

Male Urethral Stricture: American Urological Association Guideline



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Abbreviations and Acronyms

DVIU = direct visual internal urethrotomy
LS = lichen sclerosis
PFUI = pelvic fracture urethral injury
PVR = post-void residual
RUG = retrograde urethrogram
SP = suprapubic
UTI = urinary tract infection
VCUG = voiding cystourethrogram

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Purpose: The purpose of this Guideline is to provide a clinical framework for the diagnosis and treatment of male urethral stricture.

Materials and Methods: A systematic review of the literature using the Pubmed, Embase, and Cochrane databases (search dates 1/1/1990 to 12/1/2015) was conducted to identify peer-reviewed publications relevant to the diagnosis and treatment of urethral stricture. The review yielded an evidence base of 250 articles after application of inclusion/exclusion criteria. These publications were used to create the Guideline statements. Evidence-based statements of Strong, Moderate, or Conditional Recommendation were developed based on benefits and risks/burdens to patients. Additional guidance is provided as Clinical Principles and Expert Opinion when insufficient evidence existed.

Results: The Panel identified the most common scenarios seen in clinical practice related to the treatment of urethral strictures. Guideline statements were developed to aid the clinician in optimal evaluation, treatment, and follow-up of patients presenting with urethral strictures.

Conclusions: Successful treatment of male urethral stricture requires selection of the appropriate endoscopic or surgical procedure based on anatomic location, length of stricture, and prior interventions. Routine use of imaging to assess stricture characteristics will be required to apply evidence based recommendations, which must be applied with consideration of patient preferences and personal goals. As scientific knowledge relevant to urethral stricture evolves and improves, the strategies presented here will be amended to remain consistent with the highest standards of clinical care.

Key Words: urethral stricture, urethra, penis

PURPOSE

Urologists must be familiar with the evaluation and diagnostic tests for urethral stricture as well as endoscopic and open surgical treatments. This Guideline provides evidence-based guidance to clinicians and patients regarding how to recognize symptoms and signs of a urethral

stricture, carry out appropriate testing to determine the location and severity of the stricture, and recommend the best options for treatment and follow-up. The most effective approach for a particular patient is best determined by the individual clinician and patient in the context of that patient's history, values, and goals for treatment.

METHODOLOGY

The quality of individual studies that were either randomized controlled trials or clinical controlled trials was assessed using the Cochrane Risk of Bias tool.¹ Observational cohort studies with a comparison of interest were evaluated with the Drug Effectiveness Review Project instrument.² Conventional diagnostic cohort studies, diagnostic case-control studies, or diagnostic case series that presented data on diagnostic test characteristics were evaluated using the QUADAS 2 tool, which evaluates the quality of diagnostic accuracy studies.³

The AUA categorizes body of evidence strength as Grade A, B, or C based on both individual study quality and consideration of study design, consistency of findings across studies, adequacy of sample sizes, and generalizability of samples, settings, and treatments for the purposes of the Guideline.⁴

Evidence-based statements are provided as *Strong*, *Moderate*, and *Conditional Recommendations* with additional statements provided in the form of *Clinical Principles* or *Expert Opinion*.

BACKGROUND

A urethral stricture is any abnormal narrowing of the anterior and posterior urethra. The anterior urethra, which runs from the bulbar urethra to the meatus, is surrounded by the corpus spongiosum and thus anterior urethral strictures are associated with varying degrees of spongiositis.

EPIDEMIOLOGY

In developed countries, the most common etiology of urethral stricture is idiopathic, followed by iatrogenic. Late failure of hypospadias surgery and stricture resultant from endoscopic manipulation (e.g. transurethral resection) are common iatrogenic reasons. In comparison, trauma is the most common cause in developing countries, reflecting higher rates of road traffic injuries, less developed trauma systems, inadequate roadway systems and conceivably socioeconomic factors.⁵

EVALUATION

Presentation

Patients with urethral stricture most commonly present with decreased urinary stream and incomplete bladder emptying but other signs and symptoms include urinary tract infection (UTI), epididymitis, rising post-void residual (PVR) urine volume or decreased force of ejaculation.⁶ Additionally, patients may present with urinary spraying or dysuria. Rare sequelae of untreated stricture may include bladder calculi, urethral abscess, urethral carcinoma, and chronic kidney injury from obstructive uropathy.

