Trends in urodynamics study utilization in a Southern California managed care population

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OBJECTIVE: We examined trends in overall and preoperative urodynamics utilization among women with stress urinary incontinence (SUI) to determine if practice patterns changed following publication of a 2012 randomized trial questioning the value of preoperative urodynamics in patients with uncomplicated SUI.

STUDY DESIGN: We collected electronic medical record data on the number of female patient visits to Kaiser Permanente Southern California urology and urogynecology clinics with stress or mixed incontinence, urodynamic studies (UDS) performed, surgeries performed for stress incontinence, and the demographic and clinical characteristics of these patients during 2 discrete time periods before and after a potentially practice-changing publication. We used χ^2 tests and *t* tests as appropriate. A multivariate logistic regression model was used to estimate the odds of urodynamics performed during January 2013 through June 2014 (study period 2) compared to urodynamics performed during July 2010 through December 2011 (study period 1) after adjustment for demographic and clinical characteristics.

RESULTS: In all, 33,775 women were diagnosed as having SUI or mixed urinary incontinence during study period 1 and 37,238 women were diagnosed with these conditions during study period 2. Among these women 12.8% underwent UDS in study period 1 compared to 8.4% in study period 2 ($P < .01$). The rate of UDS per patient visit decreased 27.0% between the 2 time periods ($P < .01$). In women undergoing surgery for stress incontinence, urodynamics were performed 56.5% of the time in study period 1 and 46.5% of the time in study period 2. After controlling for demographic, pelvic organ prolapse, and other bladder diagnoses, the odds of urodynamics performed in study period 2 was 0.54 times the odds of urodynamics performed in study period 1 (95% confidence interval, 0.52—0.57). Among women with only the diagnosis of stress incontinence, 1.78% underwent urodynamics in study period 1 compared with 0.84% in study period 2 ($P < .01$). Preoperative urodynamics decreased from 39% in study period 1 to 20% in study period 2 ($P < .01$).

CONCLUSION: Significantly fewer UDS are being performed overall and prior to stress incontinence surgery in this population. This change may be due to recent studies suggesting low utility of urodynamics in patients with uncomplicated, stress-dominant incontinence.

Key words: health care utilization, stress urinary incontinence, urodynamics

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Traditionally, women underwent formal urodynamic studies (UDS) prior to undergoing antiincontinence surgery.[1] Various reasons for this practice included confirming the diagnosis of stress urinary incontinence (SUI), evaluating for detrusor overactivity, selecting surgical technique, or assessing the risk of postoperative voiding dysfunction.[2]

UDS involves measuring bladder pressure with a bladder catheter and abdominal pressure with a rectal catheter, and the behavior of the bladder during filling and emptying can be quantified.[3,4] The procedure is costly, typically requires an extra clinic visit, is uncomfortable or painful, and increases the risk of a urinary tract infection.[5] Furthermore, in patients with demonstrable stress incontinence on office evaluation and normal postvoid residuals, urodynamic measures were not predictive of success and did not predict voiding dysfunction. Additional evidence suggests UDS findings should not be used to determine the type of midurethral sling.[6]

Prior to the Value of Urodynamic Evaluation (VALUE) trial, several guidelines and clinical pathways questioned the need for routine preoperative UDS,[7,8] however other organizations continued to recommend UDS before surgery.[9,10] In May 2012, the VALUE study was published, which randomized >600 women to office evaluation or office evaluation and UDS.[11,12] Women were eligible to participate in the study if

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they were age >21 years, had no previous incontinence surgery, did not have prolapse past the hymen, had a postvoid residual <150 mL, had a negative urinalysis or urine culture, and had a positive provocative stress test (observed transurethral loss of urine with Valsalva or cough). Surgeons could modify treatment based on UDS findings. Women who had an office-only evaluation had similar outcomes at 1 year to women who also had UDS.

