

## FLUROURODYNAMIC STUDIES CHANGE UROLOGY PROVIDER IMPRESSIONS AND MANAGEMENT PLANS

### Hypothesis / aims of study

The utility of urodynamics has come into question after the results of a randomized controlled trial in women with stress urinary incontinence (SUI) found no difference in surgical outcomes [1]. Population-based studies using Medicare data have shown that the use of urodynamics is heterogeneous [2] and is increasing in female Medicare patients [3]. Although multiple guidelines include the use of urodynamics, there is limited literature about how providers use urodynamic information in clinical practice including patients with various urologic problems and complaints. The purpose of this study is to prospectively survey urology providers on the clinical utility of fluoroscopic urodynamic studies (FUDS) in a complex tertiary practice. We hypothesize that FUDS are an important part of the workup for various lower urinary tract disorders by providing information unavailable by history and physical alone, therefore changing the ordering physician's diagnosis and management plan.

### Study design, materials and methods

All FUDS studies completed at a single institution from 5/2013 to 8/2014 were considered eligible for inclusion. The treating urologist (one of five individuals) filled out a survey both before and after FUDS regarding questions to be answered by the test, diagnoses, and treatment decisions. Descriptive statistics were used to define the population of patients undergoing FUDS and significance testing with t-tests and chi-squared to compare providers' responses before and after FUDS.

### Results

A total of 279 surveys were completed out of a total of 836 FUDS, for a response rate of 33%. The mean age of the patients was 55.9 years, 59.5% were female, 93.9% were white, 29.2% had a diagnosis of a neurologic disorder and 5.4% had previously undergone pelvic radiation.

FUDS were categorized by the provider based on a predefined list of urodynamics questions. The most frequently chosen were "to discern predominant type of urinary incontinence" (38.4%) "to assess safety during filling" (38%) and "to evaluate for obstruction vs. atonic bladder?" (30.8%). Only 5.4% of patients were unable to be categorized by these questions. None of these studies were performed for an index patient with SUI.

Change in the provider's impression after FUDS occurred significantly in studies where the initial clinical impression was "stress urinary incontinence" 14.7% ( $p=0.02$ ) or "urgency incontinence/detrusor overactivity" 31.7% ( $p<0.0001$ ).

After FUDS, treatment plans changed in 42.7% of patients. These changes included a change in surgical plan for 35.5%, medication/dose in 14.7%, change in follow up interval for 11.5%. The follow up interval changed based on FUDS significantly more often for those patients with neurogenic bladder, ( $p=0.03$ ) and the surgical plan changed significantly more often for patients without neurogenic bladder ( $p=0.04$ ). A total of 83/274 (30.3%) patients had a change in management based on fluoroscopy. There was no difference in management changes based on fluoroscopy when patients with neurogenic bladder were compared those without ( $p=0.11$ ).

### Interpretation of results

We defined a comprehensive list of urodynamics questions that can be used to classify patients who are undergoing FUDS. In our population, which did not include primary SUI patients, FUDS changed the provider's impressions, and changed management plans in over 40% of patients, with the majority of these being changes in surgical management.

### Concluding message

Urodynamic studies, when used judiciously to answer specific questions, are clinically useful and critical in establishing surgical and medical management plans for patients with lower urinary tract dysfunction.

**Table 1: Demographics of Patients Undergoing Urodynamics**

|                             |             |
|-----------------------------|-------------|
| Age (mean)                  | 55.9 years  |
| Sex                         | 113 (40.5%) |
| Male                        | 166 (59.5%) |
| Female                      |             |
| Race                        |             |
| White                       | 261 (93.9%) |
| African American            | 15 (5.4%)   |
| Other                       | 2 (0.7%)    |
| Neurologic problem          | 81 (29.2%)  |
| Spinal cord injury          | 28 (32.9%)  |
| Multiple Sclerosis          | 11 (12.9%)  |
| Spina bifida                | 10 (11.8%)  |
| Stroke                      | 4 (4.7%)    |
| Other                       | 32 (37.7%)  |
| History of pelvic radiation | 15 (5.4%)   |

**Table 2 Categorization of Urodynamics Questions**

|   |                           |
|---|---------------------------|
|   | <b>Total 279</b><br>N (%) |
| Discern predominant type of urinary incontinence  | 107 (38.4%)               |
| Assess safety during filling  | 106 (38%)                 |
| Evaluate for obstruction versus detrusor dysfunction/atony                              | 86 (30.8%)                |
| Assess etiology of incontinence in neurogenic bladder patients                          | 50 (17.9%)                |
| Determine etiology of voiding dysfunction in a female after anti-incontinence procedure | 42 (15.1%)                |
| Other   | 15 (5.4%)                 |
| Assess bladder and outlet function prior to transplant                                  | 8 (2.9%)                  |

**Table 3: Changes in Patient Management after Urodynamics**

|  |                    |
|--|--------------------|
| <b>Change in management plan (all types)</b> | <b>119 (42.7%)</b> |
| Change in surgical plan                      | 99 (35.5%)         |
| Change in medication or dose                 | 41 (14.7%)         |
| Change in follow up interval                 | 32 (11.5%)         |
| Change in catheterization need or schedule   | 21 (7.5%)          |

#### References

1. Nager CW, Brubaker L, Litman H, et al. A randomized trial of urodynamic testing before stress-incontinence surgery. *N Engl J Med* 2012;366:1987–97.
2. Reynolds, W. S., Roger R. Dmochowski, R.R., Lai, J., Saigal, C., Penson, D.F., and Urologic Diseases in America Project. Patterns and Predictors of Urodynamics Use in the United States. *J Urol*. Vol. 189, 1791-1796, May 2013. 10.1016/j.juro.2012.11.066
3. Reynolds, W. S., Ni, S., Kaufman, M. R., Penson, D. F. and Dmochowski, R. R. (2014), Trends in urodynamics in U.S. female medicare beneficiaries, 2000–2010. *Neurourol. Urodyn.* doi: 10.1002/nau.22644

#### Disclosures

**Funding:** None **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** University of Michigan Institutional Review Board - HUM00031859 **Helsinki:** Yes **Informed Consent:** Yes