ARAŞTIRMA MAKALESİ/ORIGINAL RESEARCH

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Effect of urethroplasty on voiding and sexual functions: Retrospective Analysis

Üretroplastinin işeme ve seksüel fonksiyonlar üzerine etkisi: Retrospektif Analiz

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ABSTRACT

INTRODUCTION: To evaluate the effect of urethroplasty on voiding and sexual functions.
METHODS: The data of patients who underwent urethroplasty with different techniques due to urethral stricture and had at least 2 years of follow-up were evaluated retrospectively. Patients were grouped according to whether the corpus spongiosum was cut or not. Ten patients who underwent Excision Primary Anastomosis and Augmented Anastomotic Urethroplasty using buccal mucosa constitute Group 1 (Transecting), while fifteen patients who underwent Non Transecting Anastomotic Urethroplasty, Dorsal Onlay Buccal Mucosal Graft Urethroplasty and Kulkarni One-sided Dorsolateral Onlay Buccal Mucosal Graft Urethroplasty were considered as Group 2 (Non-Transecting).
RESULTS: While quality of life score was 3.5 ± 0.53 in Group 1 before treatment, it was 1.6 ± 0.52 after treatment ($p<0.001$), in Group 2 it was 3.26 ± 0.46 before treatment and 1.4 ± 0.51 after treatment ($p<0.001$). In Group 1, Male Sexual Health Questionnaire Ejaculatory Dysfunction score was 10.8 ± 1.55 before treatment, 11.1 ± 1.37 after treatment, and in Group 2, it was 10.88 ± 1.59 before treatment and 12.3 ± 1.54 after treatment ($p<0.001$).
DISCUSSION AND CONCLUSION: Regardless of the technique applied, a statistically significant improvement was observed in the maximum flow rates and quality of life of all patients compared to the preoperative period. While there was no statistically significant change in erectile function before and after surgery in both groups; It was observed that ejaculatory function improved statistically in the group using Non-Transecting techniques.

Keywords: urethral stricture, urethroplasty, urination, sexual health

ÖZ

GİRİŞ ve AMAÇ: Üretroplastinin işeme ve seksüel fonksiyonlar üzerine etkisini değerlendirmek.
YÖNTEM ve GEREÇLER: Üretra darlığı nedeniyle değişik tekniklerle üretroplasti yapılan ve en az 2 yıllık takipleri bulunan hastaların verileri retrospektif olarak değerlendirildi. Korpus spongiozum tam kat kesilip kesilmemesine göre hastalar gruplandırıldı. Eksizyon ve Primer Anastomoz ve bukkal mukoza kullanılarak Augmente Anastomotik Üretroplasti uygulanan on hasta Grup 1 (Transecting)' i oluşturur iken Non Transecting Anastomotik Üretroplasti, Dorsal Onlay Bukkal Mukozal Greft Üretroplasti ve Kulkarni Tek Taraflı Dorsolateral Onlay Bukkal Mukozal Greft Üretroplasti uygulanan on beş hasta Grup 2 (Non-Transecting) olarak değerlendirildi.
BULGULAR: Grup 1'de yaşam kalitesi skoru tedavi öncesi 3.5 ± 0.53 iken tedavi sonrası 1.6 ± 0.52 ($p<0.001$), Grup 2'de tedavi öncesi 3.26 ± 0.46 iken tedavi sonrası 1.4 ± 0.51 olarak izlendi ($p<0.001$). Grup 1'de erkek cinsel sağlığı, ejakülator disfonksiyon sorgulama formu skoru tedavi öncesi 10.8 ± 1.55 iken tedavi sonrası 11.1 ± 1.37, Grup 2'de ise tedavi öncesi 10.88 ± 1.59 iken tedavi sonrası 12.3 ± 1.54 saptandı ($p<0.001$).
TARTIŞMA ve SONUÇ: Uygulanan teknikten bağımsız olarak tüm hastaların maksimum akım hızları ve yaşam kalitesinde ameliyat öncesi döneme göre istatistiksel anlamlı iyileşme gözlendi. Erektil fonksiyonda her iki grupta ameliyat öncesi ve sonrası istatistiksel anlamlı değişiklik izlenmezken; ejakulatuar fonksiyonun Non-Transecting teknikler kullanılan grupta istatistiksel olarak anlamlı bir şekilde düzeldiği görüldü.

