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Effect of Duration of Catheterization on Recurrence after Endoscopic Urethrotomy

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Abstract **Original Research Article**

Purpose*:** The aim of the study was to analyze the effect of duration of catheterization on the recurrence of urethral stricture recurrence after endoscopic urethrotomy. ***Material and Methods: We retrospectively analyzed all patients who solely underwent endoscopic urethrotomy between January 2017 and June 2022. The effect of duration of catheterization and other clinical factors including weight, height, smoking, comorbid diseases, number, location, length and etiology of the strictures, presence of previous urethrotomies were analyzed. ***Results***: Total of 231 patients were included in the data analyses. The locations of the strictures were bulbar urethra (76%), penile urethra (15%) and membranous urethra (9%). The etiology was mostly iatrogenic (77%). The maximum duration of catheterization was equal or less than two weeks in all patients. The mean duration of urethral catheterization was 4.5 ± 2.3 days. Thirty-nine percent of the patients had a recurrence. There were no statistically significant difference in terms of stricture location and recurrence but mean time to recurrence was longer in younger ones (21.63±17,50 months vs. 13.37±13,11 months; p=0.013). The duration of catheterization was found to be significantly longer in the group with iatrogenic etiology (5.38±3.22 days vs. 4.22±1.96 days; p=0.002). ***Conclusions***: Endoscopic urethrotomy is still far away from being a definitive treatment with a higher recurrence rate. These rates seem to increase with elder age. Also, the surgeons have a tendency to lengthen the duration of urethral catheterization in iatrogenic ones.

Keywords: Endoscopic urethrotomy, urethral stricture, transurethral catheter, recurrence.

INTRODUCTION

One of the most challenging disease in urology; urethral strictures refers to a narrowed part of the urethra characterized by fibrosis and cicatrisation of the urethral mucosa and surrounding spongiosus tissue (spongiofibrosis) [1]. Urethral strictures in the male population has an estimated incidence of 1 in 1000 to 1 in 10.000 in developed countries and increases with age [2]. The mean age of strictures in male is 45.1 [3]. Most of the strictures are in bulbar urethra. There are many different etiologies and influential factors. Despite the low cure and high recurrence rates; endoscopic urethrotomy remains by far the most common method [4]. Direct vision internal urethrotomy (DVIU) is performed by making a cold-knife transurethral incision to release scar tissue, allowing the tissue to heal by secondary intention at a larger calibre and thereby increasing the size of the urethral lumen [5].

In a survey conducted by the members of the American Urology Association (AUA) in 2011 on the evaluation and follow-up of urethral strictures, it was shown that minimally invasive methods are at the forefront, especially in short anterior urethral strictures: urethral dilatation (92.8%), cold knife optic internal urethrotomy (85.6%), endourethral stent (23.4%), laser urethrotomy (19%), and periurethral steroid injection (7.9%) after urethrotomy [6]. Considering these results, the reason why minimally invasive techniques are at the forefront despite high recurrence rates; urethroplasty is a more complicated technique; on the other hand, the lack of surgical training, patient comfort, or follow-up procedures for strictures after urethroplasty may not be clearly clarified**.** The fact that this procedure can be performed under local anesthesia in an office environment, low cost and rapid patient recovery may be other reasons for preference [7].

Generally, studies in urethral stricture management have focused on urethroplasty outcomes, rely on surveys of clinicians without clinical details with inherent limitations such as age restrictions and lack of clinical follow up. We evaluated the effects of this etiological and clinical factors on stricture recurrence. However, in our study, we focused on endoscopic urethrotomy, which is a widely used modality, and the etiological and clinical factors on affecting stricture recurrence afterwards.

MATERIAL AND METHODS

We retrospectively analyzed all patients who solely underwent endoscopic urethrotomy between January 2017 and June 2022 in our clinic. Ones with urethral stricture after radical prostatectomy, patients who performed urethroplasty in the following period were excluded from the study. The effect of duration of catheterization and other clinical factors including weight, height, smoking, comorbid diseases, number, location, length and etiology of the strictures, presence of previous urethrotomies were analyzed. This study was approved by the institutional local Ethics Committee.

