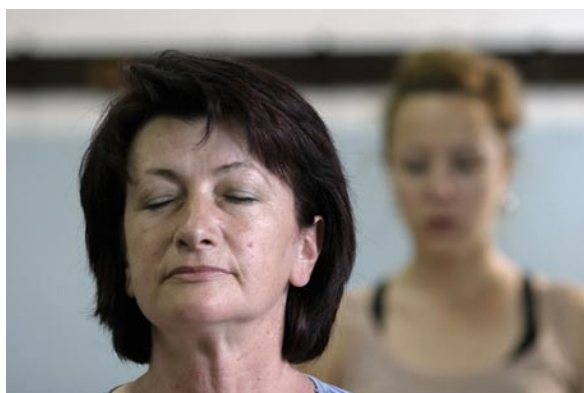


The Role of Urodynamics



Assessing Lower Urinary Tract Function in Women

By **Melissa A. Jones, PA-C**

UroPoint Bladder Control Centers

Urodynamic investigation is a series of tests used to assess the function of the lower urinary tract. Urodynamics may consist of any or all of the following: cystometry, uroflowmetry, pressure-flow, leak point pressure, urethral pressure profilometry, videourodynamics and electromyography. The appropriate test or tests are chosen according to the medical history, physical examination and voiding diary, which are obtained prior to urodynamic testing. The information gained by urodynamics may be helpful in establishing the etiology of the lower urinary tract dysfunction; thus, helping to select the most appropriate intervention or treatment plan.

UROFLOWMETRY

If voiding dysfunction is suspected, uroflowmetry can be performed as an initial screening test. Uroflowmetry measures the rate of urine over time by having the patient void on a special commode. This commode will funnel urine into a storage container that sits on top of a device that measures volume voided over time. The most important uroflow measurements to be recorded and reported include the flow pattern, which is interpreted by the clinician, maximum flow rate (Q_{max}) and voided volume. Along with these

measurements, a post void residual should be obtained to assess bladder emptying. By assessing all these factors, a clinician can get a good picture of a patient's voiding function.

PRESSURE FLOW

Pressure-flow studies provide more accurate and useful information regarding voiding mechanisms than uroflow alone. Pressure-flow studies measure detrusor pressure and urine flow rate simultaneously. This can help to distinguish an obstructive voiding mechanism from an

impaired detrusor contraction. Eliciting a good detrusor contraction is important in patients that are undergoing anti-incontinence procedures (urethropexies, suburethral slings, etc.) and have questionable voiding function. Patients with poor detrusor contractions may suffer from urinary retention postoperatively; therefore, the surgeon may choose not to perform an anti-incontinence procedure in these patients.

CYSTOMETRY

Cystometry measures pressure-volume relationships of the bladder. Cystometry evaluates bladder sensations, bladder capacity, detrusor stability and bladder compliance. Multichannel cystometry includes intravesical, abdominal and detrusor measurements. Intravesical pressure is measured by placing a catheter in the bladder to fill and detect the pressure and abdominal pressure is measured by placing a catheter in the rectum or vagina. Detrusor pressure is calculated by subtracting abdominal pressure from intravesical pressure. Multichannel cystometry is the gold

standard for diagnosing detrusor instability, urinary urge incontinence, uroinary stress incontinence and mixed incontinence.

LEAK POINT PRESSURE (LPP)

When history alone cannot distinguish between the types of incontinence, cystometry, including leak point pressure testing, can help to differentiate. Leak point pressure testing measures the bladder pressure at which leakage occurs. Both an increase in abdominal pressure or detrusor instability can cause bladder leakage; therefore, two leak point pressures are assessed -- detrusor leak point pressure and abdominal leak point pressure.

Abdominal leak point pressure is the intravesical pressure at which leakage occurs secondary to increased abdominal pressure in the absence of a detrusor contraction. Detrusor leak point pressure is the value of detrusor pressure at which leakage occurs without a rise in abdominal pressure. By determining which type of leakage is occurring, a clinician can then decide the proper treatment plan. Patients may have falsely elevated abdominal leak point pressures if they have vaginal prolapse. It is important to manually reduce the prolapse either with a speculum or pessary during the leak point testing to obtain accurate leak point pressures. If a patient is scheduled for surgical correction of the vaginal prolapse, it is important for a clinician to mimic surgery by using the speculum or pessary to reduce the prolapse to see if they can unmask stress incontinence, as the patient may need an anti-incontinence procedure in combination with the vaginal prolapse repair.

URETHRAL PRESSURE PROFILOMETRY (UPP)

Urethral pressure profilometry (UPP) measures the pressure within the urethra along its entire length. Unfortunately, there are no distinct normal values because large variations have been reported. UPP, therefore, has limited use; however, it can be used to diagnose intrinsic sphincter deficiency or the low-pressure urethra.



“ When history alone cannot distinguish between the types of incontinence, cystometry, including leak point pressure testing, can help to differentiate.”

VIDEOURODYNAMICS

Videourodynamics adds x-ray or ultrasound imaging to a urodynamic study. This is usually indicated in patients with complicated lower urinary tract

dysfunction. By using videourodynamics, a clinician can measure the pressures and visualize the anatomy simultaneously. Videourodynamics can reveal the following dysfunctions: incontinence as leakage of contrast medium, bladder base hypermobility, incompetent bladder neck, insufficient urethral closure during filling, descent of bladder, reflux during filling or voiding, bladder or urethral diverticulum and urethral obstruction during voiding.

ELECTROMYOGRAPHY (EMG)

Electromyography (EMG) can be done as part of the urodynamics study by placing surface or needle electrodes that will measure electrical activities created by the pelvic floor muscles. EMG is most commonly used to measure the coordination of voiding. EMG activity should normally decrease during voluntary voiding; however, increased EMG activity with voiding may indicate abdominal straining and a fluctuation in EMG activity may indicate detrusor sphincter dyssynergia.

Urodynamic evaluation is often indicated in women with complex symptoms, those who have failed first-line treatments, and/or those who are planning surgery.



Melissa A. Jones, PA is originally from Indianapolis, Indiana. She graduated summa cum laude from Marian College, Indianapolis, Indiana, with a Bachelor of Science in Biology. She earned her Bachelor of Science in Health Science with a major in Physician Assistant Studies from Butler University, Indianapolis.

Melissa is the recipient of the Sister Mary Rose Stockton Scholarship Award and a member of the American Academy of Physician Assistants. Her areas of special interest include urinary incontinence and general

patient education.

Melissa joined Urology of Indiana in 2006. She enjoys traveling, playing golf and basketball, and spending time with her family.