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# A new method to facilitate complicated urethral catheterization in men: a technical point of view

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## ARTICLE INFO

**Article Type:**  
Case Report

**Article History:**  
Received: 30 Jan. 2024  
Accepted: 14 Mar. 2024  
ePublished: 20 Aug. 2024

**Keywords:**  
Urethra  
Urethral catheterization  
Internal urethrotomy  
Trauma

## ABSTRACT

**Introduction:** Urethral injuries in men sometimes turn into colossal and long-term challenges. In some patients, urethral catheterization after internal urethrotomy or maintaining the alignment of the urethra after trauma may become complicated and not feasibly applicable. This study describes a new method and its technical points to facilitate probing in patients whose urethral catheterization is challenging. As far as we know, this technique has not been previously reported elsewhere.

**Case Presentation:** Case 1 involved a 34-year-old male patient who had a complete rupture of the posterior urethra following a 2-meter height fall on an iron rod penetrating the perineum. Case 2 was a 45-year-old male patient with a history of urethroplasty several times and receiving penile skin grafts for urethra reconstruction. Cystoscopy revealed intraurethral hair growth, significant fibrosis, and stricture throughout the urethra.

**Conclusion:** This study described a new method to facilitate ureteral catheterization using a Foley catheter mounted on the ureteroscope. This strategy is simple, effective, and promising when other ureteral catheterization methods prove inapplicable.

### Implication for health policy/practice/research/medical education:

This study describes a new method and its technical points to facilitate probing in patients whose urethral catheterization is challenging. This strategy is simple, effective, and promising when other ureteral catheterization methods prove inapplicable.

**Please cite this paper as:** Mousavi Bahar SH, Mohseni M, Derisi MM, Chehrazad A, Ataie AM. A new method to facilitate complicated urethral catheterization in men: a technical point of view. J Renal Inj Prev. 2024; x(x): e34305. doi: 10.34172/jrip.2024.34305.

## Introduction

Although urethral trauma is not a life-threatening problem, it can profoundly affect the individual's quality of life if it is not appropriately managed (1). In these cases, if applicable, Primary endoscopic realignment of the urethra is the preferred technique for patient management that can considerably relieve urethral stricture and the need for subsequent urethroplasty (2). For urethral stricture in men, direct vision internal urethrotomy is considered the standard primary treatment in which, after making an incision at the stricture site and restoring normal urethral flow, a Foley catheter should be implanted and fixed for a certain period to establish the therapeutic measures taken (3). In some patients, however, catheterization cannot be readily performed despite the complete opening of the urethral lumen up to the bladder after urethrotomy or even when the traumatic urethra is correctly aligned with

the endoscope (4). In these cases, the surgeon is placed in a difficult situation that can affect the success of the surgery and, subsequently, the patient's outcome. In this study, we share our experience of two patients whose urethral catheters failed to advance easily during catheterization. This method has been performed in patients who have failed the normal catheterization method like the use of council catheter.

## Case Presentation

### Case 1

The patient was a 34-year-old man who had a complete rupture of the posterior urethra following a 2-meter height fall on an iron rod penetrating the perineum. Initially, he underwent a cystostomy and was under the supervision of general surgeons until his vital signs stabilized. Two weeks after the trauma, to continue the treatment, the

