Urodynamic Studies in Adults: AUA/SUFU Guideline


From the American Urological Association Education and Research, Inc., Linthicum, Maryland, and the Society of Urodynamics, Female Pelvic Medicine and Urogenital Reconstruction

**Purpose:** The authors of this guideline reviewed the literature regarding use of urodynamic testing in common lower urinary tract symptoms. The findings are intended to assist clinicians in the appropriate selection of urodynamic tests, following an evaluation and symptom characterization.

**Materials and Methods:** A systematic review of the literature using the MEDLINE® and EMBASE databases (searched from 1/1/90 to 3/10/11) was conducted to identify peer-reviewed publications relevant to using urodynamic tests for diagnosis, determining prognosis, guiding clinical management decisions and improving patient outcomes in patients with various urologic conditions. The review yielded an evidence base of 393 studies after application of inclusion/exclusion criteria. These publications were used to create the evidence basis for characterizing the statements presented in the guideline as Standards, Recommendations or Options. When sufficient evidence existed, the body of evidence for a particular treatment was assigned a strength rating of A (high), B (moderate) or C (low). In the absence of sufficient evidence, additional information is provided as Clinical Principles and Expert Opinion.

**Results:** The evidence-based guideline statements are provided for diagnosis and overall management of common LUTS conditions.

**Conclusions:** The Panel recognizes that each patient presenting with LUTS is unique. This Guideline is intended to serve as a tool facilitating the most effective utilization of urodynamic testing as part of a comprehensive evaluation of patients presenting with LUTS.

**Key Words:** urodynamics, lower urinary tract symptoms, urinary incontinence, pelvic organ prolapse, guideline

**INTRODUCTION**

URODYNAMICS is an interactive diagnostic study of the lower urinary tract composed of a number of tests that can be used to obtain functional information about bladder filling, urine storage and emptying. Proper medical history taking, physical examination and other evaluations are integral in determining the etiology of complex lower urinary tract symptoms; however, urinary symptoms and physical findings often do not adequately predict the pathophysiology. Following these assessments, urodynamic questions (what is the information I need to obtain from UDS? and what is the most appropriate UDS technique to obtain these results?) should be formulated. Subsequent completion of the most appropriate UDS test(s) often aids in diagnosis. The main goal of UDS is to reproduce the patient’s symptoms, when present, and determine the cause.
of these symptoms by urodynamic measurements or observations. Some conditions are associated with few or no symptoms, yet urodynamic testing may be appropriate. This guideline is intended to review the literature regarding urodynamic testing in common lower urinary tract conditions and assist clinicians in the proper selection and application of urodynamic tests, following an appropriate evaluation and symptom characterization.

METHODOLOGY
A systematic review was conducted to identify published articles relevant to the use of UDS in patients with various urologic conditions, disorders and symptoms. Literature searches were performed on English-language publications using the MEDLINE® and EMBASE databases from January 1, 1990 to March 10, 2011. For a complete explanation of the methodology, please see the unabridged version of this guideline at http://www.auanet.org/content/media/adult_urodynamics_guideline.pdf.

Urodynamic Tests, Conditions, and Outcomes Reviewed During this Process
This systematic review evaluated the following urodynamic tests: post-void residual, uroflowmetry, cystometry, pressure-flow studies (PFS), videourodynamic studies, electromyography, urethral function tests (Valsalva leak point pressure, urethral pressure profile), singly or in any combination (see Appendix).
The target populations comprised adults with stress incontinence, mixed incontinence, urgency incontinence, LUTS, pelvic organ prolapse or neurogenic bladder. Outcomes of interest were grouped into four categories: diagnosis, prognosis, clinical management decisions and patient outcomes. In all, 393 studies met the inclusion criteria and addressed some combination of the urodynamic tests, target populations and diagnostic categories noted above. Relevant data from these studies were extracted and summarized in evidence tables, which comprise part of the full evidence report (available upon request).

Quality of Studies and Determination of Evidence Strength
The quality of individual studies was rated as high, moderate or low based on instruments tailored to specific study designs.1–3 This methodology is standard in the American Urological Association (AUA) Guidelines process.

