The Role of Urodynamics in Elderly Patients

Joseph E. Yared, MD, E. Ann Gormley, MD*

KEYWORDS

• Urodynamics • Elderly • Stress incontinence • Urgency • Parkinson • Stroke

KEY POINTS

- Urodynamic testing (UDS) is the study of the storage and voiding functions of the bladder and its outlet. UDS is used to determine if lower urinary tract symptoms (LUTS) is due to a dysfunction of the bladder, the outlet or both. UDS should only be performed when there is a particular question to be answered and when that answer might lead to a different management strategy.
- UDS attempts to reproduce the patient's symptoms. The patient should be prepared for the test and should be positioned comfortably and safely.
- UDS includes measurement of post void residual, a cystometrogram, a pressure-flow study, and electromyography of the pelvic floor.
- UDS may be used to diagnose bladder storage or voiding dysfunctions, but its greatest utility is to confirm the presence of a particular problem before operating.

INTRODUCTION

Urodynamic testing (UDS) is the study of the storage and voiding functions of the bladder and its outlet. According to a United Nations report on aging, those who are older than 60 will be 21.1% of the world's population by 2050 and the probability of a 65-year-old in more developed regions today living to 85 years or older continues to increase.[1] In the elderly population, lower urinary tract symptoms (LUTS) consisting of increased urgency, frequency, and nocturia and increased symptoms of both urgency and stress incontinence are common.[2] The population older than 65 years is a heterogenous group in terms of frailty, those who present with impairment in their physical activity, mobility, balance, strength, cognition and have coexistent chronic medical conditions and need for assistance with activities of daily living and those who are not frail. Separation of those older than 65 into frail and nonfrail groups is beyond the scope of this article. The existence of LUTS in any patient does not warrant the use of UDS to establish a diagnosis. In fact, level I evidence is lacking for the exact

Section of Urology, Department of Surgery, 1 Medical Center Drive, Lebanon, NH 03756, USA
* Corresponding author.
E-mail address: Elizabeth.Ann.Gormley@hitchcock.org

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indication of UDS.[3] LUTS should be initially investigated with a thorough history, physical examination, voiding diary, urinalysis, and urine culture. A pad weight test may be helpful in some incontinent patients. In female patients during the physical examination, the health of the vaginal mucosa is assessed, urethral hypermobility is noted, a stress test is performed and pelvic organ prolapse is graded. Before performing other tests and before treatment the impact of the patient's symptoms on their quality of life is assessed.

UDS is used to determine whether LUTS is owing to a dysfunction of the bladder, the outlet, or both. UDS should only be performed when there is a particular question to be answered and when that answer might lead to a different management strategy. It is also reasonable to perform UDS before considering an operative procedure, particularly in elderly patients who may not be ideal surgical candidates.

UDS should be performed with an attempt to reproduce the patient's symptoms to present an accurate clinical picture of the patient's condition. The clinician and the staff in the UDS suite must alleviate any anxiety the patient might have by preparing the patient for the test by explaining the procedure, telling patients what to expect throughout the test and explaining the purpose of the test and how it may impact treatment.

POSITIONING

Usually, the patient is placed in a seated or standing position on a special table that can accommodate fluoroscopy equipment, including a C-arm.[4] Ideally, patients should not be placed supine during filling because this may minimize overactive bladder symptoms.[5] During the voiding phase of UDS, patients should be positioned in whatever position they normally use to void. When positioning the patient for UDS, the clinician should keep in mind that older patients might have limited mobility, impaired balance, and reduced strength, and may require assistance in positioning. Patients should be positioned so that they are comfortable and feel safe without fear or risk of falling.

URODYNAMIC TESTING

UDS is composed of different components that do not necessarily need to be used together. The clinician should use their judgment to pick the most appropriate parts of the study to answer the question that they are trying to address and to establish a diagnosis. It is reasonable to start with minimally invasive studies first and then decide whether more invasive testing is warranted.

The International Continence Society has guidelines in place for good UDS technique.[6] The bladder is catheterized to ensure that the patient's bladder is empty and to obtain a postvoid volume. A dual-lumen catheter is used in the bladder to measure pressures and to allow for filling. A single-lumen catheter is inserted in the rectum to record intraabdominal pressure. In females, this can be placed in the vagina. Electromyography (EMG) electrodes are then attached to the perineal skin to record sphincter activity. Once the catheters are placed and the patient positioned, the transducers are zeroed. UDS comprise the following tests.

Postvoid Residual

The postvoid residual (PVR) is the amount of urine left in the bladder after voiding. This can be assessed noninvasively with an ultrasound/bladder scanner (**Fig. 1**) or via straight catheterization. A high PVR could be indicative of dysfunctional bladder emptying, obstruction, or both. In patients with ascites, straight catheterization is