Anahtar Kelimeler: üretra darlığı, üretroplasti, işeme, seksüel sağlık

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INTRODUCTION

Male urethral stricture is an important chronic urological disease related issue with significant morbidity and high recurrence rates (1). Urethral strictures have variable treatment options according to the length, level of spongiofibrose tissue and underlying causes (2). Many techniques can be selected from urethral dilatation to urethroplasty in treatment according to patient characteristics (3). Repeated endoscopic procedures cause complex scar formations, which complicate urethroplasty and lead to decreased success and increased complication rates (4). As a result, urethroplasty is becoming more popular among urologists as a treatment for urethral strictures.

Although an ideal urethroplasty is defined as providing complete urethral lumen patency and correcting obstructive symptoms, not requiring further procedures such as dilation, internal urethrotomy, and urethroplasty, postoperative sexual function significantly affects the patient's perception of surgical success, independent of urinary function (5). Therefore, sexual function status after urethroplasty has recently become the focus of interest.

Although initially available outcome data on sexual function after urethroplasty focused primarily on erectile function (EF), as understanding the complexity of sexual function it became clear that overall sexual satisfaction for men covers more than just the capability to have an erection (6-8).

The aim of our study was to evaluate ejaculatory function (EjF) with EF using standard, validated questionnaires to better define sexual dysfunction (SD) as well as voiding function after urethroplasty.

MATERIAL AND METHODS

The data of patients who underwent urethroplasty with different techniques due to urethral stricture in our clinic between January 2014 and May 2019 and had at least 2 years of follow-up were evaluated retrospectively. Patients who had undergone urethroplasty and hypospadias surgery, posterior urethroplasty due to pelvic fracture before, patients whose current data could not be reached and who were excluded from follow-up excluded from the study. Also the patients who continued their treatment in another center were excluded from the study.

Urethral strictures were diagnosed by clinical history, uroflowmetry (UF) and retrograde urethrography (RU). All of the patients were evaluated with preoperative physical examination and laboratory tests such as complete blood count, urea, creatinine, urinalysis and urine culture. Patients were treated with appropriate antibiotics based on the urine culture if they had an active urinary infection

Trauma history, presence of obliterative stricture, level and length of stricture, number of previous

endoscopic interventions, and physician preference were factors that effect selection of the urethroplasty tecnique. The operations were performed by the same surgeon.

The patients were divided into two groups according to whether the corpus spongiosum was cut completely or not during urethroplasty. Group 1 (Transecting) consists of 10 patients who underwent Augmented Anastomotic Urethroplasty (AAU) technique using buccal mucosa and Excision and Primary Anastomosis (EPA), while Non Transecting Anastomotic Urethroplasty (NTAU), Dorsal Onlay Buccal Mucosal Graft Urethroplasty (DOBMGU) and Kulcarni Unilateral Dorsolateral Onlay Buccal Mucosal Graft Urethroplasty techniques were evaluated as Group 2 (Non-Transecting).

In order to evaluate their voiding functions, preoperative and postoperative maximum flow rates (Qmax) as measured by UF and general quality of life (QoL) score were recorded. Any rising in the QoL score was considered significant (9). These values were repated postoperative 4th month for short-term success and post-operative 24th month for long-term success. In order to evaluate sexual functions, pre- and postoperative male sexual health evaluation form (SHIM) and Turkish-validated male sexual health (ejaculatory dysfunction) form (MSHQ-EjD) were filled.

The Qmax, QoL, SHIM and MSHQ-EjD values of the patients before and after the treatment were evaluated within the groups themselves. Ethical approval was obtained from Istanbul Prof. Dr. Cemil Taşcıoğlu Cty Hospital Clinical Research Clinical Research Ethics Committee (01.07.2021, protocol code 265, ethics committee number 48670771-514.10). During the research, the Helsinki Declaration Rules were applied during the research.

Chi-square test, independent sample t test and paired sample t test were used in the statistical analysis of the study. Statistical significance was accepted as $p<0.05$.

RESULTS

Suitable 25 patients were included in the study. The mean age of the patients was 43.8 (26-62) years in Group 1 and 45.9 (25-68) years in Group 2. The median follow-up period was 32.8 (24-52) months in Group 1 and 31.4 (24-46) months in Group 2 (Table 1). Trauma was the most common etiological factor at a rate of 50% in Group 1, while there was no patient with a history of trauma in Group 2 ($p<0.05$). Idiopathic causes were the most common etiology in Group 2 with a rate of 53.3% (Table 1). The mean stricture length was 2.1 (1.5-3.6) cm in 10 patients in the transecting group. While the mean stricture length was 3.2 (1.2-8.5) cm in 15 patients in the Non-Transecting group (Table 1).