AUA Nomenclature: Linking Statement Type to Evidence Strength
The AUA nomenclature system explicitly links statement type to body of evidence strength and the Panel’s judgment regarding the balance between benefits and risks/burdens.4 Standards are directive statements that an action should (benefits outweigh risks/burdens) or should not (risks/burdens outweigh benefits) be undertaken based on Grade A or Grade B evidence. Recommendations are directive statements that an action should (benefits outweigh risks/burdens) or should not (risks/burdens outweigh benefits) be undertaken based on Grade C evidence. Options are nondirective because the balance between benefits and risks/burdens appears relatively equal or unclear. Options may be supported by Grade A, B or C evidence (see above for description).

In some instances, the review revealed insufficient publications to address certain questions from an evidence basis; therefore, some statements are provided as Clinical Principles or Expert Opinion with consensus achieved using a modified Delphi technique if differences of opinion emerged.5 A Clinical Principle is a statement about a component of clinical care that is widely agreed upon by urologists or other clinicians for which there may or may not be evidence in the medical literature. Expert Opinion refers to a statement achieved by consensus of the Panel that is based on members’ clinical training, experience, knowledge and judgment for which there may be no evidence.

BACKGROUND
Utility in Clinical Practice
Generally, clinical UDS use has been nicely summarized for the following situations: (1) to identify factors contributing to LUT dysfunction and assess their relevance, (2) to predict the consequences of LUT dysfunction on the upper tracts, (3) to predict the consequences and outcomes of therapeutic intervention, (4) to confirm and/or understand the effects of interventional techniques and (5) to investigate the reasons for treatment failure.6

Urologists generally accept that conservative or empiric, noninvasive treatments may be instituted without urodynamic testing. Many types of urodynamic testing require urethral catheterization. Such testing subjects patients to risks of urethral instrumentation including infection, urethral trauma, and pain. Thus, clinicians must weigh whether urodynamic tests offer additional diagnostic benefit beyond symptom assessment, physical examination and other diagnostic testing.

GUIDELINE STATEMENTS
Stress Urinary Incontinence (SUI)/Prolapse
1. Clinicians who are making the diagnosis of urodynamic stress incontinence should assess urethral function. (Recommendation; Evidence Strength: Grade C)
Urethral function should be assessed when invasive UDS testing is performed to assess SUI. A quantitative assessment such as VLPP should be performed synchronously with the demonstration of urodynamic SUI. Although not a universal finding, poorer urethral function, as suggested by lower cough leak point pressure, VLPP/ALPP7–9 and/or maximal urethral closure pressure8,10,11 tends to predict less optimal outcomes with some types of
therapy. Some clinicians may use this information about urethral function to guide surgical treatment decisions.

2. Surgeons considering invasive therapy in patients with SUI should assess PVR urine volume. (Expert Opinion)

Although most studies have not demonstrated a clear association between PVR and treatment outcomes, PVR assessment, particularly if the PVR is elevated, can provide valuable information to clinicians and patients during consideration of treatment options. An elevated PVR is suggestive of detrusor underactivity or bladder outlet obstruction or a combination of both. The exact clinical definition of an “elevated” PVR volume remains unclear. Nevertheless, patients with an elevated preoperative PVR may be at increased risk for transient or permanent postoperative voiding difficulties following urethral bulking injection therapy or SUI surgery.

3. Clinicians may perform multichannel UDS in patients with both symptoms and physical findings of SUI who are considering invasive, potentially morbid, or irreversible treatments. (Option; Evidence Strength: Grade C)

Multichannel UDS are an optional preoperative study in patients considering surgical therapy for SUI. Information obtained from a multichannel UDS study may confirm or refute a diagnosis made based on history, physical examination, and stress test alone. UDS may also facilitate specific treatment selection and provide important data that promote full and accurate preoperative patient counseling. Thus, before performing invasive treatment for SUI, clinicians may choose to obtain such studies in selected patients, which may be particularly helpful in the complicated patient. UDS are not absolutely necessary as a component of the preoperative evaluation in the uncomplicated patient. These findings are compatible with the most recently published Urinary Incontinence Treatment Network multi-center trial, which concluded that urodynamics studies did not enhance the predictive value regarding treatment outcomes when compared to an office assessment alone. This trial was not abstracted in our data review as its publication date was after data abstraction closed for this Guideline.

Multichannel UDS has not been shown to correlate with outcomes of various interventions for SUI. However, UDS may alter the choice of therapy or provide guidance in patient selection to minimize the incidence of some postoperative voiding symptoms.

