

Approach to difficult urethral catheterizations in male patients during the Covid-19 pandemic

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Ethics Committee Approval

The ethics committee approval was obtained from
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Conflict of Interest

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Abstract

Background/Aim: Difficult urethral catheterization (DUC) is a frequent urological emergency in daily practice. Anticoagulant and antiaggregant drugs, included in the treatment protocols for COVID-19, tend to increase the risk of possible complications of alternative interventions, such as cystoscopy and suprapubic percutaneous cystostomy. Therefore, a less invasive method is needed in patients with DUC. This study aims to evaluate the results of Foley catheter insertion and urethral dilatation over a hydrophilic guidewire in patients with DUC.

Methods: A total of 23 male patients who visited the urology outpatient clinic or were referred due to urinary retention or inability to place a Foley catheter in the last 8 months were included in this case series. The patient charts were evaluated retrospectively. After the hydrophilic guidewire, blindly advanced from the urethral meatus under sterile conditions, reached the bladder, a Foley catheter was placed over the guidewire. In cases of urethral stricture, dilatation was performed over the guidewire with the help of hydrophilic S-Curve dilators, and a Foley catheter of suitable diameter was placed.

Results: A Foley catheter was successfully placed in 22 out of 23 patients. Urethral dilatation was performed in 13 patients due to urethral stricture, and a transurethral Foley catheter was placed in the other 10 patients without the need for dilatation. Although most of our patients (17 of 23 patients) were receiving anticoagulant or antiaggregant treatment during the procedure, no significant hemorrhagic complications occurred. A Foley catheter could not be placed in one patient with this technique; a percutaneous cystostomy catheter was placed instead.

Conclusion: The results of this study, conducted during the COVID-19 pandemic, show that our technique is safe and successful. We believe that our technique will be useful in preventing additional surgical interventions due to complications, especially during this pandemic.

Keywords: Difficult urethral catheterization, Hydrophilic guidewire, Urethral dilatation, COVID-19

Introduction

Difficult urethral catheterization in male patients is one of the most common urological emergencies. The main barrier pathologies are urethral stricture, benign prostatic hyperplasia, prostate cancer, bladder neck contracture, a false passage, and phimosis. In some cases, the urethral passage is normal; however, due to the anxiety of the patients and tight external sphincters, a catheter may not be placed [1]. During the COVID-19 pandemic, health care providers were advised to postpone surgical interventions and reduce anesthetic procedures, except for life-threatening conditions [2, 3]. In our case, we chose a less invasive method to reduce the need for additional surgery in difficult urethral catheterizations and studied its outcomes. The technique involved advancing a Foley catheter or performing urethral dilation over a transurethral, blindly advanced hydrophilic guidewire, which is less invasive compared to suprapubic cystostomy and endoscopic transurethral catheterization.

Materials and methods

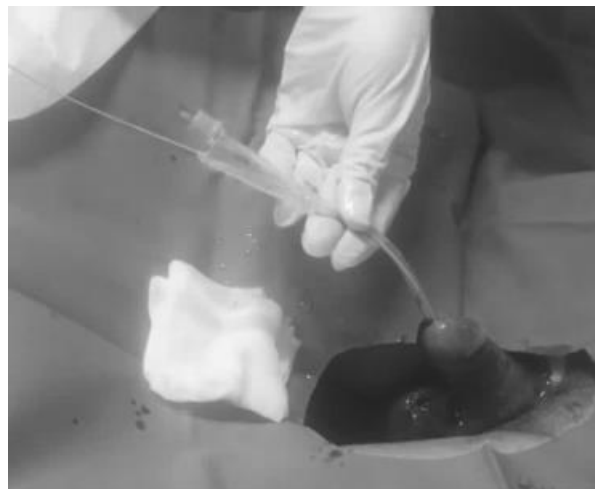
The ethics committee approval was obtained from Erzurum Regional Training and Research Hospital (Approval number: 2021/03-42). The data of patients who were referred to the urology department of the University of Health Sciences, Erzurum Regional Training and Research Hospital because of an inability to place a transurethral catheter within 8 months were retrospectively reviewed. All male patients with or without COVID-19 disease who were catheterized with the help of a hydrophilic guidewire were included in the study. Patients who could not be catheterized over the guidewire at the penile urethra level and needed dilatation were considered to have a urethral stricture. Patients in whom a Foley catheter balloon was inflated in the urethra before being referred to us, who had undergone repeated transurethral catheterization attempts and underwent catheterization with the help of a hydrophilic guidewire without dilatation were considered to have a false passage. Retrograde urography or urethro-cystoscopy was not performed for diagnosis due to pandemic conditions.

