



Does Initial Endoscopic Puncture Of Ureterocele provide A Definitive Treatment In All Children? Evaluation Of 47 cases

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Abstract

The aim of this study is to evaluate the efficacy of cystoscopic transurethral incision (CTUI) in the management of ureteroceles in children.

Forty-seven cases treated with transurethral incision (TUI) as the first line treatment between 2014-2019 were retrospectively evaluated. A total of 47 (21 boys, 26 girls) patients 20 right, 22 left, 5 bilateral with 52 ureteroceles were included. Of these, 25/47 presented antenatally, while twenty-one had urinary tract infection at the time of presentation. The median follow-up was 44 months.

Twenty-six patients were associated with duplex system ureterocele (DSU), while twenty-one patients had single system ureterocele (SSU). Secondary surgery was performed in 65,3% of DSU and 28,6% of SSU.

Primary CTUI is a safe, minimally invasive procedure that is definitive in the majority of children presenting with an ureterocele that requires intervention. 71,4 % of SSU and 34,7 % DSU patients had no surgical intervention after TUI. Urinary infection rate decreased significantly after TUI.

Keyword: Ureterocele, cystoscopic transurethral incision, urinary tract infection

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Introduction

Ureterocele is a cystic dilation of the distal part of the ureter (1,2). Ureterocele can be located inside the bladder or include the bladder neck. It may be associated with a single or, usually, with duplex system (3,4). Goals of ureterocele management include decompression upper urinary tract, avoiding vesicoureteral reflux, preventing urinary tract infection, and minimizing the number and invasiveness of operative interventions. The treatment options vary from conservative, endoscopic to aggressive surgical reconstruction.

Variations in ureterocele anatomy and mode of presentation can cause a clinical dilemma regarding treatment options. Therefore, the optimal approach is controversial. Transurethral incision (TUI) has become a popular, safe, and minimally invasive procedure (5-8). However, the success of transurethral ureterocele incision in single or duplicate systems is not the same. It is emphasized that additional surgical interventions may be required in the follow-up after trans-ureteric incision, especially in cases with a duplicated system of ureterocele.

In this study, it was aimed to investigate whether there is a difference between the secondary surgical procedure requirements by evaluating the cases with single and duplicated system ureterocele who underwent trans-ureteric incision as the first treatment option in our clinic.

Materials and Methods:

Forty-seven patients who were diagnosed with ureterocele underwent transureteroscopic ureterocele incision as the initial treatment between the years of 2014-2019 were retrospectively evaluated from the hospital records after the approval of the Hospital Ethics Committee (No E-2-21-801). Whether the ureterocele was a single or duplicated system, whether it was diagnosed antenatally, the complaint of admission, whether they had urinary tract infection after the procedure, and whether a secondary intervention was required during the follow-up were recorded. The initial presentation and timing were recorded. All ultrasounds, voiding cystourethrograms (VCUG) and dimercapto succinic acid scans (DMSA) pre-TUI and post-TUI were reviewed. Moreover, the occurrence of febrile urinary tract infections (fUTI) and any secondary surgical intervention were recorded. Cases with single and duplicate systems were classified into two separate groups and their results were compared. While statistical evaluation was made with chi-square tests at SPSS statistical program, $p < 0.05$ was considered statistically significant.

Results

A total of 47 (21 boys, 26 girls) patients with 3 days-14 years old age (mean 2.78 ± 4.35 years) 20 right, 22 left, 5 bilateral with 52 ureteroceles were included. Ureterocele is noted significantly more common in girls ($p < 0.001$). Transureteric

ureterocele incision was performed as the initial treatment in all of our 47 cases. While 25 cases were diagnosed antenatally, 21 cases were diagnosed with recurrent UTIs and one case was diagnosed incidentally.

Twenty-six patients (20 female/6 male; 9 left/16 right/1 bilateral) were associated with duplex system ureterocele (DSU), while twenty-one patients (6 female/15 male; 13 left/4 right/4 bilateral) had single system ureterocele (SSU). While 10 cases (47,6%) with single system ureterocele were diagnosed antenatally, 15 cases (57,7%) with duplex system were diagnosed antenatally. While 38,4% of cases with duplicated system had pre-procedure UTI, it was determined that 52,4% of cases with single system had UTI before the procedure (Table 1).

