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Authors

Suskind, Anne M
Clemens, J Quentin
Kaufman, Samuel R
[et al.](#)

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Patient perceptions of physical and emotional discomfort related to urodynamic testing; a questionnaire-based study in men and women with and without neurologic conditions

Anne M. Suskind, J. Quentin Clemens, Samuel R. Kaufman, John T. Stoffel, Ann Oldendorf, Bahaa S. Malaeb, Teresa Jandron, and Anne P. Cameron

Department of Urology, Division of Neurourology and Pelvic Reconstructive Surgery, University of Michigan, Ann Arbor, MI

Abstract

Objectives—To determine predictors of physical and emotional discomfort associated with urodynamic testing in men and women both with and without neurologic conditions.

Methods—An anonymous questionnaire-based study completed by patients immediately after undergoing fluoroscopic urodynamic testing. Participants were asked questions pertaining to their perceptions of physical and emotional discomfort related to the study, their urologic and general health history, and demographics. Logistic regression was performed to determine predictors of physical and emotional discomfort.

Results—A total of 314 patients completed the questionnaire representing a response rate of 60%. Half of the respondents (50.7%) felt that the exam was neither physically nor emotionally uncomfortable, while 29.0% and 12.4% of respondents felt that the physical and emotional components of the exam were most uncomfortable, respectively. Placement of the urethral catheter was the most commonly reported component of physical discomfort (42.9%), while anxiety (27.7%) was the most commonly reported component of emotional discomfort. Having a neurologic problem (OR 0.273; 95% CI 0.121, 0.617) and older age (OR 0.585; 95% CI 0.405, 0.847) were factors associated with less physical discomfort. There were no significant predictors of emotional discomfort based on our model.

Conclusions—Urodynamic studies were well tolerated regardless of gender. Having a neurologic condition and older age were predictors of less physical discomfort. These findings are useful in counseling patients regarding what to expect when having urodynamic procedures.

Keywords

experience; lower urinary tract; distress; urodynamics

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Corresponding Author: Anne M. Suskind, MD, MS, Department of Urology, University of California, San Francisco, 400 Parnassus Avenue, Box 0738, San Francisco, CA 94143, Anne.Suskind@ucsf.edu.

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Introduction

Urodynamic studies represent a series of tests conducted to determine bladder function and physiology.¹ These tests, however, are invasive in nature and involve the placement of urethral and rectal catheters, filling the bladder with fluid, voiding on demand and in front of other people, and often the use of x-ray or fluoroscopy. In addition, urodynamic testing has been shown to have associated morbidity including urinary retention, dysuria, and urinary tract infections.² For these reasons, it is not surprising that patients undergoing urodynamic testing may experience physical and emotional discomfort.³⁻⁹

Other studies have investigated discomfort related to urodynamic testing, however, these studies have been limited to women alone^{4,8} or to men and women without neurologic conditions.^{3,5-7,9} Additionally, prior studies obtained general information pertaining to whether or not physical or emotional discomfort was present during the study, but did not explore individual components of the study or factors that may be driving each type of discomfort, such as age, neurologic status, educational status, functional status, and the patient's underlying symptoms..

In order to address these knowledge gaps, we designed an anonymous questionnaire-based study administered to all consenting patients, including men and women with and without neurologic conditions, immediately following urodynamic testing. The primary goals of this study were to determine which part of the study (i.e. physical versus emotional discomfort) was considered to be most bothersome by patients and to determine whether there were any factors that were predictive of patients who experienced each type of discomfort. Findings from this study will be helpful in counseling future patients undergoing urodynamic testing and in designing and implementing measures aimed at decreasing discomfort in this patient population.

Materials and Methods

We performed an anonymous questionnaire-based survey of patients undergoing their regularly scheduled fluoroscopic urodynamic studies in our clinic from June 2013 through May 2014. All urodynamic studies were performed following the International Continence Society's (ICS) good urodynamic practices¹ at two different urodynamic facilities within our institution. Pre-study description of the procedure was provided to each patient by their own physician. Urodynamic testing was performed by either a nurse or a medical assistant trained in urodynamics, with the attending physician in the room. The nurse or medical assistant typically placed the urodynamics catheters and get the patient ready for the study and the attending typically comes into the urodynamic room upon the commencement of bladder filling. It is our standard practice to perform urodynamics in the seated position for ambulatory patients and in the supine position for non-ambulatory patients. We use an 8F dual micro tip urodynamics catheter at a fill rate of 30-50 ml/min of contrast for the first 250 ml and then transition to normal saline for the remainder of the filling. Rectal pressure is measured using a rectal balloon catheter filled with saline. All pressure transducers are zeroed to atmospheric pressure at the level of the bladder at the beginning of the procedure. Provocative measures, including cough and valsalva, are performed at 200 and 400 ml,

where appropriate. Perineal pads are applied to measure electromyography (EMG). Fluoroscopy is used during filling and voiding phases of the study, where appropriate.

