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## ORIGINAL PAPER

# Endoscopic Management of Vesicoureteral Reflux in Children in Kosova

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### ABSTRACT

**Introduction:** Vesicoureteral reflux (VUR) in children has been treated with subureteric deflux injection of Deflux (dextranomer hyaluronate copolymer) since 2009. The aim of this study was to analyze the results of endoscopic treatment of VUR in our clinic. **Methods:** Between March 2009 and December 2013, fifty-five children underwent endoscopic subureteral injection of Deflux in 78 ureters. Two months post-operatively voiding cystourethrogram (VCUG) was performed. This study examined the disappearance of VUR and urinary tract infection (UTI) as well as the quality of life during long-term follow-up. **Results:** The study included 55 patients (40 females and 15 males) with 78 refluxing ureters. There were 22 refluxed ureters altogether and 33 children had a unilateral reflux (two duplicated systems). All patients were treated, from the age 6 months up to 12 years old. The mean age of patients was 5.2 years. There has been no complications, but with few recurrences. In 6 patients (16.6%), endoscopic treatment with deflux was done twice, while in three patients (8.5%), the endoscopic treatment with deflux was performed three times, because of recurrence. **Conclusion:** We recommend the use of endoscopic Deflux injection as first line treatment for children with VUR. Endoscopic subureteral injection of Deflux is a minimally invasive method for VUR treatment in pediatric patients and is associated with low morbidity.

**Key words:** VUR, Deflux, pediatric urology.

## 1. INTRODUCTION

Vesicoureteral Reflux (VUR) is defined as the retrograde flow of urine from the bladder back into the ureters and renal collecting system due to a failure of the ureterovesical valve mechanism (1-5). Vesicoureteral reflux is diagnosed in approximately 1% of children and promotes pyelonephritis (4). Endoscopic treatment for vesicoureteral reflux (VUR) has become an established alternative to long-term antibiotic prophylaxis and ureteral reimplantation (6-10). The goals of medical intervention in patients with vesicoureteral reflux are to allow normal renal growth, prevent infections and pyelonephritis, and prevent renal failure. Vesicoureteral reflux is one of many treatable risk factors in the development of urinary tract infection (UTI). Treatment intends to prevent pyelonephritis and to preserve renal function and most children diagnosed with VUR receive antibiotic prophylaxis regardless of VUR grade (3). This study analyzes the results of our short experience of endoscopic treatment for vesicoureteral reflux. In our center, VUR in pediatric patients has been treated with deflux (dextranomer hyaluronate acid copolymer) injection since 2009.

## 2. MATERIALS AND METHODS

Between March 2009 and December 2013, a total number of 55 children (78 ureters) with VUR were

treated with subureteral or intraurethral injection of deflux, as a daily procedure. The radiological grading of VUR was done according to the international system introduced by the International Reflux Study Committee in 1985. Five grades were defined based on the extent of reflux and degree of dilation of the upper tract on imaging (6). Through a metallic needle, Deflux was injected submucosally in or below the ureteral orifice at the 6 o'clock position, to create a prominent bulge and raise the distal ureter and ureteral orifice. In most patients, only 1 puncture at 6 o'clock was needed. Only in a few patients, when an adequate subureteral mound was not attained, another puncture was performed at a different location, depending on local findings. The patients were old between 6 months and 12 years (mean age 5.2 years). Renal ultrasonography for detection of urinary obstruction and urine culture was performed 2 weeks after the injection (in order to exclude the presence of hydronephrosis). All patients underwent voiding cystourethrogram (VCUG) 3 months after the treatment, in order to confirm the successful treatment of RVU, or the presence of RVU (failure). The second VCUG was performed in children with recurrent UTIs. Patients who failed initial injection were further clinically observed, or they got second injection, or ureteral reimplantation. Successful reflux correction was

defined as absent or converted high grade to grade 1 reflux on follow-up. Surgery was performed only in case of unsuccessful reflux correction after 3 injections. This study examined the disappearance of VUR and urinary tract infection (UTI) as well as the quality of life during long-term follow-up

### 3. RESULTS

Fifty-five patients with primary VUR are included in this study. Seventy-eight refluxing ureters were treated. These patients were endoscopically treated between March 2009 and December 2013. The female/male ratio was 4:1, and the mean age was 5.2 years (from 6 months up to 12 years old). Nine patients (16.3%) underwent a second endoscopic injection, because reflux did not resolve after the first treatment (Chart 1). In 6 patients (16.6%) endoscopic injection was done twice (Chart 2), while in three patients (8.5%) – 3 times, because of recurrence (Chart 3).

