Urology Journal
UNRC/IUA

Vol. 2, No. 3, 165-168 Summer 2005
Printed in IRAN

# Reconstructive Surgery

## Early versus Delayed Internal Urethrotomy for Recurrent Urethral Stricture after Urethroplasty in Children

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**ABSTRACT**

***Introduction:*** Our aim was to evaluate the results of early versus delayed internal urethrotomy for management of recurrent urethral strictures after posterior urethroplasty in children.

***Materials and Methods:*** Twenty boys with proven posterior urethral strictures were treated by perineal posterior urethroplasty. Of these, 12 required internal urethrotomy. Each radiograph demonstrated a patent but irregular urethra with a decrease in diameter at the point of repair (fair results). Patients were then divided into 2 groups: 6 underwent early (within 6 weeks from urethroplasty), and 6 underwent delayed (after 12 weeks from urethroplasty), internal urethrotomy with the cold knife as a complementary treatment. The groups were comparable in terms of patient age, etiology of the primary urethral stricture, number of recurrences, length and site of the actual stricture, and preoperative maximum flow rate. Mean follow-up was 5 years.

***Results:*** Kaplan-Meier analyses showed that the stricture-free rate was 66.6% after early, and 33.3% after delayed, internal urethrotomy ($P$ = .03).

***Conclusion:*** Early internal urethrotomy should be considered in boys with recurrent urethral stricture after urethroplasty.

**KEY WORDS:** urethral stricture, surgery, internal urethrotomy, children, treatment outcome



### Introduction

The management of urethral strictures in young boys has been a challenge for urologists. Urethroplasty is still regarded as the gold standard for treatment of urethral stricture,[1] but recurrence of stricture with this technique is not uncommon. Recurring strictures secondary to posterior urethroplasty are difficult to manage, especially in children. We reviewed the results of early versus delayed internal urethrotomy as a complementary treatment in these patients.

*Received January 2005*
*Accepted September 2005*
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### Materials and Methods

From January 1974 to July 1997, 100 patients underwent repair of urethral strictures by perineal urethroplasty in our center. Of these patients, 20 were children between 5 and 14 years old. Posturethroplasty follow-up was based on voiding function, urinary tract infection, and radiographic appearance. The overall results were classified as *good* if the patient required no further postoperative treatment and no stricture was identified radiographically, with no residual urine on a postvoid film; and *fair* if internal urethrotomy was required and radiography demonstrated a patent but irregular urethra with a decrease in diameter at the point of repair.

Recurrent strictures were identified by peak flow rates less than 15 milliliters per second. The diagnosis was established by urethroscopy. Of 20 boys, 12 (60%) had fair results (recurrent stricture) after primary posterior perineal urethroplasty. These children with recurrent urethral strictures were candidates for internal urethrotomy. The etiology of the primary stricture was trauma for all patients. They were divided into 2 groups according to the time of internal urethrotomy, following prior informed parental consent and assent from the children. Six children (group 1) underwent early internal urethrotomy (within 6 weeks postoperatively), and the remaining 6 boys (group 2) underwent delayed internal urethrotomy (beyond 12 weeks postoperatively) with the cold knife as a complementary treatment. The mean patient age was 8 years (range, 5-14 years). The length of urethral stricture ranged from 0.5 to 1 cm in both groups. The strictures were situated in the bulbomembranous part of the urethra in all patients. The 2 groups were comparable, with no significant differences in patients' age, length, and site of actual stricture ($P$ = .01).

Preurethrotomy evaluation included a complete history and physical examination, urethrography under radiographic fluoroscopy, uroflowmetry, and urethroscopy. The only study exclusion criterion was complete occlusion of the urethra on urethrography.