The questionnaire was created based on a thorough review of the existing literature. It consisted of 19 questions on three pages relating to the patients' experience of the test and their demographic characteristics (Appendix 1). As part of the questionnaire, patients were asked what was the worst part of the test (physical discomfort, emotional discomfort, neither, or both were equally bad), what was the worst part of the physical discomfort (placement of the urethral catheter, placement of the rectal catheter, filling the bladder with fluid, holding a full bladder, urinating, nausea, light-headedness/dizziness, feeling hot/sweaty, other, none), and what was the worst part of the emotional discomfort (anxiety/worry, embarrassment, fear, not understanding what was happening, other, none).

Additionally, they were asked if the study as better, worse, or the same as they expected. Patients were also asked how many urodynamic tests they had undergone in the past, whether or not they had had a cystoscopy in the office before, whether or not they had a rectal catheter placed during their test, whether or not they had a neurologic problem (defined as spinal cord injury, multiple sclerosis, spina bifida or stroke), age, gender, race, educational status, whether they live alone or with other people, self-rated health status on the day of the test (excellent, very good, good, fair, poor), and their current lower urinary tract symptoms [leakage of urine/urinary incontinence, difficulty urinating on my own (problems starting urination, incomplete bladder emptying, urinary retention), sense of urgency (having a strong urge to urinate), sense of frequency (having to go to the bathroom to urinate often), no bladder symptoms or problems].

The initial questionnaire was pilot-tested in the clinic with 10 subjects for face and content validity. Feedback was provided verbally to the study investigator both during and after questionnaire completion by each respondent. Changes were made to the wording and content of the questionnaire based on this feedback. Data collected from pilot testing was not included in the final analysis. During the study period, written informed consent was obtained prior to the commencement of each urodynamic study for patients who were willing to participate. This study included two sites within one academic urologic practice consisting of 5 fellowship trained urologists in neurourology and voiding dysfunction. Patients completed the questionnaire immediately after their urodynamic test while they were waiting to talk with their physician, as opposed to after talking to their physician, to ensure that the results of the study or the conversation with the physician did not influence their perceptions. To maintain anonymity of the responses, patients were instructed to return to the completed questionnaire to a designated collection envelope on their way out of the clinic. No personal identifying data were collected as part of the instrument.

Multivariate logistic regression was used in order to determine predictors of physical and emotional distress associated with urodynamic testing while controlling for various patient characteristics including prior testing, prior cystoscopy, presence of a rectal catheter during the study, age, race, gender, presence of a neurologic condition, whether or not the patient lives alone, education, current self-rated health status, and current lower urinary tract symptoms. Analyses were performed using SAS version 9.3 software (Cary, NC). This study was approved by our Institutional Review Board (HUM00075334).

Results

A total of 314 patients completed the questionnaire and were included in the analyses, representing a response rate of 60%. Of these patients, 40% were males and 25% had a neurological condition affecting bladder function. This study was the first urodynamic study for 62% of patients, 54% reported having had an office cystoscopy in the past, and 87% had a rectal catheter placed during the study. This study population was fairly well educated, with 19% having attended graduate school and over 50% having attended at least some college. In terms of symptoms prompting urodynamic evaluation, 61% of patients reported urinary incontinence, 42% reported difficulty urinating/urinary retention, 43% and 46% reported urgency and frequency, respectively, and 5% reported that they had no urologic symptoms (Table 1).

Values for self-reported physical and emotional distress related to urodynamic testing are provided in Table 2. When having to choose whether physical or emotional discomfort related to the test was more bothersome, 29% of respondents reported physical discomfort, 12% reported emotional discomfort, and 51% reported that neither physical nor emotional discomfort was bothersome. The most commonly reported component of physical discomfort was the placement of the urethral catheter in 43% of respondents, followed by holding a fluid in the bladder at maximum capacity in 11% and placement of a rectal catheter in 7%. Almost 25% of patients reported no physical discomfort related to the test. The most commonly reported component of emotional discomfort related to the test was no discomfort in 51%, followed by anxiety in 28% and embarrassment in 18%. The majority of patients (55%) reported that the study was better than expected.

Predictors of physical and emotional discomfort among patients are reported in Tables 3 and 4, respectively. Patients who underwent their first urodynamics test, those with a neurologic condition, and older age (measured by each decade of increasing age), were each less likely to report physical discomfort (OR 0.37; 95% CI 0.17, 0.83), (OR 0.27, 95% CI 0.12, 0.62) and (OR 0.59, 95% CI 0.41, 0.85), respectively. Alternatively, patients who had a rectal catheter placed during the test were more likely to report physical discomfort (OR 2.98, 95% CI 1.17, 7.56). There were no statistically significant predictors of emotional discomfort based on our model.