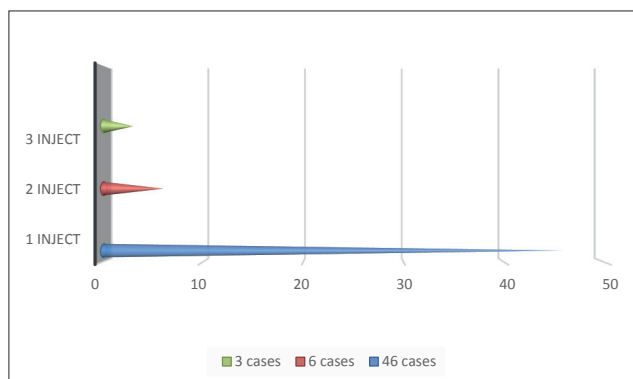


Chart 1. First injection

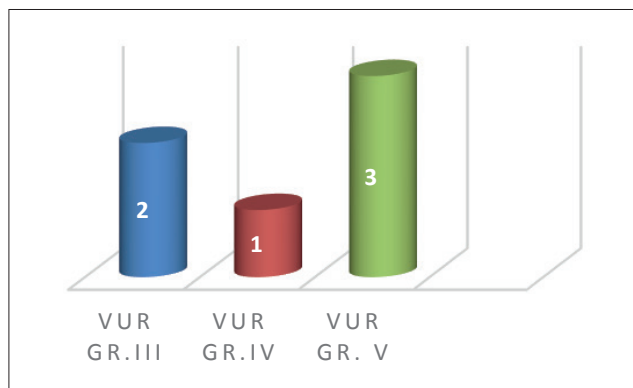


Chart 2. Second injection

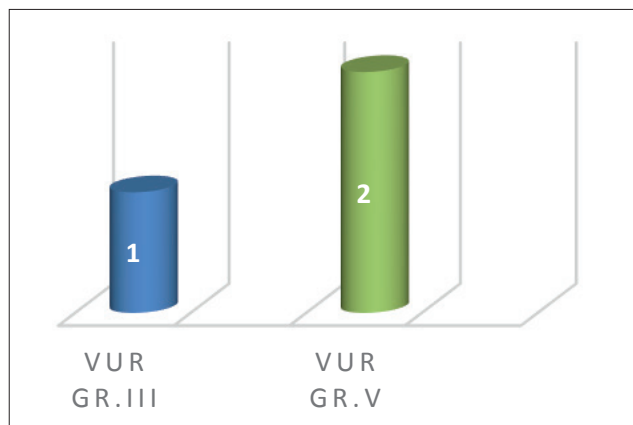


Chart 3. Third injection

There were no complications associated with endoscopic injection of Deflux in this study. Postoperative flank pain was reported in 7 patients, did not require any intervention. No additional adverse events were reported

### 4. DISCUSSION

Vesicoureteral reflux is the most common uropathy in children. Although spontaneous resolution in primary reflux is common, surgical intervention may be necessary in patients with persistent reflux or recurrent pyelonephritis. We analyzed 55 patients with primary VUR (78 refluxing ureters) who underwent injection for urinary tract infections (UTI) to identify factors associated with success following deflux injection. Success was defined as resolution of VUR after first injection on postoperative voiding cystourethrogram performed 3 months following endoscopic treatment.

The number of patients studies in this research, with primary VUR, showed a cure rate of 83.6% after one deflux injection and up to 94% after a second deflux injection. The success rate in our patients is similar to the success rate reports from other studies. Pinto et al reported the success rate of 84%, while Puri et al reported success rate of 94%.

Our results are very close to the success rate achieved with open surgical treatment (11-15). Capozza et al demonstrated that endoscopic treatment with dextranomer/hyaluronic acid copolymer proved to be effective and well tolerated during long term follow up (7.5 years) in children with vesicoureteral reflux (14). In our study patients were followed up with mean duration of twenty four months. Patients treated with deflux injection in our study experienced few complications, with only 7 patients experiencing postoperative pain, this finding is in agreement with previous studies (14). In this study, we also classified the causes of failure based on cystoscopic findings. First, mound displacement of implant developed. The injected materials migrated to a medial or caudal direction in relation to the ureteral orifice. It might be due to the bulking agent being injected in the wrong position because of poor operation

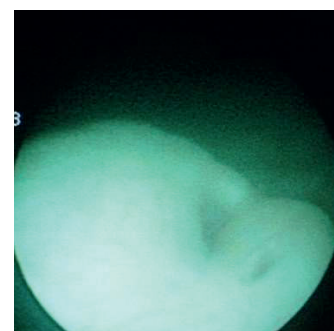


Figure 1. Injected material

Series	Ureters	Injected volume	Followup	Success rate
Puri et al. (7)	1101	0.2–1.5 ml	3–46 mo	96%
Kirsch et al. (8)	139	0.8–2 ml	3–18 mo	93%
Yu and Roth (9)	162	1 ml	2–26 mo	93%
Pinto et al. (10)	86		3 mo	84%
Prishtina (2009-2013)	78	0.4-2ml	3-6 mo	83.6%

Table 1: Endoscopic treatment with Deflux for primary VUR in different series.

field (Figure 1). Volume of the injected deflux was lost and resulted in loss of volcano shape of periureteral orifice mucosa. Our clinic is the only clinic in Kosova that deals with VUR treatment with deflux, and despite the modest experience, the results are very good (Table 1).

## 5. CONCLUSION

Endoscopic treatment of the children with primary VUR is the most comfortable method for the patient. Endoscopic treatment advantages are: a short stay in hospital, no complications and short operating time. The success rate shows that this treatment is very effective and with many advantages compared to open surgery. In our center, the endoscopic treatment is the first step of treatment in children with primary VUR .

CONFLICT OF INTEREST: NONE DECLARED.

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