Therapeutically, all the patients underwent an identical endoscopic procedure[2] under general anesthesia. Antibiotic prophylaxis was administered with intravenous injection of gentamycin, 40 mg. All patients were treated using the Storz urethrotome. Urethrotomy usually began by introducing a thin catheter, used for orientation, to bypass the stricture zone. The stricture was incised at the 12 o'clock position along its entire length and depth. A 2-way 12-F to 16-F Foley catheter was left indwelling for 48 hours.

On the second postoperative day, a nurse trained all patients' parents to perform a clean intermittent catheterization. Catheters (14-F to 18-F) with a Nelaton point were used, and parents were instructed on how to leave the catheter in situ for 5 minutes and to perform catheterization twice weekly for the first month postoperatively and once weekly for the 3 subsequent months. Patients were evaluated after termination of clean intermittent catheterization.

Follow-up was scheduled for 3, 6, 9, 12, 24, 36, 48, and 60 months after the urethrotomy. At each follow-up session, the following data were collected or the procedure performed: history of voiding difficulties, calibrating the urethra, examining the urine for sensitivity, and performing uroflowmetric studies. A recurrence was defined as a maximum flow rate of less than 10 mL/s and a characteristic flow curve.

Data analyses were performed using SPSS software (Statistical Package for the Social Sciences, version 11.5, SSPS Inc, Chicago, Ill, USA). The Kaplan-Meier method was used to estimate survival function for the 2 groups (survival times were regarded as the time to stricture recurrence), and the log-rank test was used to compare the efficacy of urethrotomies.

## Results

Both groups underwent internal urethrotomy without complications. Clean intermittent catheterization did not pose complications in any of the patients. There were no significant differences with regard to patients' ages; etiologies of the stricture; clinical presentations; and number, length, and sites of the strictures between patients in the 2 treatment groups. Incidences of complications and failure during performance of the procedure did not differ significantly between the groups. There was no significant difference between the 2 groups in the availability and duration of follow-up.

Kaplan-Meier survival function analysis showed that the estimated stricture-free rate at 60 months was 66.6% after early internal urethrotomy and 33.3% after delayed internal urethrotomy (Figures 1 and 2). The difference was statistically significant ($P$ = .03). The median time to stricture recurrence was 14 months after early urethrotomy and 6 months after delayed urethrotomy. Stricture-free survival, calculated from the time of urethrotomy, did differ significantly between the groups ($P$ = .032). The median maximum flow rate at recurrence was 7.4 mL/s (range, 1 to 9.7 mL/s). Postoperative complications including urethral bleeding, extravasation, chordee, and incontinence were not seen.

## Discussion

The incidence of posturethroplasty recurrent strictures in this study is high and probably due