RESULTS

Total of 231 patients were included in the data analyses. The mean age of the patients was 65.9 ± 11.8. The mean BMI (body mass index) of the patients was 27.25±4.2. Most of the patients were smokers (75%). Ischemia related co-morbid diseases like CAD, atherosclerosis, hyperlipidemia, hypertension etc. were present in 47%. Most of the strictures were single (78.4%). The locations of the strictures were bulbar urethra (76%), penile urethra (15%) and membranous urethra (9%). The mean percentage of stricture was 81.1±15.9.

The etiology was classified as iatrogenic, idiopathic and other reasons. It was mostly iatrogenic (77%) and had no history of prior urethrotomy (64.9%). In the rest, prior endoscopic urological surgery was present in 51.5% and 3.9% of the patients had a history of transvesical prostatectomy. TUR-P was the most common iatrogenic reason in endoscopic urological surgeries. TUR-BT and URS was following it. The other causes in etiology consisted of transvesical prostatectomy and radiotherapy was found equal %3, 9.

The maximum duration of catheterization was equal or less than two weeks in all patients. The duration of catheterization was equal or less than 3 days in %50 and equal or less than 7 days in %95. The mean duration of urethral catheterization was 4.5 ± 2.3 days.

Thirty-nine percent of the patients had a recurrence. When patients were compared according to age groups (younger than 66 versus older than 65 years), there were no statistically significant difference in terms of stenosis location and recurrence but mean time to recurrence was longer in younger ones (21.63±17,50 months vs. 13.37±13,11 months; p=0.013) (Table).

There were no statistically significant differences in the location and presence of recurrence when compared for smoking history, presence of ischemic disease and history of previous urethrotomy. The duration of catheterization was found to be significantly longer in the group with iatrogenic etiology (5.38±3.22 days vs. 4.22±1.96 days; p=0.002).

Table 1: Data related to strictures of all patients.

	Age Groups	Mean ± Std. Deviation
Time to recurrence (months)	≤65	21,63 ±17,50
	>65	13,37 ±13,11
Duration of catheterization (days)	≤65	4,39 ±2,268
	>65	4,57 ±2,42
Length (cm)	≤65	1,72 ±1,06
	>65	1,32 ±0,66
Percentage of stricture (%)	≤65	79,29 ±17,98
	>65	82,50 ±14,02
Number of stricture	≤65	1,26 ±0,61
	>65	1,37 ±,069

DISCUSSION

DVIU is often used as the first-line treatment for urethral stricture disease. Although the stages of the procedure are described in detail, there is no clear information about the duration of catheterization and some other details. The aim of our study was to elucidate the effects of catheter dwelling time on recurrence after endoscopic urethrotomy. Because there is still no clear consensus among clinicians on this issue. In the survey conducted among AUA members, which we refer to in the introduction part of our article, duration of catheterization after endoscopic incision is variable, ranging from 24 hours to 6 weeks. From this survey, they found that common practice is one week (36%) followed closely by 24 hours (35%) and 2-5 days (15%) [6]. In addition, AUA guidelines from 2016; advocated bringing urethroplasty to the agenda in patients who had one unsuccessful endoscopic attempt before [8]. 231 patients in our study; was evaluated in terms of recurrence after endoscopic urethrotomy and factors affecting this situation. Patients who had a history of

urethroplasty at any time during the follow-up period or who had undergone radical prostatectomy for prostate cancer were excluded from the study. The reason for this was to evaluate the results of endoscopic urethrotomy in patients with intact urethral integrity. This is open to criticism by readers. The etiology was mostly iatrogenic [9]. A patient with urethral stricture with inflammatory etiology (eg. lichen sclerosus) could not be documented by us. Most of the time, this diagnosis emerges as a pathological diagnosis of the excision material made during urethroplasty. When lichen sclerosus is the etiology for urethral stricture, meatoplasty and urethroplasty come to the fore as a treatment option. Biopsy and long-term follow-up of lichen sclerosus are recommended as it has potential for the development of squamous cell carcinoma [10].