4. Clinicians should perform repeat stress testing with the urethral catheter removed in patients suspected of having SUI who do not demonstrate this finding with the catheter in place during urodynamic testing. (Recommendation; Evidence Strength: Grade C)

Some patients with SUI demonstrated during physical examination will not have such findings during UDS with the urethral catheter in place. Removing the urethral catheter will allow demonstration or “unmasking” of SUI in many of these individuals. More than 50% of women with SUI symptoms and up to 35% of men with post-prostatectomy incontinence who do not demonstrate SUI with the urethral catheter in place will do so when it is removed.

In patients for whom the urethral catheter is removed to make the diagnosis of urodynamic SUI, replacement of an uncontaminated urethral catheter should be considered to allow completion of the pressure-flow (voiding) portion of the test. Additionally, the PFS may be completed and the bladder re-filled to an acceptable volume. Then the catheter may be removed and the leak point pressure measured.

5. In women with high-grade POP but without the symptom of SUI, clinicians should perform stress testing with reduction of the prolapse. Multichannel UDS with prolapse reduction may be used to assess for occult stress incontinence and detrusor dysfunction in these women with associated LUTS. (Option; Evidence Strength: Grade C)

A significant proportion of women with high grade POP without SUI symptoms will be found to have occult SUI upon prolapse reduction. If the presence of SUI would change the surgical treatment plan, stress testing with prolapse reduction should be performed to evaluate for occult SUI. This can be done independently or during urodynamic testing. Prolapse can be reduced with a number of tools including a pessary, ring forceps or vaginal pack. The investigator should be aware that the instrument used for POP reduction may also obstruct the urethra, creating a falsely elevated VLPP or preventing the demonstration of SUI.

Multichannel UDS can also assess the presence of detrusor dysfunction in women with high grade POP. UDS with the POP reduced may facilitate evaluation of detrusor function and determine if elevated PVR/urinary retention is due to detrusor underactivity or outlet obstruction or both. Invasive UDS performed both with and without reduction of the POP may help predict postoperative bladder function once the POP has been surgically repaired.

Overactive Bladder (OAB), Urgency Urinary Incontinence, Mixed Incontinence

6. Clinicians may perform multichannel filling cystometry when it is important to determine if altered compliance, detrusor overactivity
(DO), or other urodynamic abnormalities are present (or not) in patients with urgency incontinence in whom invasive, potentially morbid, or irreversible treatments are considered. (Option; Evidence Strength: Grade C)

Cystometry is the foundation in assessing urinary storage. When performing filling cystometry, a multichannel subtracted pressure is preferred over a single channel cystometrogram, which is subject to significant artifacts of abdominal pressure. UDS may have a role when conservative and drug therapies fail in a patient who desires more invasive treatment options for OAB. Patients with OAB may have concomitant findings on UDS that affect the ultimate treatment decision. A patient with refractory urgency incontinence may have concomitant urodynamic diagnoses of SU1 or BOO, and correction of these associated conditions may greatly improve the symptoms related to urinary urgency. In the setting of mixed urinary incontinence, UDS may contribute by aiding in symptom correlation. However, these tests may not precisely predict outcomes of treatment.23,24

7. Clinicians may perform PFS in patients with urgency incontinence after bladder outlet procedures to evaluate for BOO. (Expert Opinion)

Clinicians should consider pressure flow testing to assess for BOO in patients with refractory urgency symptoms after bladder outlet procedures. Although there is no urodynamic standard for obstruction and the classic “high pressure-low flow” pattern characteristic of male BOO in women with obstruction, the finding of an elevated detrusor voiding pressure in association with low flow may suggest obstruction, particularly in the presence of new onset filling, storage or emptying symptoms after surgery. In women with significant elevations in PVR, urinary retention or definite alterations in voiding symptoms following an anti-incontinence procedure, these findings strongly imply BOO, and UDS may not be necessary before intervention.

8. Clinicians should counsel patients with urgency incontinence and mixed incontinence that the absence of DO on a single urodynamic study does not exclude it as a causative agent for their symptoms. (Clinical Principle)

The technical reasons for the inability to elicit the finding of DO in certain individuals, whether spontaneous or provoked, are unclear. Thus, it is very important to try to replicate symptoms precisely. Despite this, UDS may not diagnose DO even in patients who are very symptomatic. Therefore, urodynamic findings should be interpreted in the context of the global assessment, including examination, diaries and residual urine as well as other pertinent information.

