

Urodynamics: Practice Tips

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**Society of Urologic Nurses and Associates
Urodynamics Task Force**

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Urodynamics (UDS) can present an array of challenges for the urodynamicist, being anyone who performs UDS either under an independent physician or advanced practice provider license or a medical assistant, registered nurse, or licensed vocational nurse under the delegation of a supervising physician or advanced practice provider license. The urodynamicist must have a critical comprehension of bladder and urethral dysfunction, a clear understanding of the procedural steps, and an appreciation for the troubleshooting mechanisms to expertly complete the test. A health care provider might order urodynamic testing for many purposes, including assessment for occult stress urinary incontinence (SUI), clarification of the etiology of urinary incontinence, assessment for bladder obstruction, dysfunctional voiding, and/or overactive bladder (OAB) refractory to treatment.

The SUNA Urodynamics Task Force offers the following tips based on literature review and expert opinion of the SUNA Urodynamics Task Force.

Stress Urinary Incontinence

The 2014 American Urological Association (AUA)/ Society of Urodynamics, Female Pelvic Medicine, and Urogenital Reconstruction (SUFU) guidelines (Collins et al., 2014) recommend that if a patient reports SUI but SUI was not demonstrated during the leak point pressure (LPP) test on UDS, the urodynamicist may repeat the study in one of the following ways:

1. Remove the catheter at full bladder capacity and have the patient cough again.

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Abbreviations

Abbreviation	Meaning
UDS	Urodynamics
SUNA	Society of Urologic Nurses and Associates
SUI	Stress urinary incontinence
OAB	Overactive bladder
AUA	American Urological Association
SUFU	Society of Urodynamics, Female Pelvic Medicine, & Urogenital Reconstruction
LPP	Leak point pressure
POP	Pelvic organ prolapse
UII	Urge urinary incontinence
DO	Detrusor overactivity
AD	Autonomic dysreflexia
DESD	Detrusor external sphincter dysnergia
Pves	Intravesical pressure
BPH	Benign prostatic hyperplasia
ACOG	American College of Obstetricians and Gynecologists

2. Capture the pressure flow study, then repeat the cystometrogram by refilling the bladder, then remove the catheter to assess for valsalva or cough stress test again (Collins et al., 2014). Consider refilling to a volume of at least 200 cc consistent with LPP testing. If a leak is not observed at 200 cc with the catheter removed, consider reinserting the catheter and continuing to fill until the patient reports they have reached full capacity, and remove the catheter to assess for leak again. Removing the catheter to repeat the stress leak test could rule out a false negative stress leak test secondary to potential obstruction from the catheter. Obstruction may also occur in the presence of a urethral caruncle or urethral prolapse.
3. Consider performing SUI assessment with a cough stress test every 50 cc starting at a 50 cc volume to determine the lowest potential leak volume. Some women may not leak until bladder volumes exceed 200 cc, and potentially at volumes nearing capacity. Continuing to assess every 50 cc after LPP testing will allow the urodynamicist to discern the lowest leak point volume. Checking for SUI with only a cough stress test during LPP at 200 cc may overlook potential leakage at higher volumes or when at capacity (Collins et al., 2014).

Occult Stress Urinary Incontinence

Urodynamicists may use different pelvic organ prolapse (POP) reduction techniques during testing, which may include use of a pessary, insertion of Scopettes[®], ring forceps, split speculum, vaginal packing, or manual reduction. Avoid occlusion of urethra with POP reduction, especially if a pessary is used for reduction.

- a. When assessing for occult SUI, consider using Scopettes over vaginal packing to reduce a uterine or vaginal prolapse that protrudes beyond or past the hymen of the vagina.
- b. Scopettes may not be ideal for a stage 4 prolapse.

Urge Urinary Incontinence

1. If the patient reports urge urinary incontinence (UUI) but this is not reproduced on UDS, stop the water at full bladder capacity and run water from a sink, or play running water sounds for one full minute to provoke detrusor overactivity (DO).
2. Other techniques may include having the patient laugh or asking the patient to stand (with or without water running for one minute) because these maneuvers may elicit DO.