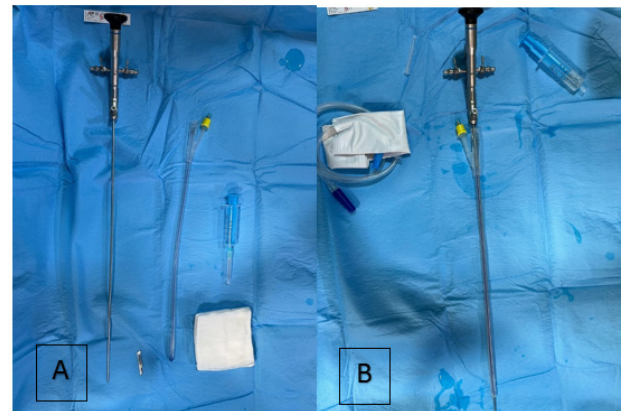
patient's urethra was evaluated, and he was considered a candidate for cystourethroscopy, possibly to reestablish the initial urethral alignment. Prior to the surgery, appropriate prophylactic antibiotics were prescribed. Also, the patient was fully explained about possible side effects and alternative methods, and informed consent was obtained from him. During cystoscopy, we realized that the membranous urethra was damaged and disrupted at 360 degrees up to the verumontanum, creating a wide gap in this area. With great effort, while the open space of the pelvis was observable, the trigone of the bladder in the upper part of the pelvis finally became visible, and we managed to enter the bladder with a cystoscope and place the guide wire along the urethral path into the bladder. We then fruitlessly tried to place the Foley catheter on the guidewire, so the catheter could not reach inside the bladder despite the correct positioning of the guide wire. At this step, to straighten the direction of the guidewire to facilitate the passage of the catheter, the Alken guide (from the Amplatz set) was passed over the guidewire, and with multiple maneuvers and the frequent use of lidocaine gel to lubricate the catheter's path, we tried to guide the Foley catheter into the bladder. However, it was again unsuccessful because the Foley catheter stopped advancing midway. Regarding the intensity of the urethral trauma and the critical impact of restoring urethral alignment on the fate of this young patient, we continued to seek a way to implement the Foley, and finally, a technique popped up in our minds that fortunately was effective.

### Case 2

The patient was a 45-year-old man with a history of urethroplasty several times and receiving penile skin grafts for urethra reconstruction. Cystoscopy revealed intraurethral hair growth, significant fibrosis, and stricture throughout the urethra. The patient initially underwent an internal urethrotomy to open the path from the urethra to the bladder. A guidewire was inserted in the urethral path, beyond which the Foley catheter of different sizes was tried. However, due to severe and all-long fibrosis, the Foley catheter twisted in midway and failed to reach the bladder despite that the path was open and sufficient amounts of lubricant gel were used. We replaced the latex catheter with a silastic one, which has more consistency than latex, to boost the chance of breaking through the fibrotic urethra. Unfortunately, the installation of the silastic catheter on the guidewire also failed. Finally, using the aforementioned technique, we managed to insert a Foley catheter for the patient with the help of a size 14 French catheter mounted on a size (4.5/6.5) French ureteroscope.

### Description of the technique

First, an appropriate Foley catheter is chosen according to the severity of the trauma or urethral stricture (usually 14-16 French). The catheter's tip is then cut by a scalpel blade



**Figure 1.** (A) Before placing the Foley catheter on the ureteroscope. (B) After placing the Foley catheter on the ureteroscope

with caution so that the bottom of the catheter, where the balloon is filled, remains untouched. Then, a rigid ureteroscope with an appropriate size (usually 6-8 French) is soaked with lubricant gel, on which the prepared Foley catheter is mounted. In other words, the ureteroscope is inserted into the Foley (Figure 1) in a way that the ureteroscope's tip is positioned a few millimeters ahead of the tip of the Foley catheter. Then, 20 mL of lidocaine gel is infused into the urethra, and the Foley catheter is covered with the gel all over. The bottom of the guidewire is passed through the ureteroscope. Then, similar to the classic method, using a ureteroscope on which the catheter is installed, the urethral path is traveled on the guidewire under direct vision. After ensuring that the ureteroscope's tip is inside the bladder, the Foley catheter is slowly pushed forward into the bladder; the ureteroscope is pulled back simultaneously, and the Foley balloon is finally filled. In this way, the Foley catheter is installed under direct vision ensuring its correct positioning.

### Discussion

Urethral stricture and traumas in men are among the ancient diseases in the field of urology, and their choice of treatment depends on various factors, such as the location and severity of the trauma, the length of the stricture, and their etiologies.

For severe urinary tract traumas, treatment in the acute phase usually includes the insertion of a suprapubic catheter to empty the bladder until the patient's condition becomes stabilized. However, patients treated only with a suprapubic catheter often suffer from complete and wide urethral stricture, which will require urethroplasty (5). Therefore, efforts to establish the initial urethral alignment can be a promising treatment. Johanson et al showed that establishing the initial alignment can be a definitive and complete treatment for about one-third of these patients (6). In contrast, the rest of the patients will at least benefit from the two urethral ends becoming closer, reducing the length of the stricture and providing the possibility of endoscopic treatment or a simpler

urethroplasty (7). However, since patients with posterior urethral rupture usually suffer from concomitant traumas such as pelvic fracture and hematoma (1), restoring urethral alignment in this condition is not always easy, which is often associated with many challenges. For this reason, various techniques have been introduced for antegrade or antegrade plus retrograde endoscopy with or without using flexible endoscopes (8).