Neurogenic Bladder
9. Clinicians should perform PVR assessment, either as part of complete urodynamic study or separately, during the initial urological evaluation of patients with relevant neurological conditions (e.g., spinal cord injury, myelomeningocele) and as part of ongoing follow-up when appropriate. (Standard; Evidence Strength: Grade B)

The Panel defines “relevant neurological conditions” as those neurogenic disorders of LUT dysfunction that may predispose a patient to upper tract complication(s). PVR is a useful tool for assessing the possibility of significant bladder and/or outlet dysfunction in patients with certain familiar neurological conditions and other systemic conditions such as AIDS, chronic alcohol use, diabetes mellitus, myelomeningocele and radical pelvic surgery,25–27 which may not have classic LUTS at presentation and a variable course. Therefore, evaluation with PVR assessment is appropriate both at the time of diagnosis and after for periodic monitoring. While the definition of elevated residual has varied, the finding of elevated residual urine volume may influence decision making.28,29 Ultimately, PVR results alone may not be sufficient to make certain management decisions without additional information obtained from a multichannel urodynamic study.

10. Clinicians should perform a complex CMG during initial urological evaluation of patients with relevant neurological conditions with or without symptoms and as part of ongoing follow-up when appropriate. In patients with other neurologic diseases, physicians may consider CMG as an option in the urological evaluation of patients with LUTS. (Recommendation; Evidence Strength: Grade C)

CMG is recommended at the time of initial consultation (or after the spinal shock phase in the case of spinal cord injury) of patients for NGB conditions thought to be at risk for developing renal complications. The initial study should be performed even in the absence of symptoms. CMG provides diagnostic, therapeutic and prognostic information in patients with relevant neurological disorders. The utility of CMG in other neurological conditions (e.g., multiple sclerosis, Parkinson’s disease, cerebrovascular accident) is less clear, specifically regarding prevention of renal complications. However, CMG remains an option for the evaluation of detrusor dysfunction in these disease processes and has been shown to accurately diagnose detrusor dysfunction in these subgroups.27,28

CMG’s benefits must be weighed against the potential risks imposed in this population. Patients with NGB may be particularly prone to infection, which might be exacerbated by CMG. Perhaps more
important is the concern of causing autonomic dysreflexia, which can be life threatening. The Panel's consensus is that clinicians who perform CMG in patients at risk for AD must be adept in its detection and prompt management, including having necessary monitoring equipment and the ability to provide quick drainage and pharmacologic intervention when necessary.

11. Clinicians should perform pressure flow analysis in patients with relevant neurologic disease with or without symptoms or in patients with other neurologic disease and elevated PVR or urinary symptoms. (Recommendation; Evidence Strength: Grade C)

PFS are an appropriate component of the work-up of NGB, especially for patients at risk for or with known elevated PVR, hydronephrosis, pyelonephritis, complicated urinary tract infections and frequent episodes of AD. In patients who are “voiding” or leaking between catheterizations, PFS can accurately distinguish between BOO and detrusor hypocontractility/acontractility. PFS are also valid to help delineate possible treatment options and monitor treatment outcomes.

“Normal” pathophysiologic processes (e.g., benign prostatic hyperplasia, OAB, incontinence) can often coexist in patients with NGB. PFS diagnostic utility is especially pertinent in this population because the underlying neurologic disease could affect or obscure patient symptomology. PFS was also reported to be beneficial in assessing LUTS when NGB was present along with coexisting OAB and/or diabetes.

The Panel concluded by consensus that PFS provides a more reliable identification of the voiding disorder, which can then direct treatment options and monitor the treatment outcome. PFS’ benefits must be weighed against the risks of infection and AD in this population.

12. When available, clinicians may perform fluoroscopy at the time of urodynamics (VUDS) in patients with relevant neurologic disease at risk for NGB or in patients with other neurologic disease and elevated PVR or urinary symptoms. (Recommendation; Evidence Strength: Grade C)

The use of simultaneous fluoroscopy with contrast-based UDS is an appropriate component in the urodynamic assessment of patients with NGB. Visual assessment aids clinicians in the following: delineating specific sites of obstruction; identifying the presence and grade of vesicoureteral reflux as well as the urodynamic parameters that are present at the time of reflux, and identifying anatomic and physical abnormalities of the bladder and urethra.

VUDS permits diagnosis of bladder neck abnormalities in patients with NGB due to a variety of different neurologic conditions and in some cases may help distinguish the etiology of NGB with respect to the underlying neurological disease.

