary tract, and determine the degree of reflux less accurately. Intravenous urography: consists of administering X-ray visible substances intravenously and performing repeated X-rays in sequence. It proposes an anatomical and functional study of the kidneys and urinary tract. Renal scintigraphy: thanks to radiolabeled substances injected intravenously, it allows a computerized study of kidney function and the evaluation of the possible presence of an obstruction in the flow of urine.

CONCLUSION

It is a common finding in newborns who present with UTI, which most often turns out to be a transient event without major clinical implications; however, it may be associated with RVU or other ATUs. Dilatation of the collecting system on renal examination does not adequately predict the presence of VUR, and a negative result does not exclude the patient from having this abnormality, even in cases where VUR is severe. This reinforces the criterion for performing UCM in all children who present with UTI in the neonatal period.

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Source of support: Nil; **Conflict of interest:** Nil.

Cite this article as:
Hasan, A.A., Jasim, M.H. and Alkuraiti, A.B.M. "Asses the Diagnostic Efficacy of Ultrasound in the Diagnosis of VUR." *Sarcouncil Journal of Medicine and Surgery* 4.1 (2025): pp 1-5.

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