Diagnosis

In the initial evaluation of patients suspected of having a urethral stricture, a combination of patient reported outcome measures to assess symptoms, uroflowmetry to determine severity of obstruction, and ultrasound PVR volume to identify urinary retention, may be used. In patients in whom urethral stricture is suspected, stricture must be diagnosed by urethro-cystoscopy, retrograde urethrogram (RUG)/ voiding cystourethrogram (VCUG) or even by the passage of a urethral catheter. Once urethral stricture is confirmed, delineation of stricture length and location is required, usually by RUG, augmented by VCUG or antegrade cystoscopy through a suprapubic (SP) tube site, if present.

Patient Selection

Patient selection and proper choice of surgical procedure are paramount to maximize the chance of successful outcome in the treatment of urethral stricture. The main factors to consider in decision making include stricture etiology, location, and severity; prior treatment; comorbidity; presence of lichen sclerosus (LS); and patient preference.

OPERATIVE CONSIDERATIONS

Before proceeding with surgical management of a urethral stricture, the physician should provide an appropriate antibiotic to reduce surgical site infections. Preoperative urine cultures are recommended to guide antibiotic choice, and active UTIs must be treated before urethral stricture intervention. Prophylactic antibiotic choice and duration should follow the AUA Best Practice Policy Statement.⁷

Postoperative Care

A urinary catheter should be placed following urethral stricture intervention to divert urine from the site of intervention and prevent urinary extravasation. Either urethral catheter or SP cystostomy is a viable option; a urethral catheter is thought to be optimal. Urethral dilation and direct visual internal urethrotomy (DVIU) require only a short period of catheterization. RUG or VCUG is typically performed two to three weeks following open urethral reconstruction to assess for complete urethral healing.

Complications

Erectile dysfunction as measured by the International Index of Erectile Function (IIEF) may occur transiently after urethroplasty with resolution of nearly all reported symptoms approximately six months postoperatively.⁸ Ejaculatory dysfunction manifested as pooling of semen, decreased ejaculatory force, ejaculatory discomfort, and decreased

semen volume has been reported by up to 21% of men following bulbar urethroplasty.⁹

Follow-Up

Successful treatment for urethral stricture (endoscopic or surgical) is most commonly defined as no further need for surgical intervention or instrumentation. Consensus has not been reached on the optimal postoperative surveillance protocol to identify stricture recurrence following urethral stricture treatment. Some centers use a flexible cystoscope to confirm lack of recurrence, while others rely on absence of lower urinary tract symptoms, low PVR, a non-flattened urinary flow pattern on uroflow, and peak urine flow > 15 ml/second to define patients free from clinically significant stricture recurrence.

GUIDELINE STATEMENTS

Diagnosis

1. Clinicians should include urethral stricture in the differential diagnosis of men who present with decreased urinary stream, incomplete emptying, dysuria, urinary tract infection (UTI), and rising post-void residual (PVR). (Moderate Recommendation; Evidence Strength: Grade C)

Differences in stricture characteristics (e.g. location, length, luminal diameter), duration of obstruction, and other factors create a heterogeneous combination of subjective complaints related to a symptomatic urethral stricture. Other urologic conditions, such as benign prostate enlargement (with or without bladder outlet obstruction), bladder outlet obstruction, and abnormal detrusor function, can present with similar subjective findings, making diagnosis challenging. Young men do not commonly present with voiding urinary symptoms; therefore, a urethral stricture should be considered in the differential diagnosis.