Consensus among the Panel confirms that adding simultaneous fluoroscopy during CMG and PFS provided additional worthwhile diagnostic information beyond what either study alone could provide. Because radiation exposure is additive, these studies should be done in a manner that provides the desired clinical information at the lowest possible radiation dose to the patient.

13. Clinicians should perform EMG in combination with CMG with or without PFS in patients with relevant neurologic disease at risk for NGB or in patients with other neurologic disease and elevated PVR or urinary symptoms. (Recommendation; Evidence Strength: Grade C)

EMG testing is a useful modality to assist in the diagnosis of detrusor external sphincter dyssynergia characterized by involuntary contractions of the external sphincter during detrusor contraction. Knowledge of this condition is important because management should be initiated to lower urinary storage pressures and ensure adequate bladder emptying.

EMG testing’s major limitation is that it is a technically challenging, nonspecific component of urodynamic testing. Artifacts are common, and interpretation of EMG requires a clear understanding of the history and any relevant physical findings. The EMG diagnosis is taken into context with fluoroscopy, cystometry and flow rate to obtain the most useful information.

Lower Urinary Tract Symptoms

14. Clinicians may perform PVR in patients with LUTS as a safety measure to rule out significant urinary retention both initially and during follow-up. (Clinical Principle)

An elevated PVR cannot be used alone to differentiate between obstructive and non-obstructive conditions. Furthermore, a definition of exactly what constitutes an elevated PVR has not been agreed upon. However, urologists generally agree that in some patients, an elevated PVR may be harmful.

The potential benefits of measuring PVR include identifying patients with significant urinary retention and thus decreasing potential morbidity. In such patients, identifying an elevated PVR can facilitate selection and implementation of treatment as well as monitor treatment outcomes. The risks/harms of assessing PVR using catheterization are low and include urinary tract infection and urethral trauma. These risks can be eliminated with ultrasound determination of PVR. Because PVR measurement may be associated with false positives and negatives that could lead to inappropriate treat-
ment, the Panel recommends that decisions not be based on a single measurement.

15. Uroflow may be used by clinicians in the initial and ongoing evaluation of male patients with LUTS that suggest an abnormality of voiding/emptying. (Recommendation; Evidence Strength: Grade C)

Significant abnormalities in uroflow are indicative of a dysfunction in the voiding phase of the micturition cycle. Like PVR, uroflowmetry is limited by its inability to distinguish between a low flow rate due to outlet obstruction, bladder underactivity or both. Additionally, because uroflow depends on voided volume there may be significant variability of measurement in the same patient. In males, different studies have shown variability in uroflow’s diagnostic accuracy in detecting BOO, ranging from moderately high to low.\(^{37,38}\)

The Panel believes that uroflowmetry has value in evaluating disorders of voiding, even if further testing is required to make a specific diagnosis and can also be used for monitoring treatment outcomes and correlating symptoms with objective findings. Risks/harms of uroflowmetry include false positives and negatives, which may lead to inappropriate treatment. The Panel supports the use of uroflowmetry in the initial diagnosis and follow-up of LUTS in men.

16. Clinicians may perform multi-channel filling cystometry when it is important to determine if DO or other abnormalities of bladder filling/urine storage are present in patients with LUTS, particularly when invasive, potentially morbid, or irreversible treatments are considered. (Expert Opinion)

The role of filling cystometry and the finding of DO in predicting treatment outcomes remain controversial. No relevant studies that met the inclusion criteria were identified regarding the usefulness of cystometry for guiding clinical management in patients with LUTS. For some conditions associated with LUTS (such as DO), cystometry is the diagnostic standard. However, cystometry often fails to explain symptoms,\(^{39}\) and the reproducibility of finding DO in the same patient can vary depending on whether the studies are performed consecutively\(^ {40}\) or on different days.\(^ {41}\) Many studies have attempted to use cystometry to help determine prognosis after various treatments for LUTS in men and women,\(^ {42,43}\) and the findings revealed no apparent trends. Regardless, the Panel believes that there are instances where a particular treatment for LUTS might be chosen or avoided based on the presence of DO and, more importantly, impaired compliance. The Panel believes that this could be particularly important when invasive or irreversible treatment is planned because it could aid in patient counseling.

