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The Effect of Previous Internal Urethrotomy on Urethroplasty Outcomes

Geçirilmiş Üretrotomi İntern Sayısının Üretroplasti Sonuçları Üzerine Etkisi

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ABSTRACT Objective: Previous repeated transurethral treatment has also been suggested to increase tissue damage, complicate stricture and reduces the success of the urethroplasty. In this study, we investigated the effect of the number of previous transurethral treatments on urethroplasty outcomes. **Material and Methods:** We retrospectively reviewed records of patients who underwent urethroplasty at our institution from 2014 to 2017. Thirty-one patients who had only bulbar urethral stricture and, excision and primary anastomosis urethroplasty were included in the study. Urethroplasty failure was defined as the need for any kind of surgical intervention during follow-up. Patients were divided into two groups according to the number of direct visual internal urethrotomy (DVIU) operations history before urethroplasty. Group 1 includes patients with the history of DVIU ≤ 2 and Group 2 include patients with the history of DVIU >2. **Results:** There were 16 patients in Group 1 and 15 patients in Group 2. The mean number of DVIU was 0.8 and 5.3 in Group 1 and Group 2, respectively. The mean stenosis length was 2.75 cm in the first group and 2.6 cm in the second group (p= 0.713). The mean duration of operation was 157.3 min in the first group and 202.5 min in the second group. Patients in Group 1 had a significantly shorter duration of operation than those in Group 2 (p= 0.028). The success rate was 87.5% in the first group and 66.7% in the second group (p= 0.177). **Conclusion:** The success and complication rate of urethroplasty does not differ in patients with history of more than two DVIU operations. However, repeated DVIU is associated with prolonged duration of urethroplasty.

Keywords: Anastomosis, surgical; urethra; urethral stricture; urologic surgical procedures, male

ÖZET Amaç: Daha önce tekrarlanan transüretral tedavinin artan doku hasarıyla ilişkili olarak darlığı komplike hale getirdiği ve üretroplasti başarısını azalttığı öne sürülmüştür. Bu çalışmada, geçirilmiş transüretral tedavilerin üretroplasti sonuçlarına etkisini araştırdık. **Gereç ve Yöntemler:** 2014'ten 2017'ye kadar kurumumuzda üretroplasti yapılan hastaların kayıtlarını retrospektif olarak inceledik. Çalışmaya sadece bulber üretral darlığı olan, tedavi olarak eksizyon ve primer anastomoz üretroplasti uygulanmış 31 hasta alındı. Üretroplasti başarısızlığı, takip sırasında herhangi bir cerrahi müdahale gerekliliği olarak tanımlandı. Hastalar, üretroplasti öncesi geçirilmiş üretrotomi intern (Uİ) sayısına göre iki gruba ayrıldı. Grup 1, Uİ ≤2 öyküsü olan, Grup 2, Uİ >2 öyküsü olan hastalardan oluşturuldu. **Bulgular:** Grup 1'de 16 hasta, Grup 2'de 15 hasta vardı. Ortalama Uİ sayısı Grup 1'de 0,8, Grup 2'de 5,3 idi. Ortalama darlık uzunluğu birinci grupta 2.75 cm, ikinci grupta 2,6 cm idi (p=0,713). Ortalama operasyon süresi birinci grupta 157.3 dakika, ikinci grupta 202,5 dakika idi. Grup 1'deki hastaların operasyon süresi Grup 2'ye göre anlamlı derecede daha kısaydı (p=0,028). Başarı oranı birinci grupta %87,5, ikinci grupta %66,7 idi (p=0,177). **Sonuç:** Üretroplastinin başarısı ve komplikasyonu, iki ve daha fazla Uİ öyküsü olan hastalarda değişmemektedir. Bununla birlikte, tekrarlanan Uİ uzamış üretroplasti süreyle ilişkilidir.