2. After performing a history, physical examination, and urinalysis, clinicians may use a combination of patient reported measures, uroflowmetry, and ultrasound post-void residual (PVR) assessment in the initial evaluation of suspected urethral stricture. (Clinical Principle)

If symptoms and signs suggest the presence of a stricture, noninvasive measures, such as uroflowmetry, may then definitively delineate low flow, which is typically considered to be less than 12 mL per second and may indicate obstruction from the stricture.^{10,11} Similarly, ultrasonographic PVR measurement may detect poor bladder emptying. The presence of voiding symptoms as described above in combination with reduced peak flow rate place patients at higher probability for urethral

stricture, therefore indicating definitive evaluation, such as urethro-cystoscopy, RUG, or ultrasound urethrography.

3. Clinicians should use urethro-cystoscopy, retrograde urethrography (RUG), voiding cystourethrography (VCUG), or ultrasound urethrography to make a diagnosis of urethral stricture. (Moderate Recommendation; Evidence Strength: Grade C)

Endoscopy and/or radiological imaging of the urethra is essential for confirmation of the diagnosis, assessment of stricture severity (e.g. staging), and procedure selection. Urethroscopy identifies and localizes urethral stricture and allows evaluation of the distal caliber, but the length of the stricture and the urethra proximal to the urethral stricture cannot be assessed in most cases. RUG, with or without VCUG, remains the study of choice for delineation of stricture length, location, and severity.¹²

Ultrasound urethrography may serve to diagnose the presence of urethral stricture as well as describe the location, length, and severity of narrowing of strictures. It has a high sensitivity and specificity in the anterior urethra but requires a skilled ultrasonographer and shares with other modalities the drawback of patient discomfort.¹³

4. Clinicians planning non-urgent intervention for a known stricture should determine the length and location of the urethral stricture. (Expert Opinion)

Determination of urethral stricture length and location allows the patient and urologist to engage in an informed discussion about treatment options, perioperative expectations, and expected outcomes following urethral stricture therapy. In addition, preoperative planning permits operative and anesthetic planning.

5. Surgeons may utilize urethral endoscopic management (e.g., urethral dilation or direct visual internal urethrotomy [DVIU]) or immediate suprapubic (SP) cystostomy for urgent management of urethral stricture, such as discovery of symptomatic urinary retention or need for catheterization prior to another surgical procedure. (Expert Opinion)

When urethral strictures are identified at the time of catheter placement for another surgical procedure, assessment of the need for catheterization should be made. Urethral strictures may be dilated in this setting to allow catheter insertion, and dilation over a guidewire is recommended to prevent false passage formation or rectal injury. Alternatively, DVIU may be performed, particularly if the stricture is too dense to be adequately dilated. SP cystostomy may also be performed to provide urinary drainage at the time of surgery if these

initial maneuvers are unsuccessful, or when subsequent definitive treatment for urethral stricture is planned in the near future.

6. Surgeons may place a suprapubic (SP) cystostomy prior to definitive urethroplasty in patients dependent on an indwelling urethral catheter or intermittent self-dilation. (Expert Opinion)

Men with a urethral stricture who have been managed with either an indwelling urethral catheter or intermittent self-dilation require a period free of catheterization before treatment. This allows the full length of the stricture to develop, permitting accurate determination of definitive treatment options. When voiding is not possible, the patient should undergo SP cystostomy placement prior to imaging.

Dilation/Internal Urethrotomy/Urethroplasty

7. Surgeons may offer urethral dilation, direct visual internal urethrotomy (DVIU), or urethroplasty for the initial treatment of a short (< 2 cm) bulbar urethral stricture. (Conditional Recommendation; Evidence Strength: Grade C)

Short bulbar urethral strictures may be treated by dilation, DVIU, or urethroplasty. Urethral dilation and DVIU have similar long-term outcomes in short strictures, with success ranging from 35-70%.¹⁴⁻¹⁶ The success of endoscopic treatment depends on the location and length of the stricture, with the highest success rates found in those with bulbar strictures less than 1 cm. Conversely, success rates for dilation or DVIU of strictures longer than 2cm are very low.¹⁷

Excision and primary anastomosis of bulbar urethral stricture has a higher long-term success rate than endoscopic treatment, ranging from 90-95%.¹⁸ Urethroplasty may be offered as the initial treatment for a short bulbar urethral stricture, but the higher success rate of this treatment compared to endoscopic treatment must be weighed against the increased anesthesia requirement, cost, and higher morbidity of urethroplasty.

