Surgical Approaches and Long-Term Outcomes in Adults with Complex Reoperative Hypospadias Repair

Christopher D. Morrison, Davide P. Cinà, Christopher M. Gonzalez and Matthias D. Hofer*

From the Department of Urology, Northwestern University Feinberg School of Medicine, Chicago, Illinois, and Urology Institute, University Hospitals Cleveland Medical Center, Case Western Reserve Medical School (CMG), Cleveland, Ohio

Abbreviation and Acronym

PVR = post-void residual urine volume

Accepted for publication November 17, 2017.

No direct or indirect commercial incentive associated with publishing this article.

The corresponding author certifies that, when applicable, a statement(s) has been included in the manuscript documenting institutional review board, ethics committee or ethical review board study approval; principles of Helsinki Declaration were followed in lieu of formal ethics committee approval; institutional animal care and use committee approval; all human subjects provided written informed consent with guarantees of confidentiality; IRB approved protocol number; animal approved project number.

* Correspondence: Department of Urology, Northwestern University Feinberg School of Medicine, 675 North St. Clair St., 20th Floor, Chicago, Illinois 60611 (e-mail: m-hofer@fsm.northwestern.edu).

Purpose: Patients with failed hypospadias repair are a challenging population for pediatric and reconstructive urologists. We describe our long-term outcomes and factors associated with complications of repeat hypospadias repair.

Materials and Methods: We retrospectively reviewed the records of 32 adult patients with a history of hypospadias repair who required subsequent urethroplasty between 2002 and 2012. Data on the presenting complaint, past medical and surgical history, demographic data, surgical approach, intraoperative findings and complications were collected and analyzed.

Results: Median patient age at urethroplasty was 32 years. Stricture of the penile urethra was the most common presentation. Urethroplasty was done in 30 patients as stricture treatment, 1 underwent perineal urethrostomy and 1 underwent diverticulectomy. Two-stage repair was performed in 90% of the men who underwent urethroplasty. The initial success rate was 83% in patients who underwent 1 or 2-stage urethroplasty. At a median followup of 9.5 years complications included 4 recurrent strictures and 1 fistula. Patient age, previous interventions, stricture length, hair present at the time of repair, the need to excise the urethral plate and the number of stages were not associated with complications or recurrence. If a graft was required, skin grafts were significantly associated with recurrence compared to buccal mucosa grafts.

Conclusions: Excellent outcomes can be achieved using a 2-stage approach with replacement or augmentation of the urethral plate in adults with failed hypospadias repair. In our experience buccal mucosa appears to be associated with fewer complications and less stricture recurrence than skin grafts.

Key Words: urethra, hypospadias, autografts, reconstructive surgical procedures, reoperation

Patients with failed hypospadias repair comprise a challenging population for pediatric and reconstructive urologists. Common complications of hypospadias repair include urethral strictures, repeat penile curvature, urethrocutaneous fistulas, urethral diverticula, meatal stenosis and glans dehiscence. Surgical correction of these complications often requires reoperations that lead to successive scarring and hypovascularity of the penile tissues.[1] Several studies have been done to address adults who present with failed hypospadias repair.[2–5] However, those studies did not describe long-term complications or identify factors associated with reoperation success.

0022-5347/18/1995-1296/0
THE JOURNAL OF UROLOGY®

https://doi.org/10.1016/j.juro.2017.11.078
Vol. 199, 1296-1301, May 2018
Printed in U.S.A.

We report our series, and describe long-term outcomes and factors associated with complications or recurrence of these complex repeat hypospadias repairs.

MATERIALS AND METHODS

Patients

Following institutional review board approval we used NMEDW (Northwestern Medicine® Enterprise Data Warehouse) to identify patients with a history of hypospadias repair who underwent urethroplasty between January 2002 and December 2012. All urethroplasties were done by a single surgeon (CMG). Demographic data were collected, including age at surgery, gender and race/ethnicity. If present in the records, the age at initial hypospadias repair, type of initial repair and interim procedures were obtained.