Technique

First, anamnesis was obtained from the patient to analyze the etiology. Antisepsis was achieved with betadine in the genital and suprapubic areas. A sterile cover with a hole was placed so that the penis was exposed. To provide local anesthesia, we applied a lubricating gel containing 2% lidocaine to the urethra and waited for 5 minutes. A 12-16 Fr (French) Foley catheter was advanced gently through the urethra. If catheterization failed, the soft end of a sterile hydrophilic guidewire wetted with saline was blindly advanced through the urethra. The open passage in the urethra was searched for by moving the guidewire back and forth at the point it was stuck. When necessary, a gel was applied from the urethral meatus, and the procedure was repeated. In cases where there was doubt about the guidewire's placement, ultrasonography was used to check whether it was in the bladder. Then, the 12 Fr or 14 Fr Foley catheter was cut slightly, protecting the balloon, and the probe canal was exposed from the tip. Because the Foley catheter was cut slightly from the tip, the rounded, non-traumatic

structure of the probe tip was preserved. The Foley catheter was then advanced into the bladder over the guidewire (Figure 1). When the catheter could move easily, the guidewire was taken out. After urinary output was observed, the procedure was terminated by inflating the Foley catheter in the bladder.

Figure 1: Foley catheter is advanced into the bladder over the guidewire



In cases where the Foley catheter could not be passed over the guidewire, after making sure that the guidewire reached the bladder, it was advanced approximately 30-40 cm further to make a few turns within the bladder. This was done to prevent possible bladder traumas during the dilatation procedure. First, an 8 Fr feeding catheter or 8 Fr Cook® hydrophilic S-Curve dilator was advanced into the bladder over the guidewire. When the catheter reached the bladder, it was taken out to continue an upper dilatation. The guidewire was then examined for urine droplets, as was done in the nephrostomy procedure. In suspicious cases or the absence of urine droplets, suprapubic ultrasonography was used to check whether the guidewire was in the bladder. Hydrophilic S-Curve dilators were used at 2 Fr intervals for the dilatation process (Figure 2). Starting with an 8 Fr or a 10 Fr S-Curve dilator, a stricture in the urethra was dilated up to 14-18 Fr according to the patient's tolerance to pain. During the dilatation or while the catheter was being advanced over the guidewire, the assisting healthcare personnel was asked to hold the distal end of the guidewire while paying attention to sterile conditions. During the dilatation procedure, utmost care was taken not to migrate the guidewire out. Depending on the dilatation level, one of the Foley catheters, up to 12-16 Fr, was advanced into the bladder over the guidewire by cutting the ends. The catheter, which was advanced without significant resistance to the bladder, was kept in the bladder, the guidewire was taken out and urine output was checked. After making sure that the catheter was in the bladder, the catheter balloon was inflated.

Figure 2: S- Curve urethral dilators



Results

Twenty-three male patients who underwent transurethral catheterization with the aid of a hydrophilic guidewire were included in the study. The average age of the patients was 76.4 years. Five were from the urology outpatient clinic, 9 patients were referred from the intensive care unit, 4 were from the inpatient clinic, and the remaining 5 were from the emergency outpatient clinic. Eight patients received treatment for COVID-19, all of which received anticoagulant/antiaggregants, in addition to 9 of the 15 non-COVID-19 patients (Table 1). A transurethral Foley catheter was successfully placed in 22 of the 23 patients (95.6%). In 13 of the patients who had a Foley catheter successfully placed, the catheter could not be advanced on the initial attempt over the guidewire starting distally from the bulbo-membranous urethra (BMU). In these patients, urethral dilatation was performed before the placement of the Foley catheter. Although there was mild urethrorrhagia during dilatation in these patients, it resolved with the possible tampon effect of the catheter immediately after the Foley catheter was placed. In 3 of the other 10 patients, a catheter had been inflated in the urethra before they were referred. In patients presenting with false passage and urethrorrhagia, the correct path was found with the guidewire and the Foley catheter was successfully placed. In 7 patients in which the Foley catheter did not pass the bulbomembranous urethra, the catheter was placed successfully without dilatation. These patients were thought to have false urethral passage or prostatomegaly. However, an endoscopic procedure could not be performed on these patients for differential diagnosis due to the pandemic conditions.

