Trauma and Reconstruction

The Efficacy of Bulbar Urethral Mobilization for Anastomotic Anterior Urethroplasty in a Case With Recurrent Anterior Urethral Stricture

Shinji Fukui,*, Katsuya Aoki, Yoshiteru Kaneko, Shoji Samma, Kiyohide Fujimoto

Department of Urology, Nara Prefectural Nara Hospital, Nara City, Nara, Japan
Department of Urology, Nara Medical University, Kashihara City, Nara, Japan
Department of Urology, Nara Prefectural Mimuro Hospital, Ikoma-gun, Nara, Japan

A R T I C L E   I N F O

Article history:
Received 6 February 2014
Accepted 17 February 2014
Available online 18 March 2014

Keywords:
Anterior urethral stricture
Urethroplasty
Bulbar urethra
Mobilization

A B S T R A C T

A 2-month-old boy was diagnosed with febrile urinary tract infection. Voiding cystourethrogram showed bulbar and anterior urethral strictures, and endoscopic internal urethrotomy was performed. He developed febrile urinary tract infection again and revealed the recurrence of the anterior urethral stricture. Consequently, endoscopic internal urethrotomy was performed 4 times. Because the anterior urethral stricture had not improved, he was referred to us. Anterior urethroplasty was performed when he was 5 years. After excision of the scarred portions of the urethra, the defect of the urethra was 20 mm. Transperineal bulbar urethral mobilization was performed, and a single-stage end-to-end anterior urethroplasty without tension could be performed simultaneously.

Introduction

Anterior urethral stricture is a rare condition in the pediatric population, and its treatment is one of the most difficult problems. End-to-end anastomosis has a good success rate, as long as approximation without tension is possible with sufficient blood supply. We experienced a case of intractable recurrent anterior urethral stricture that was adequately managed using single-stage anterior urethroplasty with bulbar urethral mobilization.

Case presentation

A boy was delivered at a gestational age of 38 weeks with a birth weight of 2758 g. He was diagnosed with febrile urinary tract infection at the age of 2 months. Voiding cystourethrogram (VCUG) showed bulbar and anterior urethral strictures. Endoscopic internal urethrotomy (EIU) and urethral dilatation with metal sounds were simultaneously performed for bulbar and anterior urethral strictures at age 5 months. Febrile urinary tract infection recurred at the age 8 months. VCUG revealed a recurrence of the anterior urethral stricture. Consequently, EIU was performed 4 times for the treatment of anterior urethral stricture.

Because the anterior urethral stricture had not improved, the patient was referred to our hospital at age 4 years and 5 months. VCUG did not reveal bladder deformity and vesicoureteral reflux. Uroflowmetry showed a plateau pattern, the maximum urine flow was 6.7 mL/s, the average flow rate was 5.1 mL/s, and voided volume was 109 mL, with little postvoid residual urine. Urethroplasty was performed to treat the intractable recurrent anterior urethral stricture when he was aged 5 years. A subcoronal circumferential skin incision was made, and the penile skin was degloved down to the penoscrotal junction. After excision of the scarred portions of the urethra, the defect of the urethra was 20 mm in length (Fig. 1). Because approximation of the normal urethra without tension seemed difficult, the bulbar urethra was exposed through a short midline perineal longitudinal incision and was subsequently mobilized from the bulbar penile junction back to the bulbomembranous junction. The entire length of the proximal penile urethra was dissected through a perineal incision, and the entire length of the anterior urethra was mobilized (Fig. 2A). Single-stage end-to-end anastomosis to the proximal and distal urethral ends without tension could be performed simultaneously (Fig. 2B). In addition, ventral penile curvature was never observed (Fig. 2C). The urethral catheter was placed 2 weeks postoperatively. The postoperative course was uneventful. Uroflowmetry performed 1 year after surgery showed a bell-shaped pattern, the maximum urine flow was 13.6 mL/s, the mean flow rate was 8.8 mL/s, and voided volume was 132 mL, with little postvoid residual urine.
Discussion

Urethral strictures are the most common cause of obstructed micturition in adults and frequently recur after initial treatment. Anterior urethral strictures commonly occur because of iatrogenic or idiopathic causes. Many treatment options exist for anterior urethral strictures in adults. Urethral dilatation with metal sounds is the oldest form of treatment, but it has only a temporary effect, and the stricture could recur. EIU is also associated with a high recurrence rate, and the long-term success rate is only 20%. End-to-end anastomosis is performed for patients with stricture lengths <25 mm. This procedure has excellent success rates of >90% when the urethra is approximated without tension and the anastomosis has sufficient blood supply.