Urinary Retention and Urinary Hesitancy

1. If the patient has difficulty starting urination, consider running water and/or having the patient place their fingers and/or hand in a cup of warm water.
2. For infants or bottle-fed pediatric patients, consider feeding or gently pouring warm water on peri area.

Safety Measures

1. Use patient call buttons or lights if you leave the urodynamic suite to allow the patient to void in privacy. Call buttons or lights can serve as an alert system if the patient becomes in distress.
2. Keep nitropaste nearby and monitor blood pressure in patients at risk for autonomic dysreflexia (AD). Obtain baseline blood pressure, monitor blood pressure every 5 minutes during procedure, and monitor closely for any adverse reactions. Be prepared to remove urethral catheter and insert a larger catheter to drain bladder quickly if autonomic dysreflexia occurs. Be prepared to administer nitropaste to chest if blood pressure remains elevated after draining bladder. Wipe paste away after blood pressure regulates.
3. If the patient has detrusor external sphincter dyssynergia (DESD) and is experiencing AD, do NOT remove the vesical (Pves) catheter. Instead, remove urine from the Pves catheter. If the Pves catheter is removed in the presence of a tight sphincter, it may make insertion of a larger catheter more difficult. If a catheter is removed prior to bladder draining, urgent cystoscopy may be needed to relieve the noxious stimulation from the full bladder.

General Tips

Rectal Catheter Placement

1. Women: While many urodynamicists prefer vaginal catheter insertion in women for increased patient comfort and less rectal peristalsis, some providers may prefer rectal catheter insertion.
2. When using a rectal catheter, consider that insertion length must be 12 to 15 cm to avoid rectal peristalsis. Some providers also recommend a glycerin suppository the night prior to UDS if the patient has not had a bowel movement in the previous 12 hours.

Urethral Catheter Placement

1. Men: Prior to catheterizing, pull the penis taut and perpendicular to the body. Liberally lubricating the catheter will help the catheter glide along the urethra. Use of lidocaine jelly 5 minutes before catheterization can help the patient relax, thereby making catheterization easier. A Coudé tip Pves can assist in patients with benign prostatic hypertrophy (BPH) and/or patients with known strictures. Guidewire with flexible cystoscope may be necessary when all attempts at catheterizing have been unsuccessful (Bianchi & Chestnut, 2021). Threading the Pves into the tip of a Foley catheter can help guide the Pves into the bladder. Once the catheter is in the bladder, gently tug the Pves out of the Foley catheter and remove only the Foley. Injecting 10 cc of lubrication into the urethra immediately prior to catheterizing can help guide the catheter into the bladder. When all other attempts to catheterize have been unsuccessful, then guiding the Pves into the bladder can be done by snipping the tip of the Pves off and using a guidewire with a flexible cystoscope.
2. Pediatrics: In uncircumcised males, when the urethra cannot be visualized, firmly grip the glans penis in your nondominant hand and 'walk' the Pves along the glans with your dominant hand until the Pves glides into the urethra. In females, when the urethra cannot be visualized, a cotton tip applicator can be placed just inside the vagina, and the Pves can be inserted into the urethral slit anterior to the cotton tip applicator. It is recommended that a parent or legal guardian be present in addition to a mandatory chaperone.