Table 1: The demographic and clinical features of the patients

No	Age	Department	Clinical Scenario	Antiaggregant/ Anticoagulant	*Covid 19	*Success
1	74	Emergency Outpatient Clinic	Urethral Stricture	Acetylsalicylic acid + clopidogrel -	-	+
2	78	Intensive Care Unit	Urethral Stricture	Enoxaparin sodium	+	+
3	80	Emergency Outpatient Clinic	Urethral Stricture	Rivaroxaban	-	+
4	78	Intensive Care Unit	Urethral Stricture	Acetylsalicylic acid + clopidogrel -	-	+
5	82	Intensive Care Unit	False passage	Acetylsalicylic acid	-	+
6	82	Intensive Care Unit	Urethral Stricture	Acetylsalicylic acid	+	+
7	80	Inpatient Clinic	Prostatomegaly/ False passage	-	-	+
8	75	Intensive Care Unit	Prostatomegaly/ False passage	Acetylsalicylic acid	+	+
9	74	Emergency Outpatient Clinic	Urethral Stricture	Enoxaparin sodium	+	+
10	66	Inpatient Clinic	Urethral Stricture	-	-	+
11	79	Inpatient Clinic	Urethral Stricture	Acetylsalicylic acid + Enoxaparin sodium	-	+
12	83	Urology Outpatient Clinic	Urethral Stricture	-	-	+
13	64	Emergency Outpatient Clinic	Prostatomegaly/ False passage	-	-	-
14	75	Urology Outpatient Clinic	Prostatomegaly/ False passage	-	-	+
15	77	Urology Outpatient Clinic	Prostatomegaly/ False passage	Acetylsalicylic acid	-	+
16	82	Urology Outpatient Clinic	Urethral Stricture	-	-	+
17	80	Urology Outpatient Clinic	Urethral Stricture	Rivaroxaban	-	+
18	61	Intensive Care Unit	Urethral Stricture	Enoxaparin sodium	+	+
19	79	Intensive Care Unit	Prostatomegaly/ False passage	Acetylsalicylic acid + enoxaparin sodium	+	+
20	79	Inpatient Clinic	False passage	Enoxaparin sodium	+	+
21	88	Intensive Care Unit	Prostatomegaly/ False passage	Acetylsalicylic acid + enoxaparin sodium	+	+
22	78	Emergency Outpatient Clinic	Urethral Stricture	Acetylsalicylic acid	-	+
23	65	Intensive Care Unit	False Passage	Clopidogrel + enoxaparin sodium	-	+

* (+) used for yes, (-) used for no

No complications developed in our patients, except for the insignificant temporary urethrorrhagia that developed in those with urethral strictures. The technique was unsuccessful in 1 patient. In this patient, no catheter or guidewire could pass from the posterior urethra. An endoscopic procedure for diagnosis could not be performed due to the patient's comorbidities and pandemic conditions. A percutaneous cystostomy catheter was placed.

Discussion

Foley catheter insertion into the bladder is a common procedure that is used to monitor urine output, in severe micturition difficulty or complete urinary retention. It is sometimes not possible to place a transurethral Foley catheter on the initial attempt. The failure to place a Foley catheter is a challenging condition that disturbs the patient and the physician and often needs to be solved immediately. It is frequently encountered by urologists in their daily work [1]. Percutaneous cystostomy catheterization, which is frequently used in daily urology practice, is more invasive and can lead to serious complications, such as hematuria, hemorrhage due to perivesical tissue injuries, peritoneum, rectum, bowel injury, and ileus [4].

The COVID-19 virus, which was first detected in Wuhan, China, in December 2019, soon turned into a global pandemic, one that severely affected our country as well. Our hospital has taken a central responsibility in combating this disease from the moment it began to spread in our city. This pandemic, which has caused us to reconsider our habits in all areas, has made it necessary for us to renew our approaches in daily urological procedures. The 2020 European Urology guidelines include recommendations for the COVID-19 pandemic period. These guidelines classified patients into four categories, and it was recommended that surgical interventions be delayed for up to 6 months in non-life-threatening situations [3].

