Non-cystoscopic Removal of Retained Ureteral Stents With Mild Sedation in Children

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INTRODUCTION We present a novel noncyctoscopic procedure in removing retained ureteral stents that requires minimal sedation and significantly reduces operation time and costs compared to the cystoscopy-based procedure.

TECHNICAL CONSIDERATIONS We used a simple self-made device, which was made of an Fr5 feeding tube and a monofilament suture to remove the stents. Although the success rate is very high with this new procedure, it is important to point out that approximately 13% of our patients required 2 to 3 trials to remove the stents. Another potential problem is that the feeding tube may tie a knot when it is in the bladder, which could pose a risk of urethral injury when the knot is pulled out.

CONCLUSION The noncystoscopic procedure we have established has less operation time and costs less. This procedure provides an alternative solution in removing retained ureteral stents in child patients compared to conventional cystoscopy-based procedure. UROLOGY 94: 255–258, 2016. © 2016 Elsevier Inc.

Retained ureteral stents (RUS) is a commonly encountered condition in child patients following various pediatric urologic surgeries, such as pyeloplasty (open or laparoscope), ureteral reimplantation, and ureteroscopic lithotripsy. RUS is usually removed by cystoscopy under general anesthesia. Several alternative procedures of RUS removal have been reported in literature.[1-3] However, all previous efforts have limitations in their applications, such as uncomfortableness, infection, or inconvenience. In this report, we present a novel noncyctoscopic procedure in removing RUS that requires minimal sedation and significantly reduces operation time and costs compared to the cystoscopy-based procedure.

MATERIALS AND METHODS

The randomized trial was designed to compare the noncystoscopic and cystoscopic procedures of RUS in child patients. The trial was approved by the Institutional Review Board of Shanghai Xinhua Hospital. The trial enrolled patients admitted to the Department of Pediatric Surgery, Shanghai Xinhua Hospital, between May 2012 and March 2015 based on the following criteria: urinary system ultrasonography indicating a properly placed stent, and blood and urinary laboratory tests indicating no infection present. Informed written consent was obtained from all patients' parents. Boy patients and girl patients were randomly assigned (1:1) to groups of noncystoscopic removal procedure and or cystoscopic removal procedure.

Patients in the cystoscope group followed the preoperative fasting guideline before undergoing general anesthesia.[4] Ketamine was used for intravenous anesthesia. The dosage of ketamine was 0.5-2 mg/kg.[5] During the procedure, the patients were placed in the lithotomy position under general anesthesia. A retrograde cystoscopy (8Fr) was performed to find the ends of ureteral stents. The stents were then taken out with a medical grasper. After the procedure, the patients were sent to recovery room for recovery.

Patients in the noncystoscopy group received minimal sedation before the procedures. Chloral hydrate of 0.5 mL/kg was administered orally. The patients were in the supine position. We used a simple self-made device, which was made of an Fr5 feeding tube and a monofilament suture (Fig. 1). With this device, the stent removal can be performed under minimal sedation: (1) apply tetracaine gel into urethra for local anesthesia and lubrication; (2) insert the device into the bladder until the flow of urine is observed; (3) advance the device further for 10 cm; (4) rotate the device for several rounds and pull tight the thread; and (5) pull the stent out together with the device (Supplementary Video S1, Video S2, for male and female, respectively). The patients were sent to recovery room for recovery after the procedure. We made at most 3 trials to remove the stents to prevent urethral injury. If we did n't succeed in 3 trials, we performed the cystoscopic way to pull the stent out.

All the patients were discharged home the same day of procedures just after the first postoperative voiding to make sure the urethra was not injured. The total charge included anesthesia and/or sedation, surgery, recovery room, device usage, and cleaning fee. Operation time was calculated since the anesthesia and/or sedation was completed until the procedure was finished.