According to the stricture levels; Kulcarni Unilateral Dorsolateral Onlay Buccal Mucosal Graft Urethroplasty operation was performed in 2 patients

with stenosis longer than 7 cm in penile urethra. EPA was performed in 6 patients, NTAU was performed in 2 patients and DOBMGU operations were performed in 7 patients with stenosis longer than 2 cm with stenosis in the bulbar urethra. AAU operations were performed using buccal mucosa in 2 patients due to long segment stenosis in the bulbar urethra. NTAU was applied to 4 patients while EPA was applied to 2 patients with membranous urethral stricture (Table 1).

Table 1. Characteristics and Success Rates of Patients Who Underwent Urethroplasty

	Grup1 (Transecting)	**Grup2 (Non-Transecting)**	**p**
N	10	15	
Age (Year)	43.8 (26-62)	45.9 (25-68)	0.65
Length (cm)	2.1 (1.5-3.6)	3.2 (1.2-8.5)	0.13
Level of Stricture			
Penile		2 (%13.3)	0.65
Bulber	8 (%80)	9 (%60)	0.54
Membranous	2 (%20)	4 (%26.6)	0.7
Short term Success	10/10 (% 100)	14/15 (% 93.3)	0.4
Long term Success	9/10 (% 90)	13/15 (% 86.6)	0.8
Follow up(month)	32.8(24-52)	31.4(24-46)	0.8
Etiology			
İdiopathic	3 (% 30)	8 (%53.3)	0.45
İatrogenic	2 (% 20)	6 (%40)	0.54
Trauma	5 (% 50)		**0.01**
Infection		1 (% 6.6)	0.4

While Qmax was 9.5 ± 0.71 ml/sec before treatment, it was 16.9 ± 1.45 mL/sec after treatment in Group 1 (p<0.001). Qmax was 9.86 ± 0.51 ml/sec before treatment, it was 17.66 ± 0.89 ml/sec after treatment in Group 2 (p<0.001). While QoL was 3.5 ± 0.53 before treatment, it was found 1.6 ± 0.52 after treatment in Group 1 (p<0.001). In Group 2, QoL was 3.26 ± 0.46 before treatment and it was 1.4 ± 0.51 after treatment (p<0.001) (Table 2).

Tablo 2. Comparision of Result before and after Surgery

	Qmax bs	**Qmax as**	**p**
Group1 (Transecting)	9.5 ± 0.71	16.9 ± 1.45	**0.001**
Group2(Non-Transecting)	9.86 ± 0.51	17.66 ± 0.89	**0.001**
	QoL bs	**QoL as**	**p**
Group1 (Transecting)	3.5±0.53	1.6±0.52	**0.001**
Group2(Non-Transecting)	3.26 ± 0.46	1.4 ± 0.51	**0.001**
	SHIM bs	**SHIM as**	**p**
Group1 (Transecting)	19.6 ± 2.01	19.2 ± 1.31	0.44
Group2(Non-Transecting)	19.87 ± 1.55	20.13 ± 1.54	0.22
	MSHQ-EjD bs	**MSHQ-EjD as**	**p**
Group1 (Transecting)	10.8 ± 1.55	11.1 ± 1.37	0.08
Group2(Non-Transecting)	10.86 ± 1.59	12.3 ± 1.54	**0.001**

bs, before surgery; **as,** after surgery; **Qmax,** maximum flow rate; **QoL,** quality of life**; SHIM,** Sexual Health Inventory for Men; **MSHQ-EjD,** Male Sexual Health Questionnaire Ejeculatory Dysfunction

While SHIM was 19.6 ± 2.01 before treatment in Group 1, it was 19.2 ± 1.31 after treatment. In Group 2, SHIM was 19.87 ± 1.55 before treatment and 20.13 ± 1.54 after treatment. While MSHQ-EjD was 10.8 ± 1.55 before treatment in Group 1, it was 11.1 ± 1.37 after treatment. In Group 2, MSHQ-EjD was 10.88 ± 1.59 before treatment and 12.3 ± 1.54 after treatment (p<0.001) (Table 2).

There was no statistical difference between the groups in terms of short-term success, long-term success and follow-up times (Table 1). While short-term success was 100% in Group 1, it was 93.3% in Group 2. While the long-term success was 90% in Group 1, it was 86.6% in Group 2 (Table 1). Recurrence of stricture was observed in one patient at the 14th month after intervention in group 1 who underwent EPA and was treated with internal urethrotomy. In group 2, one recurrence was observed 3 months after intervention who had Kulcarni Unilateral Dorsolateral Onlay Buccal Mucosal Graft Urethroplasty with the 8,5 cm stricture. He was also treated with internal urethrotomy and included in the dilatation program. Additionally, one recurrence was observed at 22 months who underwent NTAU in Group 2 and was treated with internal urethrotomy.

