

Resolution Pediatric Vesicoureteral Reflux after Urocole Injection: A Single Center Experience in 101 Cases

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ABSTRACT

Background: Experience with vesicoureteral reflux (VUR) resolution differs in different centers.

Aim: To evaluate the outcome of VUR.

Methods: In this study, 106 children with VUR who were visited at the pediatric nephrology clinic; during 2014 to September 2019. Following the diagnosis, patients received urocole injection and every month's follow-up to three years.

Results: VUR was found in 106 patients with a mean age of 6.3 ± 3.6 years (Range 2 days to 15 years). During 3.3 ± 2.2 years follow-up, resolution was observed in 76 (74%) of 101 patients with follow-up VCUG.

Conclusions: According to the excellent results with this study, it is recommended that VUR grades 3 to 5 be managed urocole injection and close follow-ups.

Keywords: Pediatric, vesicoureteral reflux, Urocole injection,

INTRODUCTION

Vesicoureteral reflux (VUR) is described as the retrograde flow of urine from the bladder into the ureter and renal pelvis^{1,2}. Reflux into parenchyma of renal is defined as the intrarenal reflux³. VUR is present in 1-2% of apparently normal children and more than 30-60% of children with UTI and 10% of neonates with hydronephrosis¹. The prevalence of primary VUR (PVUR) is 1%- 6% with dominant inheritance and variable penetrance^{1,4-6}.

VUR is caused by lateral or proximal dystopia of the orifice of ureter in bladder⁴. VUR is the most common congenital anomaly of the urinary tract. VUR predisposes to urinary tract infection (UTI) through facilitating the transport of pathogen bacteria from the bladder to the upper urinary tract⁶. Without appropriate treatment, between 30 and 60% of patients with UTI and VUR develop renal scar⁷. New scar formation in patients with primary VUR almost always develops following symptomatic UTI and pyelonephritis^{8,9}. The inflammatory reaction caused by UTI can result in reflux nephropathy (RN). RN can lead to proteinuria, renin mediated hypertension, renal insufficiency, impaired somatic growth and morbidity during pregnancy, too⁵. RN is a result of abnormal renal development leading to focal or extended renal dysplasia^{5,6}. VUR is detected most commonly during voiding, when intravesical pressure rises, but may occur any time in the voiding cycle, particularly when bladder function is abnormal. VUR is common in childhood, whereas precise prevalence is uncertain since large-scale population screening using VCUG has not been done due to the dangers and cannot be justified (8). VUR does not usually cause renal injury in the absence of the risk factor. Severity is graded using the height of retrograde flow, and dilation and tortuosity of the ureters. This is important because VUR usually will spontaneously resolve with rise of age⁶.

It is believed that medical and surgical management are equally effective in treating patients with VUR¹⁰. Each form of treatment has advantages and disadvantages that

must be discussed with parents before selecting the treatment strategy. Continuous antibiotic prophylaxis (CAP) is recommended in children at greatest risk for VUR-related renal injury, for evaluation of bladder and bowel dysfunction and in children with VUR, who have febrile UTI⁶. Surgical correction is recommended for VUR: Patients with grade V after one year old, patients with progression of renal scarring while on antibiotic prophylaxis, patients with progression of VUR grade, patients with frequent relapsing pyelonephritis, particularly those who have breakthrough UTI or renal scarring and for the non-compliant patient^{5,11}.

MATERIALS AND METHODS

Due to the lack of similar data in rationality of Iran, we analyzed our data and present our experience in this issue. The primary goal of this study was defining the rates of resolution for patients with primary VUR in our center after injection jell and was determine the rates of complication due to injection jell.

These data are helpful to follow-up in patients for VUR. In 106 children with VUR who were visited at pediatric nephrology and urology clinic; at 2014 to 2019 were studied. Endoscopic surgery was done in 106 patients of whom, 101 patients had follow up VCUG and thus were analyzed for this study. Following the diagnosis patients received urocole injection; after two week sonography was done, every month's urine sediment, urine culture and after six months follow-up with VCUG for this patient. Data were analyzed by paired two tail student t test using Excel software and differences were considered significant if p value was found < 0.05.