Due to the prothrombotic events observed at a high rate in COVID-19 patients, anticoagulant and antiaggregant agents were included in treatment protocols since the beginning of the pandemic [5]. However, using agents that can cause bleeding diathesis may increase the risk of hematuria or hemorrhage in adjacent tissues during an invasive procedure such as a percutaneous suprapubic cystostomy [4]. Depending on the types of complications that develop, an additional surgical procedure may be required under anesthesia, which may cause additional risks for both the patient and the team involved in the procedure [6]. In our study, all COVID-19 patients and 10 (66.6%) of the other 15 patients were receiving antiaggregant or anticoagulant treatment. Eight (61.5%) of the 13 patients who underwent urethral dilatation were receiving anticoagulant or antiaggregant treatment. Despite the high rate of anticoagulant and antiaggregant treatment in our study, no major hemorrhage complications developed; therefore, none of our patients required additional surgery.

Table 2: Literature studies related the difficult urethral catheterization

Author/year	Clinical Scenario	Abstract, method, and technique of the study	Success rate (%)
Krikler et al. 1989 [8]	Difficult urethral catheterization	After accessing the bladder with a flexible cystoscope, the guidewire is pushed into the bladder through the cystoscope. After the cystoscope is removed by leaving the guidewire in the transurethral pathway, the Foley catheter with a trimmed tip is pushed into the bladder over the guidewire. There is no recommendation about urethral strictures in this study. A suprapubic cystostomy was recommended for patients with contraindications, false passage, or urethral diverticula.	–
Lowe et al. 1992 [7]	False passage secondary to the traumatization of the urethra, transurethral resection of the prostate, early removal of the catheter after radical prostatectomy	A peel-away sheath is placed on the cystoscope or resectoscope, providing access to the bladder under direct vision. With the sheath left in the urethra, the cystoscope is removed, and the Foley catheter is placed into the bladder through the sheath. The sheath is taken out. The procedures of 3 of 20 patients failed due to 2 peel-away sheaths kinking and 1 patient having an erection.	85%
Beagher et al. 1994 [15]	Patients who cannot undergo transurethral catheterization in the emergency room, intensive care unit, or operating room and require a urology consultation	A 0.038-inch guidewire inserted through a cystoscope is advanced under direct vision into the bladder beyond the obstruction in the urethra. After dilatation is provided with 6-12 Fr, then 12-18 Fr Nottingham dilators over the guidewire, the Council-type urethral catheter is placed into the bladder over the guidewire. This study was conducted with 54 patients, and the procedure failed in only 2 patients due to extensive bladder contracture.	96%
Blitz et al. 1995 [16]	Difficult urethral catheterization	After accessing the bladder with a cystoscope, a rigid hydrophilic guidewire is inserted into the bladder. A transurethral catheterization is then achieved through the guidewire by opening a hole at the tip of the transurethral catheter with a 16 G (gauge) needle. In the study conducted with 8 patients, the procedure succeeded in all. Internal urethrotomy was performed in 2 of the patients at the same time.	100%
Freid and Smith 1996 [10]	In conditions where a Foley catheter cannot be placed, and an emergency cystoscopy cannot be performed	After the guidewire is blindly advanced from the urethra to the bladder, an open-ended 7 Fr ureteral catheter is sent to the bladder over the guidewire and the urine output is controlled by taking it out of the guidewire. A 0.038 PTFE-coated hydrophilic guidewire is then pushed through the 7 Fr catheter. On this guidewire/catheter unit, an 18 Fr Graham-type transurethral catheter, or a 16 Fr Council-type transurethral catheter is placed after dilatation. In the study conducted with 20 patients, the technique failed in 1 patient with a pinhole urethral stricture.	95%
Rozanski et al. 1998 [9]	Patients in whom a Foley catheter cannot be placed after transurethral prostate incision or resection	A 6 Fr ureterorenoscope is inserted into a 22 Fr Foley catheter. After the Foley catheter is trimmed from the tip and accessed to the bladder under direct vision, keeping the Foley catheter in the bladder the ureterorenoscope is taken out. The procedure was performed on 2 patients.	100%
Zammit and German 2004 [11]	Patients in whom a transurethral Foley catheter cannot be placed on the initial attempt	A 0.89 mm diameter hydrophilic guidewire, which is blindly advanced through the urethra, is advanced approximately 20 cm further after reaching the bladder. Then, the Foley catheter is sent to the bladder through the catheter guidewire through a hole opened with an 18 G needle. In failed cases, dilatation is performed with the help of a 6-12 Fr flexible ureterorenoscopy introducer. The number of patients and the success rate were not reported in the study.	–
Mistry et al. 2007 [12]	Patients who cannot use a 12Fr or 18Fr Foley catheter in acute urinary retention	A 12 Fr or 18 Fr hydrophilic transurethral catheter is pushed into the bladder. The guidewire is placed into the bladder through the catheter. After the hydrophilic catheter is taken out, a Council-type catheter is placed into the bladder over the guidewire. The procedure was successful on 30 of 44 patients. The next stage was performed with a flexible or rigid cystoscope in the patients whose procedure failed.	68.2%

