Urinary Dysfunction and Urodynamics in the Elderly

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It is essential that clinicians working in urodynamics approach all patients in a systematic, organized, and caring manner. Patients undergoing urodynamic evaluation are typically anxious about their appointment and the elderly patient is no exception. It is the job of the clinician to put the patient at ease. This requires the urodynamicist to master use of the equipment, so the focus is put upon the patient. As baby boomers age, the geriatric population continues to grow. It is important for the urodynamicist to have an in-depth understanding of the problems of this increasingly elderly population. Urinary incontinence affects 15% to 30% of the elderly at home and 50% of those dwelling in nursing homes (Resnick, 1996). The expert urodynamicist generally develops multiple hypotheses during the history and physical examination for evaluation during the study. This creates the necessity for an understanding of urologic disorders common to the geriatric population with the special considerations that may be necessary when evaluating these patients.

Approach to Patients

The approach to all patients should be caring and educative. When possible the urodynamics equipment and testing area should be prepared and ready before the patient enters the room (such as tubing primed and ready, equipment set up). Patients have their own preference for how they want to be addressed. Ask the patient how he/she would like to be addressed. A confidant, knowledgeable demeanor can put the patient at ease. The environment is important as well, and it should be as welcoming and comfortable as possible. It may be helpful to have soft music playing during the test if the patient wishes. Calming pictures above the examination table may provide a nice distraction for the patient. Prior to initiating the test the urodynamicist should explain to the patient, in clear language and terms, what to expect during the procedure. Reassure the patient that someone will be present throughout the study and that the patient will be kept as comfortable as possible. Some patients find it helpful to be distracted with small talk about family, jobs, favorite books, travel, or hobbies. If the patient tends to get confused or is overwhelmed, keep instructions and commands simple. Throughout the encounter the urodynamicist must promote patient privacy whenever possible. Keep the patient appropriately covered as the procedure permits.

Initial Assessment of Patients

It is crucial to begin the urodynamic evaluation with a history, including when possible, a 3-day voiding diary. The history should focus on the patient’s chief complaint and any urologic symptoms, but should not be limited to this information. It is also important to ascertain a complete medical history and a focused physical examination. Evaluation of the patient may include a mini-mental examination, gait assessment, pelvic examination, and a focused neurologic examination. Any cognitive awareness and mobility issues must be fully evaluated and noted. After the history and focused physical examination, the urodynamicist determines some of the possible findings to be noted during the study. For example, if a 68-year-old man is complaining of weak...
stream, incomplete emptying, frequency and urgency, the examiner knows to watch for uninhibited detrusor contractions, obstructive flow (high detrusor pressure, low urine flow), incomplete bladder emptying, or a hypocontractile detrusor contraction. All patients should be screened for urinary tract infections prior to testing by using the urine dipstick to check for white blood cells or nitrites. If white blood cells or nitrites are present, a microscopic evaluation is indicated to determine if bacteria are present. Urodynamics is contraindicated in the presence of an infection due to the risk of spreading the infection to the upper urinary tracts.

Changes in the Lower Urinary Tract Related To Aging

A number of age-related changes described in the literature by Diokno et al. (1988) and Resnick (1988) occur in the urinary tract of an elderly individual. The detrusor muscle may become less contractile, with a smaller bladder capacity and an inability to delay voiding. Post menopausal, female patients experience changes to vaginal mucosa and periurethral tissue. These changes can cause increased susceptibility to urinary tract infections and stress incontinence (Pandit & Ouslander, 1997). Detrusor overactivity may increase in elderly individuals of both sexes. In some, post-void residuals may increase to a range of 50 to 100 ml. Increased urine production at night, common in the elderly, may cause nocturia. These factors, along with the propensity towards other diseases, such as diabetes, which may affect the bladder, increase the likelihood of voiding dysfunction in the elderly.

Common Urologic Disorders in the Aged

A urodynamicist must have a complete understanding of a multitude of common urodynamic findings in the geriatric patient. Irrespective of cognitive or mobility issues, voiding disturbances are common in the elderly. Most commonly, the problem is urinary incontinence. Resnick (1988; 1990) described four types of dysfunction of the lower urinary tract that can lead to incontinence. These include detrusor overactivity, pelvic floor or sphincter weakness, bladder outlet obstruction, and detrusor hypocontractility. Incontinence in the elderly can also be related to the patient’s mental status changes or functional ability to get to the bathroom.