Chaperones: Per the American College of Obstetricians and Gynecologists Committee Opinion on Sexual Misconduct

"It is recommended that a chaperone be present for all breast, genital, and rectal examinations. The need for a chaperone is irrespective of the sex or gender of the person performing the examination and applies to examinations performed in the outpatient and inpatient settings, including labor and delivery, as well as during diagnostic studies such as transvaginal ultrasonography and urodynamic testing" (American College of Obstetricians and Gynecologists Committee Opinion on

Sexual Misconduct, 2020, p. e47) Despite this recommendation, not all facilities require a chaperone for urodynamic testing, and many facilities will allow the patient to decline a chaperone for a sensitive examination. If the patient declines a chaperone, it is also up to the discretion of the provider to perform or decline to perform the procedure. ■

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Other Resources

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Organizations and Publications

American Urological Association

Society of Urodynamics Female Pelvic Medicine and Urogenital Reconstruction

Society of Urologic Nurses and Associates (SUNA) Urodynamics Task Force

Urologic Nursing Journal

Quick Reference Interpretation Guide

Table 1.
Uroflowmetry Maximum Flow Rate (Qmax)

Normal Max Flow Rate: Qmax >15 mL/sec	
Abnormal Max Flow Rate: Qmax <10 mL/sec	
Max Flow Rate Variations by Sex and Gender	
Males <40 years old	>22 mL/sec
Males 40-60 years old	>19 mL/sec
Males >60 years old	>13 mL/sec
Females <50 years old	>25 mL/sec
Females >50 years old	>18 mL/sec
<ol style="list-style-type: none"> Elevated flow rates (Qmax >40 mL/sec): possible intrinsic sphincter deficiency (ISD) OR increased outlet resistance. High pressure/low flow suggests obstruction. Prolonged low flow rates with/without low volumes: bladder outlet obstruction (BOO). Repeated low flow rates with adequate volumes: increased bladder outlet resistance AND/OR decreased bladder contractility. 	

Sources: Pessoa & Kim, 2018; Yetman, 2005b.

Table 2.
Complex Cystometrogram

Bladder Sensation	
First sensation	100-250 mL
First desire	200-330 mL
Strong desire	350-560 mL

Sources: Mahfouz et al., 2012; Taylor et al., 2022.

Table 3.
Cystometric Bladder Capacity

Normal	300-600 mL
Small	<300 mL
Large	>600 mL

Sources: Gray, 2011a; Yao & Simoes, 2021.

Table 4.
Pediatric Cystometric Bladder Capacity

< 1 year old	(2.5 x age [months]) + 38
2+ years of age	(2 + age [years]) x 30

Sources: Acosta et al., 2017; Ceylan et al., 2022; Guerra et al., 2018; Hofmeester et al., 2017; Holmdahl et al., 1996; Koff, 1983; Mahfouz et al, 2012; Meister et al., 2021; Snow-Lisy et al., 2022; Wen et al., 2018.

Table 5.
Bladder Wall Compliance

Normal	>30 mL/cm H ₂ O
High	Significantly greater than 30 mL/cm H ₂ O
Low	<10 mL/cm H ₂ O

Sources: D’Ancona et al., 2019; Gray, 2011b.

Table 6.
Leak Point Pressures

Valsalva Leak Point Pressure (VLPP)	<ul style="list-style-type: none"> • <60 cm/H₂O: intrinsic sphincter deficiency (ISD) • 60-90 cm/H₂O: sphincter incompetence + urethral hypermobility • >90 cm/H₂O: urethral hypermobility <p>Sources: Burden et al., 2015; Gray, 2011c; Kazobinka et al., 2017.</p>
Detrusor Leak Point Pressure (DLPP)	<ul style="list-style-type: none"> • >40 cm/H₂O = threatening • >80 cm/H₂O = obstruction <p>Sources: D'Ancona et al., 2019; Kavanagh et al., 2019; Lemmons, 2005.</p>
Pressure Flow Study	<ul style="list-style-type: none"> • See uroflowmetry points. • Low flow, low Pdet/detrusor underactivity or acontractile detrusor: possible bladder neuropathy. <p>Sources: Pessoa & Kim, 2018; Yetman, 2005a, b.</p>
Urethral Pressure Profile	<ul style="list-style-type: none"> • Air charged catheters maximum urethral closure pressure (MUCP) <40 cm/H₂O: ISD <p>Sources: Culligan et al., 2001; Pipitone et al., 2021 ; Pollak et al., 2004; Zehnder et al., 2008.</p>

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