Various techniques were presented for inserting a transurethral catheter through the difficult male urethra. These techniques, for which we give a detailed summary of the literature in Table 2, include urethral dilatation and Foley catheter insertion, if necessary, following the advancement of a guidewire into the bladder under direct vision with flexible or rigid urethroscopy [7-9], after accessing the bladder with a sheath placed on a cystoscope or resectoscope, leaving the sheath in the urethra and placing a Foley catheter through the sheath [7], inserting a guidewire with a flexible cystoscope followed by inserting a Foley catheter over the guidewire [8] and providing access to the bladder with a ureterorenoscope placed in a 22 Fr Foley catheter [1,9]. Another technique provides access to the bladder with a hydrophilic guidewire that is blindly advanced from the urethral meatus. A Foley catheter is placed over the guidewire, and if there is a urethral stricture, dilatation is performed [10, 11]. Mistry et al. [12] tested a method in which, after they advanced a 14 Fr or 18 Fr hydrophilic catheter from the urethra to the bladder, they took the catheter out by inserting a guidewire into the bladder through the catheter. In the next step, they placed Council-type catheters transurethrally over the guidewire. However, this method was successful in only 30 of 44 patients (68.2%). Villanueva et al. [13] evaluated the approach of 142 urology assistants in difficult urethral catheterizations in a 2010 survey conducted in the U.S. This survey asked about the approach to difficult urethral catheterizations (DUCs) in three different clinical scenarios, as follows: 1. The catheter passed the BMU and the patient had prostatic surgery 2. The catheter passed the BMU, and the patient has no history of any urologic surgery 3. The catheter could not pass the BMU, and the patient has no significant urologic history.

The survey found that flexible cystoscope (74%, 62%, 63%) and blind guide wire advancement from the urethra (15%, 23%, 20%) techniques were preferred the most. Although transurethral catheterization by the aid of flexible cystoscope technique seems more advantageous at first glance, it requires well-equipped facilities such as an operating room.

In the guidelines prepared for the COVID-19 pandemic, the Italian Research Urology Network (RUN) recommended avoiding advanced anesthetic procedures as much as possible and using local anesthesia [2]. Simonato et al. [14] recommended postponing actual curative treatment after transurethral or suprapubic catheterization in patients who developed urinary retention during the COVID-19 pandemic period. Hence, more practical approaches have become necessary. Zammit and German [11] performed urethral dilatation up to 12 Fr with ureteral catheters over a hydrophilic guidewire that was blindly advanced from the urethra to the bladder. Then, dilation was achieved by advancing an 18 Fr sheath over the 12 Fr catheter, and finally, a 16 Fr Foley catheter was placed over the guidewire. Although this technique overlaps with our technique, there are essential differences. Using an 18 Fr sheath directly over a 12 Fr dilator can be disadvantageous in terms of traumatizing the urethral tissue, and it can be more difficult for the patient to tolerate. Because it provides step-by-step dilatation at 2 Fr intervals, the hydrophilic S-Curve dilator set we used seems to be advantageous in terms of protecting the urethral tissue and enhancing the patient's tolerance.

Thanks to this technique, a catheter can be placed successfully, providing treatment opportunities to patients with urethral strictures using dilatation. It is especially noteworthy that our technique can be performed under all conditions with very few instruments since we encounter these patients under

different conditions, including emergency rooms or small health institutions where endourological facilities are limited.

Both Simonato et al. [14] and the EAU guidelines [3] recommend that the curative treatment of such patients be postponed to a relatively uncertain time such as 'after the pandemic' or for 6 months. Thanks to this technique, performing dilatation for a urethral stricture will allow these patients to experience this waiting period more comfortably.

Limitations

Due to the COVID-19 pandemic conditions, the patients could not be assessed with endoscopic procedures for definitive differential diagnosis and curative treatment.

Conclusion

The presented technique is an easy, useful, and safe approach in patients with DUC. Urethral catheterization was performed with a high success rate (95.6%) without additional interventions under different conditions. It is noteworthy that although most patients (73.9%) were using antiaggregants or anticoagulants, there were no serious complications.

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