RESULTS

From 101 patients with VUR, 56 (55%) were female (had 55.5% left VUR, 33.3% right VUR and 12.2% bilateral); and (45%) male (had 44% left VUR, 33.3% right VUR and 22.7% bilateral); mean age was 7.3 ± 3.9 years (Range 2 days to 21 years). In 101 patients we could do follow-up

cystography; in 76 patients VUR resolved after injection (74%), 25 patients with VUR didn't show resolved in VCUG (26%). Among patients with resolution, 78% were female.

With sonography after jell injection, two patients was had hydronephrosis because abstraction so done DJ catheter insertion. Mean follow-up time after VUR diagnosis was 3.3 ± 2.2 years (range 1 month to 9.1 years).

DISCUSSION

Vesicoureteral reflux is a common pediatric problem¹⁻³. In one study reported the prevalence of VUR in normal children to be 2.2% of girls and 0.6% of boys by the estimation. However, in children with urinary tract infection the prevalence was more than 30% (1). Fallahzadeh et al. 2007 reported that the spontaneous resolution rate of VUR was 55% in a 4.5 years follow-up². These results are compatible with the worldwide trend of medical management of primary VUR and avoidance of invasive surgical methods.

The prevalence of resolution VUR in our study was higher in girls, this was the case in most reported series (1, 2, 8). However in Snodgrass report it was equal in both sexes¹. Only 52% of our patients had regular follow-up and control RNCs which we could analyze their data and this is our limitation in this study because the patients can change their physician easily in our area.

Conflict of interest: None declared.

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REFERENCES

1. Sharifian M, Dalirani R, Mohkam S, et al. Spontaneous resolution of vesicoureteral reflux (VUR) in Iranian children: A single center experience in 533 cases. *Nephro-Urol Mon* 2011; 3(3): 191-5.
2. Fallahzadeh M, Ghane F, Hashemi G, Derakhshan A. Primary Vesicoureteral Reflux in Children in Southern Iran. *Iran J Med Sci* 2015; 27(3): 110-3.
3. Fukui S, Watanabe M, Yoshino K. Intrarenal reflux in primary vesicoureteral reflux. *Inter J Urol* 2013; 20(6): 631-6.
4. Hickling DR, Sun TT, Wu XR. Anatomy and Physiology of the Urinary Tract: Relation to Host Defense and Microbial Infection. *Microbiol Spect* 2015; 3(4): 10.1128/microbiolspec.UTI-0016-2012.
5. Mattoo TK, Mathews R, Gupta IR. Vesicoureteral Reflux and Renal Scarring in Children. In: Avner ED, Harmon WE, Niaudet P, et al. *Pediatric nephrology*. 7th Ed. Baltimore: Lippincott Williams & Wilkins; 2016: 1716-35.
6. Elder JS. Vesicoureteral Reflux. In: Behrman RE, Kliegman RM, Nathan J, BLUM, Samir S. SHAH, Joseph W. ST, Robert C. Tasker, Karen M. Wilson, *Nelson textbook of Pediatrics*. 21th Ed. Philadelphia: Elsevier company; 2020: 2796-99.
7. Tej K. Mattoo, Russell W. Chesney, Saul P. Greenfield, et al. Renal Scarring in the Randomized Intervention for Children with Vesicoureteral Reflux (RIVUR) Trial. *Clin J Am Soc Nephrol*. 2016 Jan 7; 11(1): 54-61.
8. Nickavar A, Hajizadeh N, Harahdashti AL. Clinical course and effective factors of primary Vesicoureteral reflux. *Acta Medical Iranica* 2015; 53(6): 376-9.
9. Tej K. Mattoo, Russell W. Chesney, Saul P. Greenfield, Alejandro Hoberman, et al. Renal Scarring in the Randomized Intervention for Children with Vesicoureteral Reflux (RIVUR) Trial. *Clin J Am Soc Nephrol*. 2016 Jan 7; 11(1): 54-61.
10. Sumit Dave, Antoine E. Khoury. The current evidence based medical management of vesicoureteral reflux: The Sickkids protocol. *Indian J Urol*. 2007 Oct-Dec; 23(4): 403-413.
11. Esposito C, Escolino M, Lopez M, et al. Surgical management of pediatric vesicoureteral reflux: a comparative study between endoscopic, laparoscopic, and open surgery. *J Laparoendosc Advanc Surg Techniq* 2016; 26(7): 574-80.