

# The Importance of Cystoscopy in Diagnosis and Treatment of Urethral Stricture Following Transurethral Prostatectomy

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**ABSTRACT:** **Background:** Transurethral prostatectomy is the gold standard surgical treatment of bladder outlet obstruction due to benign enlargement of the prostate, with more than 30,000 procedures performed annually in the United States alone. The success rate of this minimally invasive procedure is high and the results are durable. The development of urethral stricture is a long-term complication of the procedure and is noted in about 2% of patients. The stricture narrows the urethral lumen, leading to re-appearance of obstructive urinary symptoms. Traditionally, the evaluation of the stricture was performed by retrograde urethrography. Advancements in the fields of flexible endoscopy allowed rapid inspection of the urethra and immediate dilatation of the stricture in selected cases.

**Objectives:** To compare the efficacy of urethrography versus cystoscopy in the evaluation of urethral strictures following transurethral prostatectomy.

**Methods:** A retrospective review was conducted of a series of 32 consecutive patients treated due to post-transurethral resection of prostate (TURP) urethral stricture.

**Results:** Twenty patients underwent both tests. In 16 there was concordance between the two tests. Four patients had no pathological findings in urethrography but had strictures in cystoscopy. All strictures were short (up to 10 mm) and were easily treated during cystoscopy, with no complaints or re-surgery needed in 24 months follow-up.

**Conclusions:** Cystoscopy was superior to urethrography in the evaluation of post-TURP strictures. Strictures were often short and treated during the same procedure. We recommend that cystoscopy be the procedure of choice in evaluating obstructive urinary symptoms after TURP, and retrograde urethrography be preserved for selected cases.

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**KEY WORDS:** cystoscopy, transurethral prostatectomy, urethral stricture, urethrography, urethrotomy

**B**enign hypertrophy of the prostate (BHP) is the leading cause of bladder outlet obstruction in men over the age of 50 [1]. The surgical approach to BHP has shifted from open retropubic and transvesical procedures to the transurethral endoscopic approach. Although a wide variety of endoscopic technologies exist, transurethral resection of prostate (TURP), is still the gold standard and the most common approach for treating benign prostatic enlargement that causes obstruction of the urinary bladder [2].

Although the overall success rate of TURP in surgery is high, its morbidity remains around 20%. The common peri-operative complications include blood loss requiring transfusion, hyponatremia (TUR syndrome), and urinary tract infections. Later complications include sexual dysfunction, urinary incontinence, urinary retention, and the development of a urethral stricture [3].

The long-term risk of developing a urethral stricture is about 2%. The cause of the stricture is thought to be resectoscope trauma, catheter use, or bacterial infection in the postoperative period [4].

There are two efficient tools for evaluating a urethral stricture: retrograde urethrography and flexible cystoscopy.

Retrograde urethrography is performed at the radiology suite. Contrast material is injected into the urethral meatus, demonstrating the urethra, the stricture, and its borders, as well as the prostatic urethra (or the prostate lodge following TURP). The procedure can be expanded by filing the bladder in the erect position and voiding cystography, measuring bladder volume, and emptying [5].

Cystoscopy is performed at the urological clinic under local anesthesia. It is quick and allows a review of the urethra along its length to the narrow area (if present) and examination of the bladder neck prostatic lodge appearance after surgery. Short and flimsy strictures can be opened at the same time by the endoscope or a dilator [6].

Complex urethral strictures, scheduled for reconstructive surgery, such as strictures resulting from pelvic fractures or failed hypospadias repair, are often assessed by the two methods, yet post-TURP strictures, which are far more common,

tend to be shorter and closer to the bladder neck [7]. Therefore, the need for both tests may be questionable.

The purpose of this study was to assess the pros and cons of urethrography versus cystoscopy in the evaluation of urethral strictures following transurethral prostatectomy.

## PATIENTS AND METHODS

The study was approved by the hospital's review board. We reviewed the charts of 32 consecutive patients evaluated in our department between the years 2013 and 2014 due to lower urinary tract symptoms following TURP. All patients were evaluated by clinical interview, urine cultures, non-invasive urodynamic study (uroflowmetry), and urinary ultrasonography including post-voiding residual measurements.

The possibility of re-obstruction was raised when a patient reported a re-appearance of obstructive urinary symptoms following a period of normal voiding following transurethral resection of the prostate. These symptoms were accompanied by either an obstructive flow pattern in the uroflowmetry assessment or urinary residuals above 100 cc. As a common practice, patients with minimal complaints, an obstructive flow pattern, and small urinary residuals were not assessed since they represent mildly obstructed patients without bladder decompensation. Also, patients with minimal complaints, normal flow pattern, and urinary residuals above 100 cc were not assessed since they typically represented mild bladder atony.

The patients underwent a formal retrograde cystourethrography by a uro-radiologist and then were referred to cystoscopy for diagnosis and treatment. In equivocal cases, flexible cystoscopy was performed under local anesthesia in the clinic, using an Olympus CYF-5 cystoscope (Olympus, USA). If a clear cut stricture was noted, patients underwent rigid cystoscopy in the operating room under regional anesthesia and the stricture was incised using a cold knife (Storz urethrotome (Karl Storz, Germany)). Following the procedure, an indwelling catheter was placed for 5 days and removed in the clinic. Patients were then followed and evaluated by the same protocol.

## RESULTS

The average age of the patients was 76 years and the mean time for symptom onset was 47 months post-surgery.