8. Surgeons may perform either dilation or direct visual internal urethrotomy (DVIU) when performing endoscopic treatment of a urethral stricture. (Conditional Recommendation; Evidence Strength: Grade C)

Dilation and DVIU have similar success and complication rates and can be used interchangeably. Few studies exist that compare different methods of performing DVIU, but cold knife and laser incision of the stricture scar appear to have similar success rates and may be used interchangeably.^{19,20}

9. Surgeons may safely remove the urethral catheter within 72 hours following

uncomplicated dilation or direct visual internal urethrotomy (DVIU). (Conditional Recommendation; Evidence Strength: Grade C)

The reported length of catheterization after dilation or DVIU is highly variable in the literature, ranging from one to eight days.^{17,19,21} There is no evidence that leaving the catheter longer than 72 hours improves safety or outcome, and catheters may be removed after 24-72 hours. Catheters may be left in longer for patient convenience or if in the surgeon's judgment early removal will increase the risk of complications.

10. In patients who are not candidates for urethroplasty, clinicians may recommend self-catheterization after direct visual internal urethrotomy (DVIU) to maintain temporary urethral patency. (Conditional Recommendation; Evidence Strength: Grade C)

Studies using varying self-catheterization schedules after DVIU, ranging from daily to weekly, have demonstrated that stricture recurrence rates were significantly lower among patients performing self-catheterization (risk ratio 0.51, 95% CI 0.32 to 0.81, $p = 0.004$).¹⁸ Data suggests that performing self-catheterization for greater than four months after DVIU reduced recurrence rates compared to performing self-catheterization for less than three months.¹⁸

11. Surgeons should offer urethroplasty, instead of repeated endoscopic management for recurrent anterior urethral strictures following failed dilation or direct visual internal urethrotomy (DVIU). (Moderate Recommendation; Evidence Strength: Grade C)

Urethral strictures that have been previously treated with dilation or DVIU are unlikely to be successfully treated with another endoscopic procedure.²² Repeated endoscopic treatment may cause longer strictures, and may increase the complexity of subsequent urethroplasty.²³

12. Surgeons who do not perform urethroplasty should offer patients referral to surgeons with expertise. (Expert Opinion)

When evaluating a patient with a recurrent urethral stricture, a physician who does not perform urethroplasty should consider referral to a surgeon with experience in this technique due to the higher rate of successful treatment compared to repeat endoscopic management.

Anterior Urethral Reconstruction

13. Surgeons may initially treat meatal or fossa navicularis strictures with either dilation or meatotomy. (Clinical Principle)

First time presentation of an uncomplicated urethral stricture confined to the meatus or fossa

navicularis may be treated with simple dilation or meatotomy, with or without guidewire placement. Most patients with previous hypospadias repair, prior failed endoscopic manipulation, previous urethroplasty, or LS should be offered urethroplasty.

14. Surgeons should offer urethroplasty to patients with recurrent meatal or fossa navicularis strictures. (Moderate Recommendation; Evidence Strength: Grade C)

Meatal and fossa navicularis strictures refractory to endoscopic procedures are unlikely to respond to further endoscopic treatments.¹⁵ Furthermore, urethroplasty is the best option for completely obliterated strictures or strictures associated with hypospadias or LS. Patients who opt for repeat endoscopic treatments or intermittent self-dilation in lieu of more definitive treatment, such as urethroplasty should be advised that success of a subsequent reconstructive procedure may be lower when following a plan of repeated endoscopic surgery and/or intermittent self-dilation. Similar to other types of stricture, exact delineation of length and etiology is important for guiding treatment.