17. Clinicians should perform PFS in men when it is important to determine if urodynamic obstruction is present in men with LUTS, particularly when invasive, potentially morbid, or irreversible treatments are considered. (Standard; Evidence Strength: Grade B)

The voiding PFS is the current reference standard for BOO diagnosis in men. To be useable, a PFS study must be well performed with minimal artifacts.\(^ {44}\)

While the results of many studies showed variability regarding the ability of PFS to predict outcomes of surgical procedures to treat benign prostatic obstruction,\(^ {45,46}\) the Panel concludes that the preponderance of evidence suggests that a diagnosis of obstruction on a PFS predicts a better outcome from surgery than a diagnosis of no obstruction. Therefore, it can be recommended as part of the evaluation of LUTS in men. The Panel also believes that despite some limitations, PFS remains the only means of definitely establishing or ruling out the presence of BOO in men. However, it may not always be necessary to confirm urodynamic obstruction before proceeding with invasive therapy. Patients should also be made aware of the risks of PFS as well as some of the diagnostic pitfalls of the studies.

18. Clinicians may perform PFS in women when it is important to determine if obstruction is present. (Recommendation; Evidence Quality: Grade C)

The urodynamic diagnosis of obstruction in females is not as well established as in men. Various diagnostic criteria have been used to define obstruction in women.\(^ {47,48}\) While definitions of female BOO vary, all studies have shown differences in pressure (higher in women with obstruction as compared to non-obstructed) and flow rate (lower in women with obstruction as compared to non-obstructed) though there tends to be tremendous overlap.

Despite the relative lack of literature correlating PFS findings with outcomes,\(^ {49,50}\) the Panel supports the use of PFS as an option in women for the evaluation of potential BOO, particularly if invasive treatment is planned. Because of the limitations of PFS in women, the Panel believes that the results of PFS should always be correlated with patient symptoms and other diagnostic tests to make the most accurate diagnosis of female BOO.

19. Clinicians may perform VUDS in properly selected patients to localize the level of obstruction, particularly for diagnosing primary bladder neck obstruction (PBNO). (Expert Opinion)

In young men and women without an obvious anatomic cause of obstruction, VUDS can differentiate between functional causes of obstruction such
as PBNO and dysfunctional voiding. Videourodynamic evaluation is the only diagnostic tool that can document pressure/flow parameters and localize functional bladder-neck obstruction. To date, studies have not been performed comparing treatment of PBNO on men or women with VUDS versus those who had treatment but no VUDS. However, the Panel believes that VUDS remains the standard test with which to diagnose PBNO and should be an option for any young male or for a female patient in whom the condition is suspected.

Conflict of Interest Disclosures
All panel members completed COI disclosures. Relationships that have expired (more than one year old) since the Panel’s initial meeting, are listed. Those marked with (C) indicate that compensation was received; relationships designated by (U) indicate no compensation was received.

Consultant/Advisor: Jack Christian Winters, Astellas, Inc (C); Pfizer, (C); Roger R. Dmochowski, Allergan (C), Johnson and Johnson (C), Merck (C), Serenity (C), Antrares (C)(expired), Medtronic (C)(expired), Pfizer (C)(expired), Astellas (C)(expired), Lilly (C)(expired), Watson Pharmaceuticals (C)(expired), Novartis (C)(expired), Schering (C)(expired); Howard B. Goldman, American Medical Systems (C), Johnson and Johnson (C), Allergan, (C), Pfizer (C), Teva (C), TDoc (C), IBI Medical (C)(expired); Kathleen C. Kobashi, Allergan (C), Coloplast, (C)(expired), Novelion (C)(expired); Eric S. Rovner, Tengion (C), Pfizer (C), Astellas (C), Solace (C), Contura (C), Allergan (C), Johnson and Johnson (C), NIH/NIDDK (C).

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Disclaimer
This document was written by the Urodynamics Guidelines Panel of the AUA Education and Research, Inc., which was created in 2009. The PGC of the AUA selected the panel chair. Panel members were selected by the chair. Membership of the panel included urologists, nurses, and other clinicians with specific expertise on this disorder. The mission of the committee was to develop recommendations that are analysis-based or consensus-based, depending on Panel processes and available data, for optimal clinical practices in the use of urodynamics.

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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 guideline 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 preempt 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 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 these guidelines as necessarily experimental or investigational.

APPENDIX

Urodynamic studies included in the literature review

PVR
Uroflow
Cystometry
Pressure-flow study
Urethral function tests (UPP/LPP)
Videourodynamics
EMG
Any combination of tests

REFERENCES


10. Lin HH, Sheu BC, Lo MC et al: Comparison of treatment outcomes for imipramine for female gen-