Discussion

Urodynamic studies were very well tolerated among subjects overall. Patients more commonly reported physical discomfort than emotional discomfort related to this test, and the most commonly reported cause of physical discomfort was placement of the urethral catheter. Patients who underwent their first urodynamics test, had a neurologic condition, and were older in age were less likely to report physical discomfort related to the study, while patients who had a rectal catheter placed as part of their study were more likely to report physical discomfort. Interestingly, gender was not associated with either physical or emotional distress and none of the factors that we examined were significant predictors of emotional distress.

Other studies have found that urodynamic testing is generally well tolerated by patients.^{4,5,7,9} One study used a pre and post study assessment of patient expectations associated with urodynamic testing and found that over 90% of patients thought that the test was the same or better than expected and 95% would undergo testing again if medically indicated. These findings are in agreement with our study, which found that over 90% of our patients reported that the study was the same as or better than expected. Like our study, these authors concluded that results did not vary by gender, however, unlike our study, they excluded patients with neurologic conditions.⁷ Another study also reported that urodynamics were well tolerated by patients and found that younger age and feelings of apprehension were strongly correlated with pain related to the study, particularly during catheter insertion. Again, this study did not address patients with neurologic conditions,⁵ but its findings agreed with our study in that pain was worse among patients with younger age and that urethral catheter insertion was a bothersome part of the study.

Our finding that younger age was associated with more bothersome physical discomfort is in agreement with other studies^{4,5,8} and is an interesting finding. There are many reasons why this could be the case. One could be behavioral/experiential. Younger patients likely have fewer experiences of pain than older patients and may have lower pain tolerance or different expectations of pain. Another explanation is biological, whereby older patients may have decreased sensitivity to pain due to potential dysregulation of the hypothalamic-pituitary-axis and changes in autonomic function, age-related reduction in nerve conduction, as well as an increased prevalence of other diseases that may occur with advancing age that could alter pain sensorium.^{10,11}

Our findings regarding the affect of the rectal catheter are somewhat mixed. Only 6.5% of patients reported that this was the worst part of the test; however, our regression model indicated that the presence of a rectal catheter was associated with physical discomfort (OR 2.98). The fact that the majority of our patients (86.9%) had a rectal catheter placed during their urodynamic study may make this variable less reliable in our model, and it should be interpreted with this in mind.

Interestingly, our study did not find any significant predictors of emotional discomfort. This is not to say that there are no significant predictors of emotional discomfort, but rather that none of these were measured by our study and included in our model. Additional unmeasured variables pertaining to psychosocial factors may contribute to patient perceptions of urodynamic testing. We did find, however, that only 12.4% of patients in our study reported that emotional discomfort was the worst part of the study, behind neither physical nor emotional discomfort (50.7%) and physical comfort (29.0%). Furthermore, the number of patients reporting emotional discomfort was relatively low in our population, indicating that this was not a major concern among the majority of our patients.

A strength of our study is that we included patients of both genders with and without neurologic conditions. This adds value to the literature because we were able to assess the effects of both gender and neurologic status on patient experience of discomfort, while controlling for various other factors. Interestingly, we found that gender was not significantly associated with either physical or emotional distress and that the presence of a

neurologic condition was associated with less physical distress. This finding makes sense in that patients with neurologic conditions often have diminished or no sensation of the lower urinary tract and have also potentially had more test procedures performed in the past, making them less like to be bothered by the urodynamic study, either physically or emotionally.

The main limitation of our study is that it represents data collection from a single institution that performs a relatively high volume of urodynamic studies by a group of subspecialized fellowship-trained physicians. Furthermore, our results may not be generalizable, particularly to practices that are lower in volume. However, we see this as a strength of our study in that we were able to combine information on a large number of patients from 5 different physicians who have varying practice patterns and patients mixes, adding to the robustness of our data.

Conclusions

Overall, urodynamic studies are very well tolerated by men and women with and without neurologic conditions. Physical discomfort was more often reported than emotional discomfort as being the worst part of the study and insertion of the urethral catheter was considered the worst “physical” part of the study by the largest number of patients. Having a neurologic condition and older age were associated with less physical discomfort. Findings from this study will be useful in counseling patients undergoing urodynamic procedures.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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Table 1

Demographic and characteristics and self-reported symptoms of study population.