On the other hand, Foley catheter insertion after endoscopic ureteral surgeries, such as internal urethrotomy, will have a deterministic role in their subsequent success. Nevertheless, catheterization is not feasibly accessible in some patients despite complete and successful urethrotomy (4). Different maneuvers have been introduced to overcome this problem, including the antegrade or retrograde placement of a guidewire in the urethra, followed by Foley catheter installation or the simultaneous use of various urethral catheters and dilators (8, 9). In the study of Yeşil et al, the leading cause of failure of post-urethrotomy catheterization has been noted to be the twisting of the guidewire due to insufficient tension. Therefore, to facilitate urethral catheterization after urethrotomy, the guidewire is inserted into the urethra through the suprapubic line; then, the two urethral and suprapubic ends of the guidewire become under tension, and the catheter is finally passed through (3). In another study, Chelladurai et al used ureteral dilators with small to large sizes, in sequence, to finally pass the Foley catheter and facilitate catheterization after passing the guidewire through the stricture site in those suffering from urethral strictures (8). In this study, the same as Villanueva et al, the researchers preferred to use ureteral dilators instead of urethral dilators, arguing that the smaller diameter, the longer length, and the hydrophilic covering of ureteral dilators could better facilitate dilatation (9). Athanasopoulos et al used a ureteral access sheath for urethral dilatation in complicated catheterization cases due to urethral stricture, believing that the hydrophilic nature would lead to successful and atraumatic dilatation (10).

With the passage of time and gathering personal experiences, every urologist will evoke their specific methods for catheterization in challenging situations using the existing tools and equipment. There are no single standard methods in this area. In this study, we presented our experience in such situations in detail, which can be easily applied using widely available and leased facilities to help in complicated cases of urethral catheterization within the shortest period. In this method, we use a semi-rigid ureteroscope as a backbone carrier for the Foley catheter, offering us sufficient resistance concurrent with an appropriate diameter and direct vision.

Although it is possible to perform this technique using a latex catheter, it is preferred to apply silicone catheters because they are more persistent than latex catheters of the same size (causing them to be more easily mounted

on the ureteroscope and facilitate intraurethral passage). Also, due to their transparent walls, they provide the possibility of visualizing the path and ensuring the optimal positioning of the catheter after ureteroscope removal.

The catheter size should not be so small, causing tension and difficulty mounting on the ureteroscope. In such cases, removing the ureteroscope will also become challenging, making it difficult to withdraw it easily or causing the Foley catheter to become shortened or dislocated. On the other hand, very large catheters impede the urologist's supervision over the procedure, especially in cases of urethral stricture.

According to our experience, in this technique, silicone catheters No. 16 and 14 are suitable choices for the ureteroscope with sizes 8 and 6 French, respectively, which can be easily mounted on and removed from the ureteroscope without tension.

As a final note, because the balloon line is extended toward the bottom of the catheter's tip in some silicone catheters, making its cottage by the scalpel unavoidable, it is recommended to ensure the integrity of the balloon after cutting the catheter and before mounting it on the ureteroscope. Otherwise, the balloon may become empty during the procedure, leaving the catheterization process disturbed.

## Conclusion

This study described a new method to facilitate ureteral catheterization using a Foley catheter mounted on the ureteroscope. This strategy is simple, effective, and promising when other ureteral catheterization methods prove inapplicable.

## Acknowledgments

We appreciate the operating room department of Shahid Beheshti hospital in Hamedan for their valuable support in carrying out this report. Patients consent was obtained prior to the video recording for demonstration of the surgery and publication.

## Authors' contribution

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### Ethical considerations

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the authors.

### Conflicts of interest

The authors declare no conflicts of interest.

### Ethical issues

This case report was conducted in accordance with the principles outlined in the World Medical Association Declaration of Helsinki. Written informed consent was obtained from the patient for the publication of this case report.

### Funding/Support

This paper received no funding.

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