Anahtar Kelimeler: Anastomoz, cerrahi; üretra; üretra darlığı; ürolojik cerrahi işlemler, erkek

Urethral stricture is typically tightening of the urethra due to fibrosis or inflammation of the epithelial tissue and causes some problems including obstructive voiding symptoms, urinary tract infection or renal insufficiency in severe cases. The main symptoms are poor stream,

dribbling, increased frequency, prolonged voiding, hematuria, urinary incontinence, recurrent urinary tract infections and urinary retention. Urethral endoscopic procedures such as cystoscopy and catheterization are the most common cause of urethral stricture in that they cause trauma to the urethral lumen and fibrosis, which can lead to stricture formation.[1] Other less common causes are external blunt perineal trauma, sexually transmitted disease, or lichen sclerosus.

Two options are available to manage urethral strictures: transurethral treatment and open surgical management. Transurethral treatment is widely and improperly used in the urethral stricture diseases because of their reproducibility in terms of simplicity with low complication rates. Urologists have not been well informed about the urethroplasty, which requires surgical experience. Recent studies have shown that urethroplasty is considered to be the gold standard method of urethral stricture treatment.[1]

Previous repeated transurethral treatment has also been suggested to increase tissue damage, complicate stricture and reduces the success of the urethroplasty. In this study, we investigated the effect of the number of previous transurethral treatments on urethroplasty outcomes.

MATERIAL AND METHODS

We retrospectively reviewed records of patients who underwent urethroplasty at our institution from 2014 to 2017. Patients with incomplete clinical data, with stricture localization other than the bulbar urethra, prior urethroplasty, those treated with substitution urethroplasty and staged operation, and follow-up duration shorter than 6 months were excluded from study. Thirty-one patients who had only bulbar urethral stricture and, excision and primary anastomosis urethroplasty were included in the study. All patients' demographic data, etiology, number of direct visual internal urethrotomy (DVIU), pre-operative maximum urinary flow rate (Qmax) obtained by uroflowmetry and post-mictional residual (pmr) urine volume were noted. Before the operation physical examination, complete urine analysis, urine culture and retrograde urethrography and/or voiding cystourethrography were performed.

All patients were operated under general anesthesia with broad-spectrum prophylactic antibiotic coverage. The patients were placed in the lithotomy position. A vertical perineal skin incision was used and the urethra was located by palpation and then dissected. The stenosis was determined by cystoscope and fibrotic urethra was resected until completely healthy urethra was found. A 1-cm spatulation was performed on each urethral end. The anastomosis was performed with six to eight interrupted 4/O polyglactin sutures with end-to-end technique. A 16-F Foley catheter is placed for urinary diversion.

Patients were evaluated with uroflowmetry after urinary catheter expulsion, retrograde urethrography 1 month after operation and cystoscopy 3 months after operation. Urethroplasty failure was defined as the need for any kind of surgical intervention (catheterization, dilatation, DVIU, urethral stenting, and re-urethroplasty) during follow-up. Patients were divided into two groups according to the number of DVIU operations history before urethroplasty. Group 1 includes patients with the history of DVIU ≤2 and Group 2 include patients with the history of DVIU >2. Statistical comparison of operative and postoperative data were performed between groups.

The Statistical Package of Social Sciences for Windows version 20 was used for statistical analysis. Categorical variables were presented as numbers and percentages and compared with Chi Square test. Continuous variables were presented as means and standard deviations and were compared with independent sample t test. Correlation analyses were evaluated using Pearson's correlation coefficient. Statistical significance was considered when two-tailed p value is <0.05.

RESULTS

Thirty-one men undergoing primary bulbar urethroplasty were identified for analysis. There were 16 patients in Group 1 and 15 patients in Group 2. The mean number of DVIU was 0.8±0.9 and

5.3±3.6 in Group 1 and Group 2, respectively. The mean age at the time of urethtroplasty was 43.9±16.6 in the first group and 38.5±18.8 years in the second group (p=0.403). There was no difference between groups in the terms of etiology and coronary artery disease (p=0.846, 0.964, respectively).