In a Cochrane Database of Systematic Review study of Wong *et al*., compared the results of surgical urethral dilatation and optical urethrotomy in 210 adult men with urethral stricture disease, there was no significant difference in the proportion of men without stenosis at 3 years or median recurrence time [11]. However, we did not include patients who were included in the urethral dilatation program or were followed up with urethral dilatation only. Because such patients were very few in our database.

In a recent study examining the results of high pressure balloon dilatation and optical urethrotomy used for urethral stricture, the stricture-free period after balloon dilatation was found to be longer than after urethrotomy [12]. In our patient population, although it is not considered as a data; dilatation program is applied with the aid of a benique bougie instead of balloon dilatation.

In another retrospective study, the success of these two techniques was compared in patients who underwent urethrotomy and/or urethroplasty between 2008 and 2012. The success rate in patients who underwent urethrotomy was 47.8% , while it was 86.4% in those who underwent urethroplasty (p = 0.01) [13].

An open randomized controlled trial compared urethrotomy and urethroplasty for cost-effectiveness. Over 24 months, urethroplasty cost on average more than urethrotomy (cost difference £2148, 95% CI £689 to £3606). Both interventions yielded similar results in symptom control during follow-up. However, urethrotomy was found to be more cost-effective based on available evidence [14].

The retrospective analysis by Redón-Gálvez *et al*., who made similar evaluations to our study, had a more limited number of patients. 67 patients were included in the study. Similar to our findings, thirty-eight percent of the patients had relapses; the majority of whom were obese and older than 60 years. Stricture location and etiologic findings were similar to our results. Differently, 88% of the patients in this study were non-smokers, but in our study 75% of the patients were smokers. In this study, only the length of the stenosis was found to have a statistically significant effect on recurrence (p=.025) [15]. Unfortunately, stenosis length could not be included as a criterion in our evaluations due to insufficient data.

In another paper, 1203 men who had undergone urethrotomy were examined by using a large database from across the country. Three different surgical interventions were performed for recurrences during the follow-up period: urethrotomy, urethroplasty, and end-to-end urethral anastomosis. In 236 cases (68%) at least one repeat urethrotomy was performed and 932 patients (78%) received no further surgical intervention for recurrent urethral strictures. Endoscopic urethrotomy was the most frequently performed intervention for the first recurrence. In this article, the mean time between primary and recurrent intervention was 29.5 months, with the longest interval in the 50-59 age group (31.2 months) [16]. In our study, when the age limit was 65 and the patients were divided into two different age groups; relapse time was statistically significantly longer in the younger group (21.63±17,50 months vs. 13.37±13,11 months; p=0.013).

In a retrospective analysis examining the relationship between the duration of catheter stay and recurrence after endoscopic urethrotomy, it was shown that catheterization time exceeding 5 days in general increased recurrence (p=0.0001). In addition, it was observed that recurrence rates increased as the diameter of the catheter inserted after the operation increased (p=0.004) [17]. In our study, no direct statistical significance was found between the catheter duration time and recurrence. Some significant findings were obtained indirectly.

There are some limitations in our study. Especially being a single-centered retrospective study; lack of adequate database on urethral stricture lengths; ignoring the type of blade used during endoscopic urethrotomy and not including patients who underwent urethroplasty during the follow-up period due to recurrent recurrences.

CONCLUSIONS

Endoscopic urethrotomy is still far away from being a definitive treatment with a higher recurrence rate. These rates seem to increase with elder age. As well, the surgeons have a tendency to lengthen the duration of urethral catheterization in iatrogenic ones. Future-oriented treatments for urethral strictures continue in tissue engineering-related issues. These studies highlight urethral substitutes, especially focused on reducing recurrences of endoscopic urethrotomy and improving surgical outcomes in urethroplasty. Detailed information about urethrotomy, such as catheter dwelling time and

catheter diameter, will be brought to the literature with comprehensive randomized controlled studies.

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Author Contribution

Research conception and design: all authors. Data acquisition: Muhammet Hilmi Enes Aracı. Data analysis and interpretation: Hikmet Köseoğlu. Drafting of the manuscript: all authors. Critical revision of the manuscript: Tolga Eroğlu, Hikmet Köseoğlu. Supervision: Hikmet Köseoğlu. Approval of the final manuscript: all authors.

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