15. Surgeons should offer urethroplasty to patients with penile urethral strictures because of the expected high recurrence rates with endoscopic treatments. (Moderate Recommendation; Evidence Strength: Grade C)

Strictures involving the penile urethra are more likely to be related to hypospadias, LS, or iatrogenic etiologies when compared to strictures of the bulbar urethra, and are thus unlikely to respond to dilation or urethrotomy, except in select cases of previously untreated, short strictures.²² Given the low likelihood of success with endoscopic treatments, most patients with penile urethral strictures should be offered urethroplasty at the time of diagnosis, avoiding repeated endoscopic treatments. When compared to bulbar strictures, penile urethral strictures are more likely to require tissue transfer and/or a staged approach.^{24,25}

16. Surgeons should offer urethroplasty as the initial treatment for patients with long (≥ 2 cm) bulbar urethral strictures, given the low success rate of direct visual internal urethrotomy (DVIU) or dilation. (Moderate Recommendation; Evidence Strength: Grade C)

Longer strictures are less responsive to endoscopic treatment, with success rates of only 20% for strictures longer than 4cm in the bulbar urethra.¹⁴ The success rate for buccal mucosa graft urethroplasty for strictures of this length is greater than 80%.²⁶⁻²⁸

Given the low efficacy of endoscopic treatment, urethroplasty should be offered to patients with

long urethral strictures. Urethroplasty may be performed using a variety of techniques based on the experience of the surgeon, most often through substitution or augmentation of the narrowed segment of the urethra.

17. Surgeons may reconstruct long multi-segment strictures with one stage or multi-stage techniques using oral mucosal grafts, penile fasciocutaneous flaps or a combination of these techniques. (Moderate Recommendation; Evidence Strength: Grade C)

Multi-segment strictures (frequently referred to as panurethral strictures) are most commonly defined as strictures over 10 cm in length spanning long segments of both the penile and bulbar urethra. Reconstruction of panurethral strictures should be addressed with all of the tools in the reconstructive armamentarium, including fasciocutaneous flaps, oral mucosal grafts or other ancillary tissue sources, and may require a combination of these techniques.²⁹⁻³¹ Regardless of technique and combinations, success rates appear similar in all of these small series.

18. Surgeons may offer perineal urethrostomy as a long-term treatment option to patients as an alternative to urethroplasty. (Conditional Recommendation; Evidence Strength: Grade C)

Perineal urethrostomy can be used as a staged or permanent option for patients with anterior urethral strictures in order to establish unobstructed voiding and improve quality of life. Reasons to perform perineal urethrostomy include recurrent or primary complex anterior stricture, advanced age, medical co-morbidities precluding extended operative time, extensive LS, numerous failed attempts at urethroplasty, and/or patient choice.

19. Surgeons should use oral mucosa as the first choice when using grafts for urethroplasty. (Expert Opinion)

Patient satisfaction is higher for oral mucosa urethroplasty compared to skin flaps and skin grafts due to less post-void dribbling and fewer penile skin problems.³²

20. Surgeons should not perform substitution urethroplasty with allograft, xenograft, or synthetic materials, except under experimental protocols. (Expert Opinion)

Use of non-autologous grafts may be indicated in the patient who has failed a prior urethroplasty and has no tissue available for reoperative substitution urethroplasty. However, experience to date is limited and the long-term success rates are unknown.

21. Surgeons should not perform a single-stage tubularized graft urethroplasty. (Expert Opinion)

Tubularized urethroplasty consists of a technique in which a graft or flap is rolled into a tube over a catheter to completely replace a segment of urethra. This approach, when attempted in a single stage, has a high risk of restenosis and should be avoided.

22. Surgeons should not use hair-bearing skin for substitution urethroplasty. (Clinical Principle)

The use of hair-bearing skin for substitution urethroplasty may result in urethral calculi, recurrent UTI, and a restricted urinary stream due to hair obstructing the lumen.

Urethral Reconstruction after Pelvic Fracture Urethral Injury (PFUI)

23. Clinicians should use retrograde urethrography (RUG) with voiding cystourethrogram (VCUG) and/or retrograde + antegrade cystoscopy for preoperative planning of delayed urethroplasty after pelvic fracture urethral injury (PFUI). (Moderate Recommendation; Evidence Strength: Grade C)

Preoperative evaluation of the defect after PFUI should include RUG, VCUG and/or retrograde urethroscopy. The VCUG may include a static cystogram to determine the competency of the bladder neck mechanism and the level of the bladder neck in relation to the symphysis pubis. Other adjunctive studies may include antegrade cystoscopy (with or without fluoroscopy) and pelvic CT or MRI to assess the proximal extent of the injury, degree of malalignment of the urethra, and length of the defect.

