

Transurethral incision of ureterocele: Does the time of presentation affect the need for further surgical interventions?

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Summary

Objectives

Ureterocele management is considered to be one of the famous debates in pediatric urology. Despite some considering transurethral ureterocele incision (TUI) as a temporary line of treatment, others have reported good results in terms of being a definitive treatment. The present study evaluated the feasibility of TUI as a definitive line of management. Moreover, it studied the impact of presentation on the outcomes.

Patients and methods

The charts of patients who had ureteroceles from 1995 to 2015 were retrospectively reviewed. Patients who had undergone initial TUI were included. The initial presentation and timing were recorded. All ultrasounds, voiding cystourethrograms (VCUG) and dimercaptosuccinic 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.

Results (Fig. A)

A total of 51 patients with 53 ureteroceles were included. Of these, 51% presented antenatally, while others had FUTI at the time of presentation. Thirty-nine ureteroceles were associated with duplex system ureterocele (DSU), while the remaining ones had single system ureterocele (SSU). The median follow-up was 44 months. The incidence of de-novo reflux into

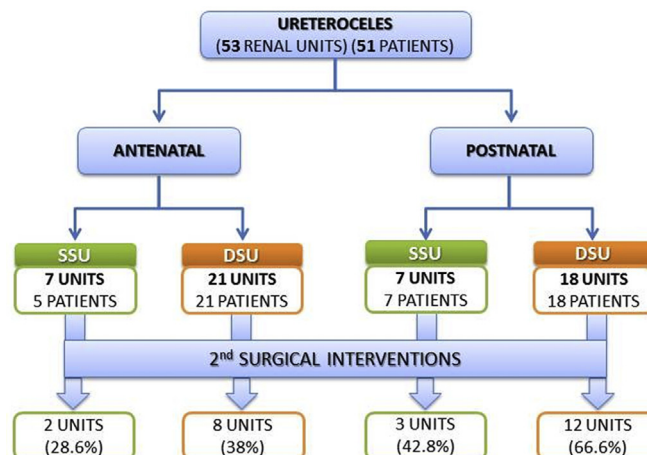
ureterocele was 44% of SSU and 23% of DSU ($P = 0.22$). Reflux into ureterocele after TUI (four SSU and seven DSU) carried a high risk of surgical interventions (3/4 SSU and 6/7 DSU). Hydronephrosis was improved in 64% of both DSU and SSU patients. Secondary surgery was performed in 51% of DSU and 35.7% of SSU. Twelve patients (67%) presented postnatally with DSU and had subsequent interventions after incision in comparison with 38% (eight patients) of those who presented antenatally. The DSU had improved renal function (by DMSA) in 26%, while the remaining had stable renal function.

Discussion

All patients with delayed ureterocele presentation had FUTI, while 1/3 of antenatally presenting patients had FUTI during follow-up. Notably, the age at subsequent interventions was apparently the same despite different ages at presentation. Study limitations included the retrospective chart review. Additionally, the pre-operative and postoperative investigations, such as laboratory and radiological results, were present and reviewed in most, but not all, patients.

Conclusion

Two thirds of SSU and approximately half DSU patients had no surgical intervention after TUI. However, those who presented antenatally had a lower risk of FUTI and lesser probability of being re-operated. VUR into ureterocele, regardless the system duplicity, had a high re-operation rate. After ureterocele incision, 26% of DSU patients had renal function improvement.



Summary Fig. A Rate for second surgical interventions, in relation to time of presentation and renal system duplicity. SSU, single system ureterocele; DSU, duplex system ureterocele.

Introduction

Transurethral ureterocele incision (TUI) has been described as a temporary first-line management for ureteroceles [1]. Thereafter, further surgical intervention (FSI) such as uretero-ureterostomy, partial or complete nephrectomy or ureteral reimplantation should be considered [2,3]. However, debate still remains about whether or not TUI alone may be effective as a definitive treatment [4–6].

Ureterocele management is a source of much debate in the pediatric urology community. This may be due to variations in presentation, system duplicity, ureterocele position and pre-existing VUR. The present study hypothesized that TUI could provide acceptable outcomes in ureterocele management and decrease the need for FSI. Moreover, it was hypothesized that pre-emptive TUI would decrease the need for FSI.