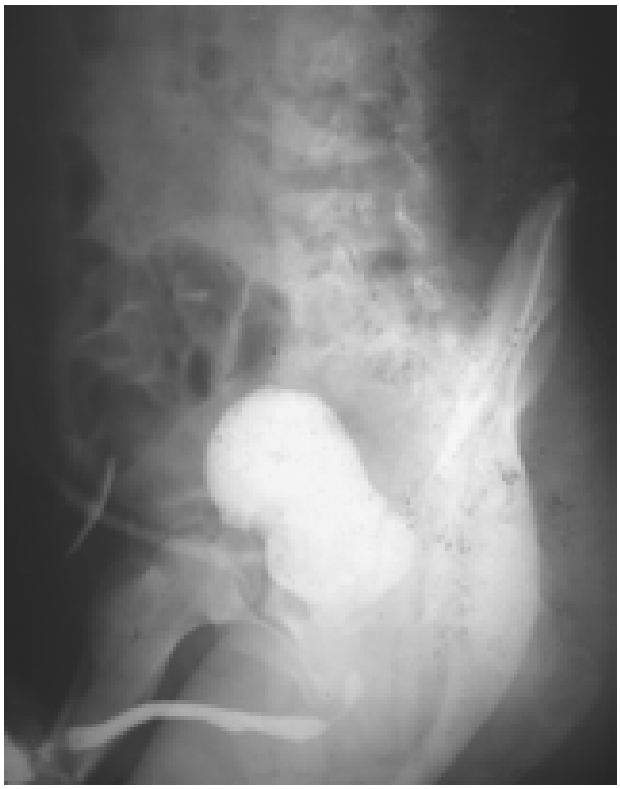

**Fig. 1.** Bulbourethral stricture in a 12-year-old boy after previous failed urethroplasty

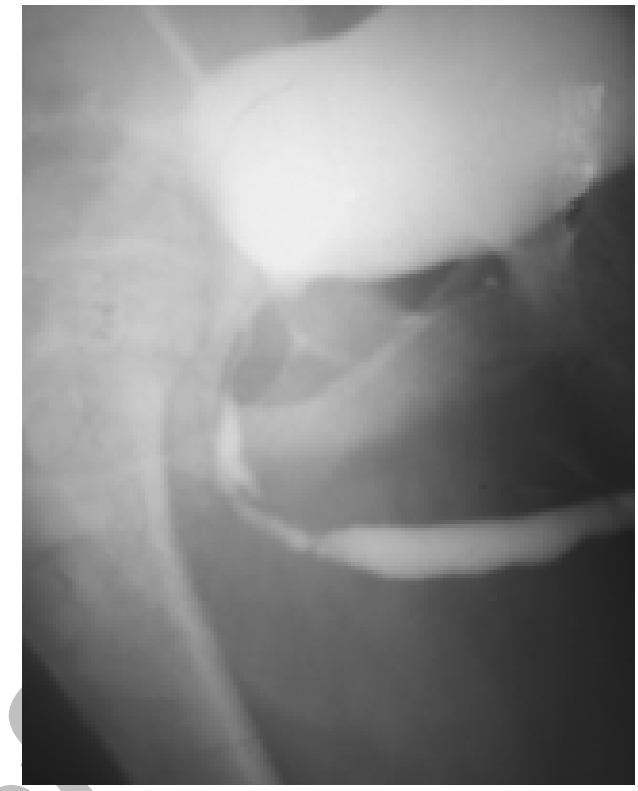

**Fig. 2.** The same patient as in Figure one, 4 years after early internal urethrotomy

to the fact that all patients were examined by voiding interview, uroflowmetry, and retrograde urethrography. Urethral stenosis may occur at the level of the urethral anastomosis. Therefore, a careful follow-up, based mainly on voiding symptoms and uroflowmetry, is necessary.[3,4] In the literature, most studies of urethral stricture treatment have only inconsistently reported stricture characteristics, such as length, location, and etiology, and have not presented the optimal time for internal urethrotomy. In our study, the 2 groups of patients were analyzed in combination to compare treatment results among those with identical etiologies that underwent identical procedures at different times. Follow-up in both groups was sufficient (mean, 5 years). Mean patient ages were comparable and all strictures had been treated previously by perineal urethroplasty. The primary investigations (urinary flow rate and retrograde urethrography) were comparable in both groups, with treatment success defined as no clinical symptoms and peak flow rate greater than 15 mL/s.

The overall recurrence rate differed remarkably in both groups (33.3% in group 1 versus 66.6% in group 2) owing to the differences in urethrotomy time. Risk of recurrence is higher with periurethral scarring.[5-7] It is agreed that every procedure causes a scar, and progressive scarring occurs with the passage of time. Severe scar formation necessitates reconstructive urethroplasty with excision of the lesion. The only cofactor significantly associated with stricture recurrence in our study was the time of urethrotomy. The recurrence rate was 66.6% for delayed internal urethrotomies and 33.3% for early internal urethrotomies ($P$ = .03).

## Conclusion

Early internal urethrotomy is an efficient complementary method that consolidates the results obtained in the treatment of posterior urethral strictures in children. Postponement of urethrotomy leads to progressive scar formation and is associated with higher recurrence rates. Further studies with larger samples are necessary to evaluate the ultimate durability of internal urethrotomy in pediatric populations.

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