Table 1: Demographic results

		DSU	SSU	p
Gender	Female	20	6	0,001
	Male	6	15	
Location	Right	16	4	
	Left	9	13	
	Bilateral	1	4	
Secondary Surgery	Sting	2		
	UNC	13	5	
	Heminephrectomy	2	1	
	Nephrectomy			
UTI	Preoperative	11	10	0,388
	Postoperative	8	4	

A second surgical intervention was required in 17 cases (65.4%) with duplex system, in 6 cases (28.6%) with single system. Secondary surgical interventions were performed significantly more in duplex system than single system ($p < 0.019$) (Table 2).

Table 2: Duplex/single system – secondary surgery

	Secondary surgery		p
	Yes	No	
SSU	6	15	0,019

UTI was continuing in 31% of cases with duplicated system after ureterocele incision, UTI was detected in 19% of cases with single system. There is no significant difference for preoperative UTI between duplex and single system ($p < 0.388$). UTI was noted significantly less after ureterocele incision in single system ($p < 0.002$).

Ureteral incision was performed with resectoscope in 6 cases, cold knife in 4 cases, and HoYAG laser in 32 cases. The median follow-up was 44 months.

In one case, it was accompanied by a ureteral stone. Additional anomalies were epidermolysis bullosa in one case, alagille syndrome + MCDK in one case, and microcephaly in one case. In five cases, the ureterocele in the form of a cecoureterocele extending from the bladder neck to the urethra was detected and TUI was performed as the first treatment option. Our case with epidermolysis bullosa died after sepsis caused by skin lesions.

Discussion

Ureterocele is a complex malformation of the lower urinary tract, characterized by cystic dilatation of the lower end of ureter. It may be associated with a single or, usually, with duplex system, associated with the upper pole⁽³⁾. Surgical treatment of ureterocele has to be performed to eliminate the obstruction and urinary tract infection (UTI) and to avoid the occurrence of vesico-ureteral reflux, and, also, to preserve renal function and prevent urinary incontinence. Electro surgery-incision, cold-knife incision and laser-incision are described surgical techniques for the treatment of ureterocele for relieving the obstruction^(9,10). In our series, the ureter was incised with HoYAG laser in 68.0% of the cases. There was no complication of the preferred incision method. Both laser-puncture and electro surgery-incision endoscopic techniques are highly effective in relieving the obstruction in neonates with ureterocele.

Although transurethral incisions (TUIs) are widely used for intravesical ureteroceles, they remain a temporizing technique before open surgery for the management of EUs⁽¹¹⁾ via either an upper tract approach (UTA), including ureteroureterostomy or heminephrectomy, or a bladder-level approach (BLA), including common-sheath reimplantation (CSR) with ureterocelelectomy or total reconstruction of the upper and lower urinary tracts with ureterocelelectomy, ureteral reimplantation, and heminephrectomy⁽¹²⁾.

However, these approaches have limitations, including the technical difficulty involved with small bladder volumes in infants and the concerns for high morbidity and postoperative incontinence due to disturbances of the trigones in immature bladders⁽¹³⁾.

The use of primary TUIs for the treatment of EUs has been widely reported. Adorisio et al.⁽¹⁴⁾ found that this approach is effective, though they did not evaluate postoperative complications. Furthermore, many studies have reported high rates of secondary surgery during long-term follow-ups⁽¹⁵⁻¹⁷⁾.

However, we hypothesize that primary TUIs in EUs with duplex systems should be considered as initial treatment options. This study was performed to evaluate whether primary TUIs are effective in treating EUs with duplex systems by reporting our experience with endoscopic treatments and describing success rates and postoperative complications.

In some publications, it is stated that there is no difference between the success of transurethral incision in single and duplex systems⁽¹⁸⁾.

Primary CTUI is a safe, minimally invasive procedure that is definitive in the majority of children presenting with an ureterocele that requires intervention. Two thirds of SSU and approximately half DSU patients had no surgical intervention after TUI.

As a conclusion, while a second surgical procedure was required in half of the cases with a double system, a second surgical procedure was required in 28.6% of cases with a single system. Postoperative UTI rate was noted 31% in cases with double system, despite prophylaxis, and 19% in cases with single system. Duplicated system ureteroceles should be closely monitored as they increase the need for second surgery and the rate of recurrent UTI.

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