However, urethral stricture is a rare condition in the pediatric population, and its treatment is one of the most difficult problems. Anterior urethral strictures in children mainly develop subsequent to hypospadias repair or trauma. The treatment options for anterior urethral strictures are urethral dilatation with metal sounds, EIU, end-to-end anastomosis, or single-stage or multiple-stage urethroplasty with a pedicled skin flap or buccal mucosa graft. The success rates are comparable with those of adult cases.

Because anterior urethral strictures are mainly caused by hypospadias repair in pediatric patients and the blood supply to the distal urethra may be shifted and limited, end-to-end anastomosis is rarely selected for treatment in pediatric patients although it has achieved excellent success rates.

In this report, we described a patient with intractable recurrent anterior urethral stricture who underwent urethral dilatation using metal sounds and EIU several times. We selected an end-to-end anastomosis procedure for the treatment of the recurrent anterior urethral stricture because of its high success rates. However tension-free anastomosis is necessary for achieving high success rates, bulbar urethral mobilization using the perineal approach was simultaneously performed. Bulbar urethral mobilization was used in distal to midshaft hypospadias surgery. There seem to be few reports on the treatment of anterior urethral stricture with bulbar urethral mobilization in pediatric patients. In this procedure, a short midline perineal incision was made, and the bulbospongiosus muscle was reflected. The entire length of the anterior urethra was mobilized, and the bulbar urethra was...
advanced anteriorly. The primary blood supply to the bulbar urethra was antegrade flow from the posterolateral bulbar vessels, and the secondary blood supply was retrograde vascularization from the glans. In hypospadias cases, however, there is no retrograde blood supply from the glans because of circumferential atresia of the distal spongiosus. Thus, particular attention should be paid while dissecting and mobilizing the bulbar urethra to prevent injury to the antegrade blood supply from the posterolateral bulbar vessels. However, in our case, there was no history of hypospadias or penile reconstruction surgery, and special care was not required to prevent injury to the blood supply from either antegrade flow from the posterolateral bulbar vessels or retrograde flow from the glans. Tension-free end-to-end anastomosis could be performed, and the postoperative course has been uneventful.

Conclusion

We described our experience with anterior urethroplasty with bulbar urethral mobilization performed for the treatment of intracatable recurrent anterior urethral stricture for which treatment with EIU and urethral dilations was repeatedly unsuccessfully. We believe it is possible to perform single-stage urethroplasty with end-to-end anastomosis without tension using bulbar urethral mobilization even in patients with comparatively long anterior urethral strictures.

Conflict of interest

None of the authors have any potential conflicts of interest to declare.

References

1. Voelzke BB, Breyer BN, McAninch JW. Blunt pediatric anterior and posterior urethral trauma: 32-year experience and outcomes. J Pediatr Urol. 2012;8:258–263.
2. Das S. Shusruta of India, the pioneer in the treatment of urethral stricture. Surg Gynecol Obstet. 1983;157:581–582.
3. Steenkamp JW, Heyns CF, de Kock ML. Internal urethrotomy versus dilation as treatment for male urethral strictures: a prospective, randomized comparison. J Urol. 1997;157:98–101.
4. Tritschler S, Roosen A, Füllhase C, Stief CG, Rubben H. Urethral stricture: etiology, investigation and treatments. Dtsch Arztebl Int. 2013;110:220–226.
5. Barbagli G, De Angelis M, Romano G, Lazzeri M. Long-term follow up of bulbar end-to-end anastomosis: a retrospective analysis of 153 patients in a single center experience. J Urol. 2007;178:2470–2473.
6. Sunay M, Karabulut A, Dadali M, Bagbanc S, Emir I, Erol D. Single-institution outcomes of open reconstruction techniques for management of pediatric and adolescent post-traumatic urethral strictures. Urology. 2011;77:706–710.
7. Fichtner J, Fisch M, Filipas D, Thüroff JW, Hohenfellner R. Refinements in buccal mucosa graft urethroplasty for hypospadias repair. World J Urol. 1998;16:192–194.
8. Warwick RT, Parkhouse H, Chapple CR. Bulbar elongation anastomotic meatoplasty (BEAM) for subterminal and hypospadiac urethroplasty. J Urol. 1997;158:1160–1167.
9. Koenig JF, Kottwitz M, Mckenna PH. Urethral mobilization for distal and mid shaft hypospadias with chordee. J Urol. 2013;190:1–5.