Of 32 patients, 10 did not undergo cystoscopy, 8 due to normal urethrography and two due to short membranotic stricture and small urine residues. Two other patients with short strictures dropped out of follow-up.

Twenty patients underwent both tests. Fourteen patients were found to have a stricture in both urethrographic and cystoscopic procedures. One patient had normal findings in both tests and one had remnants of prostatic tissue in both tests. Four patients had no pathological findings in urethrography

but had strictures in cystoscopy. A typical urethrography is presented in Figure 1. All strictures were short (up to 10 mm) and were incised in the operating room. No obstructive complaints or re-surgery were needed in a 24 months follow-up.

## DISCUSSION

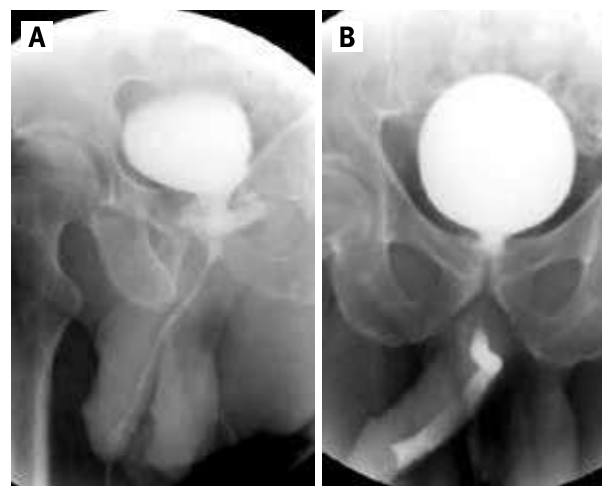
The evaluation of urethral strictures in men has no one strict algorithm and depends on the patient's age and compliance as well as the etiology of the stricture.

Urethral strictures following urethral disruption occurring during pelvic fractures or strictures secondary to repeated hypospadias repairs are often long and complex and may consist of several areas of stenosis. In such cases, an endoscope will often not pass a narrow area and deeper evaluation of the stricture will not be possible.

Retrograde urethrography, performed in the radiology suite, is a dynamic test. The retrograde filling demonstrates the distal part of the urethra and the stricture. If it is possible to fill the bladder and the patient is cooperative, a voiding phase is feasible, assessing the bladder capacity and function, as well as the proximal urethra and the strictured area. The role of endoscopy in such cases is to evaluate the urethral mucosa near the stricture, since often the area near the stricture is scarred and ischemic, with a typical whitish appearance, and not suitable for anastomosis. If the patient has a supra-pubic cystostomy, antegrade flexible cystoscopy can be performed to visualize the proximal urethra and the bladder neck [8].

Post-TURP strictures tend to be shorter and proximal, thus easier to evaluate by cystoscopy. Elderly patients often do not tolerate voiding cystourethrography well, since the procedure

**Figure 1.** Urethrography of a patient with a post-transurethral resection of prostate (TURP) stricture. The study was described as normal but a shorter stricture was found on cystoscopy in the bulbar urethra close to the sphincteric region



begins in the supine position and the patient is then tilted to the upright position. However, modern flexible cystoscopy is much better tolerated. The patient is in the supine position and the instrument is of a smaller caliber. If a stricture is identified, a glide wire can be passed safely under vision and further dilatation can be performed by a shaped dilators on the glide [9]. Only tight strictures are referred for internal urethrotomy.

In our series of 20 patients, in 16 the result of cystoscopy and cystourethrography was the same. In 4 patients, urethrography was reported as normal but cystoscopy revealed a stricture. We believe that this finding is the result of the proximal location of the stricture, where it is possible to misdiagnose the stricture as the beginning of the sphincteric area.

Not all strictures should be treated. Patients with a weak urinary stream, minimal complaints, small urinary residual, and an uncompromised upper urinary tract can be followed conservatively. While cystourethrography is the all-in-one test (stricture+bladder emptying), simple uroflowmetry followed by bladder volume measurement can give the same information in a minimally invasive way [10].

## CONCLUSIONS

In our series, cystoscopy was superior to cystography in the evaluation of post-TURP urethral strictures. Urethral strictures where often short and proximally located. We recommend that cystoscopy be offered as the first step to clearly identify any pathology in patients with urinary obstructive symptoms after TURP. Retrograde urethrography should be reserved for selected cases.

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## Capsule

### The skinny on T cell fatty acid uptake

When T cells take up residence in a tissue, adaptation to that tissue is key for their survival. **Frizzell** and colleagues studied metabolic adaptation of tissue-resident memory T (TRM) cells at three different sites: skin, liver, and small intestine. They found that TRM cells in each kind of tissue rely on distinct members of the fatty acid-binding protein (FABP) family of proteins for uptake of fatty acids. By transferring liver-resident

TRM cells into naïve mice, they found that FABP expression of these TRM cells was reprogrammed by the tissue they ended up seeding in the recipient mice. This study reinforces the idea that immune cells are integral components of the tissues in which they reside.

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## Capsule

### Metabolism as cancer progresses

Numerous cancer-specific alterations in metabolism have been identified but have not yet resulted in an effective anti cancer therapeutic. In a Review, **Faubert** and co-authors discussed how metabolism changes as cancer develops from a small, premalignant lesion to an aggressive primary tumor and then metastasizes. Metabolic vulnerabilities likely change

with cancer progression, making the identification of general cancer-associated metabolic features difficult. The authors propose that a more targeted approach to tissues and vulnerabilities identified in patients may be more effective.

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