The chief complaint(s) and condition(s) requiring urethroplasty were documented. Surgical data were collected, such as stricture location and length, presence of hair in the urethra and urethroplasty type. Postoperative followup, subjective recurrence of lower urinary tract symptoms and PVR were identified. PVR was defined as the highest PVR during followup, excluding PVRs obtained at catheter removal. Further workup of complications was guided by physical examination, symptoms and PVRs. Any complications and complication management were documented.

Statistical Analysis

Descriptive statistics were used to characterize demographic, clinical and surgical data on patients who met study inclusion criteria. Patients with a urethral stricture at reoperation were identified and subdivided into those in whom complications did vs did not develop. These subgroups were compared based on age, previous procedures, previous repeat hypospadias repair, stricture length, hair presence, need for urethral plate excision and number of repair stages. In patients who received a graft during reoperation we identified complications or recurrences. GraphPad Prism®, version 5 was applied for statistical analyses. The Fisher exact test was used for categorical analyses and the Mann-Whitney test was used to compare medians with $p \leq 0.05$ considered significant.

RESULTS

A total of 32 patients with hypospadias and a history of prior repair underwent urethroplasty between January 2002 and December 2012. Table 1 shows the characteristics of these patients. The patients were 16 to 63 years old (median 32). The most common complaint was obstruction/stricture, followed by fistula and infections. Of the patients 24 (75%) reported interim endoscopic and/or repeat repairs with multiple procedures in most patients.

Urethral stricture was present in 31 men. The remaining patient had a bulbar urethral diverticulum. In patients with stricture the mean stricture length was 7 cm (range 1 to 14). We noted penile urethra involvement in 25 patients (81%), a bulbar stricture in 5 and a fossa navicularis stricture in 1 (table 1). Urethroplasty was performed in 30 men. One of the remaining 2 patients elected perineal urethrostomy and 1 required diverticulectomy.

Table 1. *Patient and stricture characteristics*

No. pts	32	
Median age at surgery (range)	32	(16—63)
No. race (%):		
Caucasian	24	(75)
Other/unknown	8	(25)
No. presenting complaint(s) (%):		
Obstruction/stricture	25	(78)
Fistula	7	(22)
Recurrent infections	7	(22)
Penile curvature	2	(6)
Diverticulum	1	(3)
No. meatal presenting location (%):		
Distal	18	(5)
Mid shaft	6	(19)
Proximal	1	(3)
Undocumented	7	(22)
No. hypospadias severity at birth (%):		
Proximal	10	(31)
Mid shaft	7	(22)
Distal	1	(3)
Unknown	14	(44)
No. age at initial repair (%):		
Infant (1 yr or less)*	4	(13)
Child (greater than 1—less than 18 yrs)*	20	(63)
Adult (18 yrs or greater)*	2	(6)
Unknown	6	(19)
No. stricture	31	
Median cm stricture length (range)	7	(1—14)
No. hair present (%):		
Yes	10	(32)
No	21	(68)
No. stricture location (%):		
Bulbar urethra	5	(16)
Penile urethra	16	(52)
Fossa navicularis	1	(3)
Penile urethra + fossa navicularis	2	(6)
Bulbar + penile urethra	4	(13)
Bulbar + penile urethra + fossa navicularis	3	(10)

* Known age.

Of the 30 patients treated with urethroplasty 27 (90%) underwent 2-stage repair, of whom 16 required augmentation of the urethral plate and 11 needed excision and replacement of a portion of the urethral plate. Mean ± SD time between stages was 6.7 ± 2.4 months. In 3 patients the plate was deemed sufficiently robust for a 1-stage procedure. Two patients were treated with a ventral onlay graft, and 1 underwent bulbar stricture excision and primary anastomosis. When a graft was required, buccal mucosa was most commonly used (72.4% of patients). Two patients who presented with penile curvature secondary to ventral scarring required a 2-stage repair. Curvature was treated during the first procedure with excision of scar tissue. The figure shows a patient with recurrent stricture after failed hypospadias repair who underwent 2-stage