A subanalysis of patients who underwent UDS as part of this trial demonstrated UDS findings rarely changed the surgical plan, and no outcome improvement if the UDS results led to alteration of the surgical plan.[13] These findings were confirmed in a subsequent Dutch study of >500 women randomized to immediate sling vs surgery tailored to UDS findings; the immediate sling group did not have inferior results compared to the tailored treatment program.[14] The lack of benefit of UDS for uncomplicated SUI has since been emphasized in a committee opinion published by American Congress of Obstetricians and Gynecologists and the American Urogynecologic Society.[15]

Following the publication of these results, we hypothesized that practice patterns changed to allow patients meeting the VALUE inclusion criteria to undergo surgical treatment without UDS. Our aim was to evaluate the trends of overall and preoperative UDS performed prior to surgery for SUI in a southern California managed care population in the time periods before and after the VALUE publication. We also sought to estimate the health system's cost savings from the reduction in UDS performed.

Materials and Methods

This is a descriptive study examining trends in UDS among women age >21 years seeking care at 13 Kaiser Permanente Southern California urology and urogynecology clinics during July 2010 through December 2011 (study period 1) and January 2013 through July 2014 (study period 2). This study was approved by the Kaiser Permanente Southern California Institutional Review Board.

Data were collected from the electronic medical record and included the number of unique female patient visits to urology and urogynecology clinics, the number of UDS performed, the number of midurethral sling surgeries performed for SUI, and demographic and clinical characteristics of patients undergoing UDS. During the study period, midurethral slings represented the vast majority of antiincontinence procedures performed throughout Kaiser Permanente Southern California. Transurethral and periurethral bulking injections were excluded from analysis as these procedures are performed in both the office and operating room settings. We were unable to accurately assess the number of bulking procedures performed due to differences in coding between sites and settings.

Unique patient visits were defined as visits with a unique medical record number during the time period. Women with >1 visit during the specified time period were counted only once. The number of UDS performed was determined by the number of procedures ordered with *Current Procedural Terminology* codes indicating complex cystometry. For UDS performed, the associated diagnosis codes included SUI, mixed urinary incontinence (MUI), urge urinary incontinence (UUI), overactive bladder, prolapse, incomplete emptying, and other miscellaneous bladder diagnoses. Midurethral sling procedures for SUI were identified by *Current Procedural Terminology* codes 57288, 51990, and 51992. The age, ethnicity, and additional diagnoses of pelvic organ prolapse, overactive bladder, UUI, incomplete bladder emptying, urinary retention, and other bladder diagnoses including neurogenic bladder, low bladder compliance, and bladder pain were abstracted for each patient.

Because the data were abstracted, we were unable to assess whether SUI was the predominant symptom in patients

TABLE 1
Demographic and clinical characteristics of the study population

Variable	2010 through 2011 (n = 33,775)		2013 through 2014 (n = 37,238)		*P* value
Age (y), mean ± SD	58.5 ± 14.9		59.7 ± 15.0		
Race/ethnicity, n (%)					< .0001
White	14,718	(43.6)	15,488	(41.59)	
Black	2014	(6.0)	2312	(6.21)	
Hispanic	14,129	(41.8)	16,040	(43.07)	
Asian/Pacific Islander	2108	(6.2)	2475	(6.65)	
Other	806	(2.4)	923	(2.48)	
Prolapse, n (%)	11,457	(33.9)	12,898	(34.6)	.045
Overactive bladder, n (%)	10,625	(31.5)	14,626	(39.3)	< .0001
Urge incontinence, n (%)	8147	(24.1)	9561	(25.7)	< .0001
Unspecified, n (%)	9012	(26.7)	11,171	(30.0)	< .0001
Overflow, n (%)	30	(0.1)	75	(0.2)	< .0001
Incomplete bladder emptying, n (%)	767	(2.3)	1041	(2.8)	< .0001
Urinary retention, n (%)	1425	(4.2)	1684	(4.5)	.049
Other bladder (neurogenic, dysuria), n (%)	5126	(15.2)	7064	(19.0)	< .0001
Urodynamic studies, n (%)	4305	(12.8)	3142	(8.4)	< .0001

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