| Descriptor | Percent |
|--|----------------|
| First urodynamic test | 62.1 |
| Had a cystoscopy in the office before | 53.7 |
| Had a catheter placed in rectum for test | 86.9 |
| Age | |
| 35-49 | 11.8 |
| 50-64 | 18.4 |
| 65-79 | 37.2 |
| 80-100 | 27.1 |
| White | 89.4 |
| Male | 40.1 |
| Neurologic condition | 24.8 |
| Lives alone | 15.6 |
| Education | |
| Less than a high school diploma | 5.1 |
| High school diploma | 25.3 |
| Some college | 29.8 |
| Completed college | 20.9 |
| Graduate school | 18.8 |
| Self-rated health | |
| Excellent | 4.8 |
| Very good | 25.6 |
| Good | 41.9 |
| Fair | 22.8 |
| Poor | 4.8 |
| Urologic symptoms | |
| Leakage of urine/urinary incontinence | 61.2 |
| Difficulty urinating | 42.0 |
| Sense of urgency | 42.7 |
| Urinary frequency | 46.2 |
| No urologic symptoms | 5.1 |

Table 2

Self-reported physical and emotional discomfort related to urodynamic testing.

| | |
|-------------------------------------|------|
| Worst part of test | |
| Physical discomfort | 29.0 |
| Emotional discomfort | 12.4 |
| Neither | 50.7 |
| Both | 7.9 |
| Worst physical part of test | |
| Placement of urethral catheter | 42.9 |
| Holding a full bladder | 10.9 |
| Placement of rectal catheter | 6.5 |
| Bladder filling | 4.8 |
| Urinating | 4.8 |
| Other | 3.4 |
| Light-headedness/dizziness | 1.4 |
| Nausea | 0.3 |
| Feeling hot/sweaty | 0.3 |
| None | 24.8 |
| Worst emotional part of test | |
| Anxiety | 27.7 |
| Embarrassment | 17.8 |
| Not understanding what was going on | 2.1 |
| Fear | 1.7 |
| Other | 1.7 |
| None | 50.7 |
| The study was than expected | |
| Better | 55.1 |
| Worse | 7.8 |
| The same | 37.1 |

Table 3

Logistic regression model predicting physical discomfort among patients undergoing urodynamic testing.

| Effect | Odds Ratio Estimates | 95% Wald Confidence Limits | |
|--|-----------------------------|-----------------------------------|------|
| First urodynamic test | 0.37 | 0.17 | 0.83 |
| Had a cystoscopy in office before | 0.72 | 0.34 | 1.49 |
| Had a catheter placed in rectum for test | 2.98 | 1.17 | 7.56 |
| Age, for each unit increase | 0.59 | 0.41 | 0.85 |
| White | 1.47 | 0.49 | 4.40 |
| Male | 1.21 | 0.59 | 2.49 |
| Neurologic condition | 0.27 | 0.12 | 0.62 |
| Lives alone | 1.47 | 0.56 | 3.84 |
| Less than a high school diploma (vs grad school) | 0.25 | 0.05 | 1.16 |
| High school diploma or equivalent (vs grad school) | 0.43 | 0.15 | 1.23 |
| Some college (vs grad school) | 0.66 | 0.23 | 1.91 |
| Completed college (vs grad school) | 0.30 | 0.10 | 0.90 |
| Self-rated health | 1.14 | 0.79 | 1.64 |
| Symptom of leakage | 1.37 | 0.63 | 3.00 |
| Symptom of retention | 0.87 | 0.43 | 1.77 |
| Symptom of urgency | 1.37 | 0.59 | 3.15 |
| Symptom of urinary frequency | 1.83 | 0.83 | 4.02 |
| No urinary symptoms | 0.68 | 0.16 | 2.92 |

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Table 4

Logistic regression model predicting emotional discomfort among patients undergoing urodynamic testing.

| Effect | Odds Ratio Estimates | 95% Wald Confidence Limits | |
|--|----------------------|----------------------------|------|
| | | | |
| First urodynamic test | 0.83 | 0.46 | 1.49 |
| Had a cystoscopy in office before | 0.91 | 0.51 | 1.62 |
| Had a catheter placed in rectum for test | 2.00 | 0.87 | 4.64 |
| Age, for each unit increase | 0.80 | 0.61 | 1.05 |
| White | 1.15 | 0.49 | 2.69 |
| Male | 1.38 | 0.76 | 2.52 |
| Neurologic condition | 0.59 | 0.30 | 1.15 |
| Lives alone | 1.16 | 0.56 | 2.42 |
| Less than a high school diploma (vs grad school) | 0.49 | 0.13 | 1.83 |
| High school diploma or equivalent (vs grad school) | 0.60 | 0.27 | 1.33 |
| Some college (vs grad school) | 1.14 | 0.53 | 2.48 |
| Completed college (vs grad school) | 0.74 | 0.32 | 1.69 |
| Self-rated health | 1.19 | 0.89 | 1.59 |
| Symptom of leakage | 1.45 | 0.77 | 2.76 |
| Symptom of retention | 0.82 | 0.47 | 1.42 |
| Symptom of urgency | 0.98 | 0.51 | 1.91 |
| Symptom of urinary frequency | 0.90 | 0.48 | 1.70 |
| No urinary symptoms | 0.48 | 0.12 | 1.90 |