24. Surgeons should perform delayed urethroplasty instead of delayed endoscopic procedures after urethral obstruction/obliteration due to pelvic fracture urethral injury (PFUI). (Expert Opinion)

Repeated endoscopic maneuvers, including intermittent catheterization, should be avoided because they are not successful in the majority of PFUI, increase patient morbidity, and may delay the time to anastomotic reconstruction. Anastomotic reconstruction is performed through a perineal approach. Excision of the scar tissue and wide spatulation of the anastomosis is required. Several methods to gain urethral length and reduce tension can be employed when necessary, including mobilization of the bulbar urethra, crural separation, inferior pubectomy and supracrural rerouting, but in most cases the latter two maneuvers are not required.

25. Definitive urethral reconstruction for pelvic fracture urethral injury (PFUI) should be planned only after major injuries stabilize and patients can be safely positioned for urethroplasty. (Expert Opinion)

No optimal time to perform urethral reconstruction has been established, with studies reporting a

wide range of times from six weeks to four years. Reconstruction should occur when patient factors allow the surgery to be performed (usually within three to six months after the trauma).

Bladder Neck Contracture/Vesicourethral Stenosis
26. Surgeons may perform a dilation, bladder neck incision or transurethral resection for bladder neck contracture after endoscopic prostate procedure. (Expert Opinion)

Treatment of bladder neck contractures following endoscopic prostate procedures can be performed depending on surgeon preference, with comparable outcomes expected.

27. Surgeons may perform a dilation, vesicourethral incision, or transurethral resection for post-prostatectomy vesicourethral anastomotic stenosis. (Conditional Recommendation; Evidence Strength: Grade C)

Treatment of first time vesicourethral anastomotic stenosis is successful in about 50-80% of cases, with all techniques having similar success rates.³³⁻³⁷ Success appears to be lower in cases with prior pelvic radiation; however, prospective cohort studies including radiated and non-radiated patients are lacking. Repeat endoscopic treatment may be necessary for successful treatment. There is conflicting data about the utility of mitomycin C for the treatment of recurrent vesicourethral stenosis; further study is necessary to validate its use.^{38,39} Patients should be made aware of the risk of incontinence after any of these procedures.

28. Surgeons may perform open reconstruction for recalcitrant stenosis of the bladder neck or post-prostatectomy vesicourethral anastomotic stenosis. (Conditional Recommendation; Evidence Strength: Grade C)

The treatment of recalcitrant vesicourethral anastomotic stenosis must be tailored to the preferences of the patient, taking into consideration prior radiotherapy and the degree of urinary incontinence. Urethral reconstruction is challenging and may cause significant urinary incontinence requiring subsequent artificial urinary sphincter implantation but offers success rates of approximately 66-80%.^{40,41} Success rates are lower after radiation. For the patient who does not desire urethroplasty, repeat urethral dilation, incision or resection of the stenosis is appropriate. Intermittent self-dilation with a catheter may be used to prolong the time between operative interventions. Suprapubic diversion is an alternative.

Special Circumstances

29. In men who require chronic self-catheterization (e.g. neurogenic bladder),

surgeons may offer urethroplasty as a treatment option for urethral stricture causing difficulty with intermittent self-catheterization. (Expert Opinion)

There is some evidence to suggest that urethral reconstruction, if offered at an early stage in men with stricture and neurogenic bladder, can achieve outcomes comparable to men without neurogenic bladder.⁴²

30. Clinicians may perform biopsy for suspected lichen sclerosus (LS), and must perform biopsy if urethral cancer is suspected. (Clinical Principle)