The most common urethral stricture etiology was trauma (43.8%) in Group 1 and idiopathic (40%) in Group 2. In the first group, 5 patients (31.3%) had cystostomy, whereas in the second group 13 patients (86.7%) had cystostomy, preoperatively (p= 0.001). No statistical difference was detected between the preoperative Qmax and pmr urine volume of both groups (p: 0.743, 0.309, respectively). The mean stenosis length was 2.75 ± 1 cm in the first group and 2.6 ± 1.2 cm in the second group (p= 0.713). The mean duration of operation was 157.3 min in the first group and 202.5 min in the second group. Patients in Group 1 had a significantly shorter duration of operation than those in Group 2 (p= 0.028). Preoperative data are shown in Table 1.

Both groups were similar in urethral catheter duration, duration of follow-up, postoperative Qmax values (p= 0.079, 0.531, 0.521, respectively). Early surgical complications were one wound hematoma in Group 1, one wound hematoma and one wound infection in Group 2 (p= 0.521). The success rate was 87.5% in the first group and 66.7% in the second group. Although the success rate was lower in Group 2 but there was no statistically significant difference between groups (p=0.177) (Table 2). Of 7 patients with failed urethroplasty, one underwent urethral dilatation, four underwent DVIU, one underwent urethral stenting, and one underwent re-urethroplasty.

TABLE 1: Comparison of demographics of patients

	Group 1	Group 2	p
Number of Patients	16	15	
Age (years)*	43.9 ± 16.6	38.5 ± 18.8	0.403
Etiology			0.846
-Infection	0	1 (6.7%)	
-Iatrogenic	5 (31.3%)	4 (26.7%)	
-Trauma	7 (43.8%)	4 (26.7%)	
-Idiopathic	4 (25.0%)	6 (40.0%)	
CAD story	1 (6.3%)	1 (6.7%)	0.964
Surgical Story	5 (31.3%)	6 (40.0%)	0.625
Previous number of DVIU*	0.8 ± 0.9 (0-2)	5.3 ± 3.6 (3-12)	<0.05
Patient with Cystostomy	5 (31.3%)	13 (86.7%)	0.001
Preoperative Qmax (ml/sec)*	8.4 ± 0.9	8.1 ± 2.1	0.743
PMR (cc)*	68 ± 19.2	83.9 ± 31.2	0.309
Stenosis Length in Urethrography	2.75 ± 1.0	2.60 ± 1.2	0.713

*: Mean + Standard Deviation
CAD: Coronary Artery Disease
DVIU: Direct Visual Internal Urethrotomy
PMR: Post-Mictional Residue

TABLE 2: Comparison of operative and post-operative datas.

	Group 1	Group 2	p
Stenosis Length in Operation (cm)*	3.0 ± 1.2	2.9 ± 1.1	0.747
Operation time (min)*	157.3 ± 50.6	202.5 ± 57.6	0.028
Urethral Catheter Time (days)*	16.9 ± 4.2	13.9 ± 4.5	0.079
Duration of Follow (months)*	14.2 ± 9.2	13.5 ± 5.8	0.797
Postoperative Qmax (ml/sec)*	30.8 ± 5.9	29.3 ± 7.1	0.531
Complication	1 (6.3%)	2 (13.3%)	0.521
Success	14 (87.5%)	10 (66.7%)	0.177

*: Mean + Standard Deviation

DISCUSSION

Urethral stricture is typically sections of tightening of the urethra due to fibrosis or inflammation of the epithelial tissue. Iatrogenic causes are probably the most common cause, including instrumentation and catheters. In our study the most common etiology was trauma (35.5%). The main symptoms are poor stream, dribbling, increased frequency, prolonged voiding, haematuria, incontinence of urine, recurrent urinary tract infections and urinary retention. Retrograde urethrography, voiding cystourethrography, urethro-cystoscopy or ultrasound urethrography can be used for diagnosis of urethral stricture. Determining the length and the location of the urethral stricture is important to decide the treatment strategy.

Retrograd urethrography is the most common preoperative investigation for uretral stricture. However, the stenosis seems to be shorter due to dilatation in the proximal segment of the stricture. Therefore, the accuracy of the retrograde urethrography to assess urethral stricture is limited.[2,3]

Hence, the surgical technique is unpredictable for urethroplasty. Final decision for the reconstructive surgical technique can be made after the intraoperative assessment of localization and length of stricture.