DISCUSSION

Regardless of the surgical technique applied in our study, a statistically significant improvement was observed in the maximum flow rates and quality of life of all patients compared to the preoperative values (Table 2). In the evaluation made in terms of sexual functions, there was no worsening in EF in which Non-Transecting techniques were used, while statistically significant improvement was observed in EjF. In patients who underwent transecting techniques, although there was a slight decrease in EF in the postoperative period, it was not statistically significant. Additionally, improvement was observed in EjF in this group but it was not found to be statistically significant (Table 2).

The primary surgical treatment for urethral stricture is urethroplasty and it has %85-90 success rates for simple procedures and approximately 80% for complicated repairs (10). Urethroplasty is superior in terms of both cost management and success when available data are compared with endoscopic methods, therefore it is known as the gold standard method (11).

Because of its high success rate, long-term durability, and minimal morbidity, EPA has been the gold standard treatment option for small bulbar urethral strictures. (12). However, sexual side effects of EPA such as erectile dysfunction and ejaculation difficulties have been demonstrated. For this reason, Non-Transecting urethroplasty methods without cutting the corpus spongiosum have been developed to preserve urethral blood flow (13).

In a study investigating the effect of urethroplasty on sexual and voiding functions, 185 patients who underwent urethroplasty were evaluated and a %63 success rate was achieved in symptom scores and 69% in QoL scores. No worsening of EF was observed in patients compared to the preoperative period (9). SD has become important in determining overall patient satisfaction and independent perception of surgical success after reconstructive

surgery for urethral stricture. However, there are few publications about SD in the literature, and only EF of patients has been evaluated in most publications. This situation causes other SDs to be missed (14,15).

The incidence of erectile dysfunction (ED) after pelvic fracture has been observed in studies between 5%-20% (16). The incidence of ED increases from 42% to 62% in patients with pelvic fracture urethral injury (PFUI) (17). Patients who underwent posterior urethroplasty due to PFUI were not included in our study in order to exclude conditions that may cause ED regardless of the surgical technique.

Furr et al. was reported 99.3% success in terms of voiding symptoms in the study of 140 patients with a 60-month follow-up using the dorsal buccal graft and EPA technique. In this study, SD were also evaluated, including ejaculation disorders, and no difference in SD was found in patients who underwent both EPA and buccal mucosal grafts (18). In a study by Erickson et al., improvement in ejaculation function was observed after urethroplasty (8). In a more recent study of the same investigator, it is reported that ejaculation function is not affected after urethral reconstruction. It was observed that the dissection of the bulbocavernous muscle did not have a damage on the ejaculation function (19). Our results show that high success rates have been achieved in maximum flow rates and quality of life. When we evaluated it in terms of SD, there was a statistically insignificant worsening in EF in the transecting group, while ejaculatory functions improved, although it was not statistically significant in this group. In the patients to who underwent non-transecting techniques, there was no worsening in terms of EF, but there was a statistically significant improvement in terms of EjF (Table 2).

There are some limitations of our study. The first is that our study is retrospective. The other one is the small number of patients and the shorter follow-up period compared to the other publications in the literature.

Conclusion

Although it is known that urethroplasty procedures have high success rates in terms of voiding symptoms, the results of studies contradictory in terms of evaluating the effects on sexual functions.

In our study, we observed a statistically significant improvement in the maximum flow rates and quality of life of all patients compared to the preoperative period, regardless of the technique applied. While there was no statistically significant change in erectile function before and after surgery in both groups; we observed that ejaculatory function improved statistically in the group using Non-Transecting techniques.

We believe that large-scale prospective studies with

a large number of patients are required to completely understand the changes in sexual function following urethral stricture reconstruction.

Ethics Committee Approval: Ethical approval was obtained from Istanbul Prof. Dr. Cemil Taşcıoğlu Cty Hospital Clinical Research Ethics Committee (01.07.2021, protocol code 265, ethics committee number 48670771-514.10).

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Authors Contributions:

Concept: E.C.P., A.O., Design: E.C.P., A.O., Supervision: E.C.P., A.O., Resources:L.O., M.U.K., Materials: M.U.K., L.O., Data Collection:M.U.K., L.O., Analysis: E.C.P., A.O., Literature search:L.O., M.U.K., Writing:E.C.P., L.O., Review:A.O., M.U.K.,

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