The rate of squamous cell carcinoma in male patients with LS has been reported to be 2-8%, highlighting the need for biopsy in selected cases both to confirm the diagnosis as well as to exclude malignant or premalignant changes.⁴³⁻⁴⁶

31. In lichen sclerosus (LS) proven urethral stricture, surgeons should not use genital skin for reconstruction. (Strong Recommendation; Evidence Strength: Grade B)

Reconstruction of anterior urethral strictures associated with LS should proceed according to the principles outlined in Guidelines 15-20, with the caveat that genital skin flaps and grafts should be avoided due to very high long-term failure rates.¹⁸

Postoperative Follow-Up

32. Clinicians should monitor urethral stricture patients to identify symptomatic recurrence following dilation, direct visual internal urethrotomy (DVIU) or urethroplasty. (Expert Opinion)

Urethral stricture recurrence following endoscopic treatment or urethroplasty can occur at any time in the postoperative period, and, because of this, a specific regimen for postoperative follow-up cannot be reliably determined. A number of diagnostic tests can be used to detect or screen for stricture recurrence following open or endoscopic treatment (see guideline statements 1 and 2). The use of, or combination of, urethrocystoscopy, ultrasound urethrography, or RUG appears to provide the most definitive confirmation of stricture recurrence.¹⁸

RESEARCH NEEDS AND FUTURE DIRECTIONS

Urethral stricture remains a subject of active investigation. Areas of focus should include basic science and epidemiological research into the mechanisms and risk factors for urethral strictures. Educational efforts should be undertaken to aid in the prevention of traumatic strictures following catheter insertion and endoscopic surgery.

Research terms should be standardized to allow comparison between centers, with this Panel recommending adoption of International Consultation on Urological Diseases nomenclature. In studies of the treatment of urethral strictures multiple measures of successful outcome should be reported to facilitate comparison between studies. Multi-institutional collaboratives should be formed to evaluate management of uncommon diagnoses, such as PFUI, hypospadias, panurethral strictures, and LS. In addition, multi-centered randomized clinical trials, pragmatic trials, or registries should be created for evaluation of important research questions.

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DISCLAIMER

This document was written by the Male Urethral Stricture Guideline Panel of the American Urological Association Education and Research, Inc., which was created in 2013. The Practice Guidelines Committee (PGC) of the AUA selected the committee chair. Panel members were selected by the chair. Membership of the panel included specialists in urology with specific expertise on this disorder. The mission of the panel was to develop recommendations that are analysis-based or consensus-based, depending on panel processes and available data, for optimal clinical practices in the treatment of male urethral strictures.

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While these guidelines do not necessarily establish the standard of care, AUA seeks to recommend and to encourage compliance by practitioners with current best practices related to the condition being treated. As medical knowledge expands and technology advances, the guidelines will change. Today these evidence-based guidelines statements represent not absolute mandates but provisional proposals for treatment under the specific conditions described in each document. For all these reasons, the guidelines do not pre-empt physician judgment in individual cases.

Treating physicians must take into account variations in resources, and patient tolerances, needs, and preferences. Conformance with any clinical guideline does not guarantee a successful outcome.

The guideline text may include information or recommendations about certain drug uses ('off label') that are not approved by the Food and Drug Administration (FDA), or about medications or substances not subject to the FDA approval process. AUA urges strict compliance with all government regulations and protocols for prescription and use of these substances. The physician is encouraged to carefully follow all available prescribing information about indications, contraindications, precautions and warnings. These guidelines and best practice statements are not intended to provide legal advice about use and misuse of these substances.

Although guidelines are intended to encourage best practices and potentially encompass available technologies with sufficient data as of close of the literature review, they are necessarily time-limited. Guidelines cannot include evaluation of all data on emerging technologies or management, including those that are FDA-approved, which may immediately come to represent accepted clinical practices.

For this reason, the AUA does not regard technologies or management which are too new to be addressed by this guideline as necessarily experimental or investigational.

CONFLICT OF INTEREST DISCLOSURES

All panel members completed COI disclosures. Those marked with (C) indicate that compensation was received. Disclosures listed include both topic- and non-topic-related relationships.

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