Detrusor instability or overactivity is seen on the urodynamic study as a sudden involuntary rise in detrusor pressure and a return to baseline (see Figure 1). It is the most common cause of urinary incontinence for both sexes. According to Hilton and
Stanton (1981), 39% to 68% of the elderly with incontinence have detrusor instability. In elderly persons, this may be idioopathic or linked to an identifiable neurologic lesion affecting the micturition pathway. Instability can be attributed to brain failure due to dementia, arteriosclerotic disease, or idiopathic causes. Since the middle cerebral artery also feeds the detrusor motor center in the frontal lobe, a stroke causing its occlusion could produce secondary instability. Other neurologic causes may be a frontal lobe lesion, multiple sclerosis, or Parkinson’s disease. Finally, detrusor instability in the elderly may also be related to hypertrophy of the detrusor muscle in response to urethral obstruction. Increasing prostatic enlargement as men age most commonly causes outlet obstruction.

Another common geriatric problem, pelvic floor or sphincter weakness, may cause incontinence. This can be related to normal muscle weakening with the reduction of bulk associated with aging or the lack of estrogen, which affects the elements of urethral compression and tension necessary for continence. Previous abdominal surgeries including prostatectomy, hysterectomy, or multiple vaginal deliveries may have an adverse affect on the pelvic floor. In addition, abnormal straining to void or prolapse of the vagina, bladder, or rectum may affect the mechanisms necessary to maintain continence.

Bladder outlet resistance sometimes causes obstructive and irritative symptoms. This may be relative, but not limited to an enlarged prostate, stricture, scarring, cystocele, or the presence of a mass or fibroids. Obstructive symptoms include decreased urine flow, hesitancy to start the urinary stream, intermittent voiding, straining to pass urine, incomplete bladder emptying, prolonged voiding times, or post-void dribbling. Irritative
symptoms characterized by frequency, urgency, nocturia, or urge incontinence are often caused by the bladder’s hypertrophic response to prolonged outlet obstruction. Urodynamics typically demonstrates this as a high detrusor pressure and a low urine flow (see Figure 2). This may or may not be accompanied by uninhibited detrusor activity. Detrusor hypocontractility (see Figures 3 & 4) may be a cause of incontinence in the elderly. With this disorder the bladder never fully empties and the incontinence is related to the overflow of urine. This is a less common cause of incontinence.

Detrusor hypocontractility is usually considered within the context of other co-morbid conditions discussed below.

Although incontinence is common, it is not the only urologic problem in the elderly. Other urologic dysfunction may be related to decreased sensation to bladder filling, obstructive changes without incontinence, or incomplete emptying related to a hypocontractile detrusor muscle. Bladder sensation changes may be related to neurologic lesions in the frontal lobe, diabetic neuropathy, or other neuropathies. These changes would be noted on urodynamics testing as delayed or decreased sensations to filling. Obstructive changes may occur with or without incontinence and are typically seen on urodynamics testing as a high detrusor pressure (> 60 cm of water) accompanied by a low urine flow (< 12 ml/sec) (Gray, 2001). Irritative symptoms associated with detrusor hypertrophy may be displayed as detrusor instability. The detrusor may become hypocontractile relative to neurologic disorders such as lesions, stroke, or idiopathic etiologies. Other causes may be
immobility, constipation, medications such as anticholinergics or sedatives, or previous bladder overdistention secondary to obstruction (Farrar, 1984). Hypocontractility is illustrated on urodynamics as a weak, poorly sustained detrusor pressure with typically incomplete emptying of the bladder (see Figure 3).

Attendant Challenges
There are many challenges in performing urodynamics in the elderly patient. The urodynamicist must be cognizant of potential hurdles to successful testing. The elderly patient may not have the mobility skills to maneuver on and off the urodynamic table or to assume the best positions for catheterization. Assistance should be provided when the patient is getting on and off the table and a gait belt may be helpful. Once the patient is on the table, a strap can be used to safely secure the patient to the chair or table. Alternative positions for catheterization may be necessary, such as the posterior approach, with the female patient lying on her side. Some patients may not speak English or may be hard of hearing, making communication an issue. These obstacles can be overcome with an interpreter or by speaking clearly, allowing the patient to read lips if necessary. The urodynamicist should always check patient understanding prior to proceeding. If cognition is impaired it may be necessary to simplify all instructions and commands.

Conclusion
Urodynamics in the elderly can be challenging, yet very rewarding. Often urinary problems can be resolved and patients can regain the active quality of life they hoped for in their golden years. Knowledge regarding the geriatric population can help solidify causative reasons for urinary dysfunction, paving the way for identifying appropriate treatment options. The urodynamicist plays a key role in the process of understanding and resolving urologic problems, thereby improving the quality of life in elderly patients.

References