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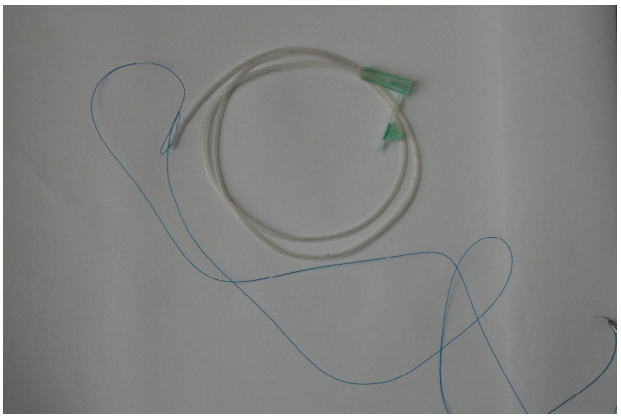

Figure 1. Simple self-made device for noncystoscopic removal procedure. (Color version available online.)

Statistical analysis was performed using SPSS, version 19.0. Comparisons between numerical variables of the cystoscopy group and noncystoscopy group were done by *t* test. A *P* value of less than .05 was considered statistically significant.

RESULTS

A total of 277 patients, 195 boys and 85 girls, aged 1 month to 11 years, were enrolled for the trial. The mean time for the stents left in place before removal was 3.27 weeks (range 3-4weeks). All stents were removed successfully, except 1 stent from the noncystoscopic group, which was removed by cystoscopy. We excluded this case from the results presented in this report. Mean operation time for cystoscopy, including time for instrument preparation, was 12.57 minutes for the Boy group and 9.61 minutes for the Girl group; whereas the time for noncystoscopy was 5.05 minutes for the Boy group and 4.63 minutes for the Girl group. In addition, expenses were also included in this study, which are listed in Table 1 and shown in Figure 2. Approximately 13% (18/138) of patients in the noncystoscopic group required 2 to 3 trials to remove the stents. There were no severe complications such as urethral laceration or bladder perforation in all cases.

DISCUSSION

Stents had been widely used in various pediatric urologic surgeries, such as pyeloplasty (open or laparoscope), ureteral reimplantation, and ureteroscopic lithotripsy. Although it is debatable whether ureteral stents should be placed to help urinary drainage following pyeloplasty, stenting is still favored by many pediatric urologists. It is reported that stenting could reduce hospital stay, decrease postoperative morbidities and the need for additional procedures, and result in quicker improvement compared with nonstented pyeloplasty.[6,7] In addition, the advantages of stenting include decreasing postoperative leakage and maintaining reliable urinary drainage.

Table 1. Statistical comparisons between the cystoscopy group and the noncystoscopy group

	Patients	Anesthesia	Mean Operation Time (Min)	Mean Expenses (¥)
Boy group				
Cystoscopy group	97	Ketamine	12.57 ± 0.82	3804.12 ± 29.57
Noncystoscopy group	97	Chloral hydrate	5.05 ± 1.20	463.71 ± 14.53
P value	—	—	<.05	<.05
Girl group				
Cystoscopy group	41	Ketamine	9.61 ± 0.86	3788.78 ± 21.47
Noncystoscopy group	41	Chloral hydrate	4.63 ± 1.13	477.56 ± 27.64
P value	—	—	<.05	<.05

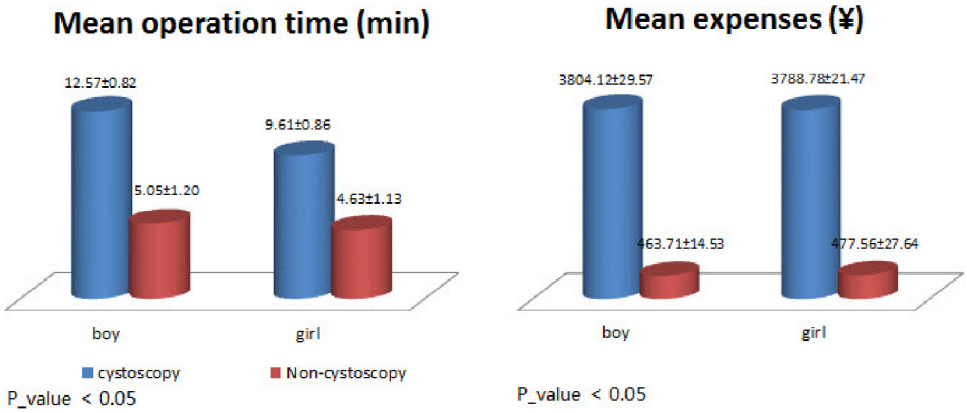

Figure 2. Statistical comparisons between the cystoscopy group and the noncystoscopy group. (Color version available online.)