Patient and methods

The charts were reviewed of all patients who presented to the present institute with ureterocele from January 1995 to September 2015. Patients' demographic data were initially collected. Only patients who underwent TUI were included. The following were recorded: pre-operative investigations, including abdominal ultrasound, VCUG and DMSA; ultrasound data, including the type of renal system (single or duplex) and Society for Fetal Urology grading; and the ureterocele position (intravesical or extravesical).

Transurethral incision was indicated in patients with obstructive large ureterocele. Patients with small ureteroceles, had non-functioning moieties or dysplastic kidneys were managed conservatively, unless complicated. However, those that had interventions other than TUI were due to surgeon's preference. The incision was made using cold knife mainly at the most dependent part of the ureterocele at the bladder neck, and extended distally in case of extravesical ureterocele. It was intended to not de-roof the ureterocele and to leave a sheath that acted against urine refluxing into the ureter during bladder filing.

Postoperatively, the following were reviewed: VCUG, last ultrasound, last DMSA scan and febrile UTI (FUTI) occurrence throughout follow-up. Post-TUI VCUG was indicated in case of worsening or non-improving hydronephrosis, de-novo hydronephrosis or FUTI occurrence. Moreover, FSIs were recorded.

The primary outcome was to assess the feasibility of TUI as a definitive surgical alternative for ureterocele management. The secondary outcome was to study the effect presentation (antenatal vs postnatal) on post-TUI outcomes. Ureterocele management using TUI was compared according to renal duplicity (single system ureterocele (SSU) vs duplex system ureterocele (DSU)).

Evaluation included FUTI occurrences, VUR status (persistent or de-novo) and the need for FSI. Moreover, improvements of hydronephrosis on ultrasound and renal function on DMSA scan were evaluated. The total differential renal function (DRF) was collected instead of the manually defined moiety area, which may lead to miscalculations. Then, the change in ipsilateral DRF was calculated. A >10% increase in the ipsilateral initial DRF

was defined as functional improvement. Worsening function was defined by a decline in initial DRF >10%, while stable renal function was considered when the net change was –10 to 10. Hydronephrosis improvement was defined as downgrading of the dilated system, while upgrading of hydronephrosis or de-novo high-grade hydronephrosis were considered as worsening hydronephrosis. VUR was considered as worsening if upgraded or associated with higher grade of hydronephrosis. The impact of ureterocele position (intravesical vs extravesical) was also evaluated.

Post TUI, FSI was indicated if one of the following occurred: worsening hydronephrosis, worsening VUR or recurrent FUTI. Further surgical intervention included nephrectomy (complete or partial), lower urinary tract reconstruction (LUTR), or both.

Data were recorded and analyzed using SPSS 20 (IBM Corp. in Armonk, NY). Chi-squared test was used to evaluate categorical data, and Mann Whitney U test was used for continuous data. *P*-value was considered significant if ≤ 0.05 .

Results

Eighty-one patients with ureteroceles presented to the department. Nine patients were excluded, who were managed conservatively, and two patients who were lost to follow-up. Those who were managed conservatively had small asymptomatic ureteroceles in association with non-functioning kidneys or moieties. Moreover, 19 patients were excluded who underwent ureterocele management other than TUI. Finally, 51 patients were included with 53 ureteroceles.

Demographic data and patients' characteristics are shown in Table 1. The median follow-up was 44.4 months (range 9.1–199.8). Duplicity was diagnosed in 73% of included renal units. All patients had pre-operative ultrasounds. VCUG was carried out for all patients except two with DSU. Postoperative outcomes regarding to the system duplicity are presented in Table 2.

The effect of presentation on the outcome

One patient of those who presented antenatally had prolapsed ureterocele and urine retention after birth (Table 3). All patients that manifested postnatally had FUTI at presentation. Two thirds of DSU that presented postnatally (12/18) underwent FSI, while 42.8% (3/7) SSU with postnatal presentation were re-operated ($P = 0.07$). Despite SSU and DSU having different ages at TUI ($P < 0.05$), there were no differences regarding the age at FSI ($P = 0.8$). Three SSU patients (75%) who developed ipsilateral de-novo VUR presented postnatally. During follow-up, 50% of DSU that presented postnatally experienced FUTI in comparison with 33% of those that presented antenatally ($P = 0.29$).

Post-TUI renal function

Seven SSU and 15 DSU patients had a postoperative DMSA scan. Duplex system ureterocele had improved renal function in 4/15 units, while the remaining renal units had

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