The choice of management depends heavily upon the location, cause and length of the stricture. Urethral dilation, DVIU or urethroplasty can be an option for the initial treatment of a short (<2 cm) bulbar urethral stricture but urethroplasty is superior to transurethral technics in long (>2cm) bulbar urethral strictures. Urethroplasty can be a better choice instead of repeated endoscopic management for recurrent anterior urethral strictures following failed dilation or DVIU.[1] In our series, the majority of patients were managed by DVIU (74.2%) as a first-line therapy. There were only 8 patients (25.8%) whose strictures had not favorable characteristics for endoscopic treatment and as a first-line therapy urethtroplasty was selected. In addition, 19 patients (61%) received repeated DVIU.

Repeated DVIU makes urethroplasty more difficult due to tissue injury.[4,5] Several previous studies have shown that longer strictures and more complex reconstruction at urethroplasty are the results of repeated transurethral treatment.[6,7] Breyer et al. reported that history of DVIU was a significant predictor of failure after urethroplasty.[8] In this study, the operation time of urethroplasty increased with previous repeated transurethral treatments. We think that this is the result of a difficult, time-consuming dissection due to fibrosis of tissues. Although the success of urethroplasty was lower with Group 2 but the difference was not significant and complication rates were similar between the groups.

The most suitable urethroplasty option is selected according to the location and condition of the stenosis including excision and primary anastomosis, augmentation procedures, and multistage techniques. One stage or multistage techniques using oral mucosal grafts, penile fasciocutaneous flaps or a combination of these techniques can be performed for long multisegment strictures. In our study all patients had strictures in the bulbar urethra with the mean stenosis length of 3.0 cm. Excision and primary anastomosis urethroplasty was applied to all patients.

Many studies have demonstrated the long-term efficacy of urethroplasty and the high rate of stricture recurrence of transurethral treatment.[9,10] As a result, nowadays urethroplasty is superior to recurrent transurethral treatments.[11] Most urologists had tendency to transurethral treatment and had little experience with urethroplasty. DVIU is suitable for short bulber urethral strictures and has high failure rates when the stricture is long. Repetitive DVIU should be avoided because of low efficacy and increasing spongiofibrosis.[12] Hence, multiple endoscopic treatments are associated with a lower success rate and a more difficult subsequent open repair.[13] Viers et al. found each endoscopic procedure was associated with an incremental 19% increased risk of urethroplasty failure, and increasing stricture length.[14] In contrary, some studies showed that patients with previous endoscopic treatments do not have a significantly higher failure rate, but urethroplasty can be more complex.[15,16]

Recurrent urethral stricture after urethroplasty is a controversial issue. Failed anastomotic repairs are usually the result of an inadequate excision of fibrotic tissue and/or inadequate distal urethral mobilization, resulting in an anastomosis performed under tension. Warner et al. concluded that salvage DVIU offers an appropriate first step in the management of failed urethroplasty for a bulbar urethral stricture with a cure rate of 56%. If the DVIU fails, a redo urethroplasty has a comparable success rate to a first time urethroplasty at 72%.[17]

The main limitations of this study include its retrospective design, the inability to calculate etiology-based outcomes and that the number of patients was small. Therefore, further prospective and randomized studies with a larger patients volume are needed to assess the accuracy.

In conclusion, the success and complication rate of urethroplasty does not differ in patients with history of more than two DVIU operations. However, repeated DVIU is associated with prolonged duration of urethroplasty.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Fatih Yanaral, Murat Şahan;* ***Design:*** *Metin Savun, Alkan Çubuk;* ***Control/Supervision:*** *Faruk Özgör, Ömer Sarılar;* ***Data Collection and/or Processing:*** *Fatih Yanaral, Metin Savun, Ufuk Çağlar;* ***Analysis and/or Interpretation:*** *Murat Şahan, Faruk Özgör;* ***Literature Review:*** *Ufuk Çağlar, Alkan Çubuk;* ***Writing the Article:*** *Fatih Yanaral, Murat Şahan;* ***Critical Review:*** *Faruk Özgör, Ömer Sarılar;* ***References and Fundings:*** *Metin Savun;* ***Materials:*** *Ufuk Çağlar, Alkan Çubuk.*

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