

NONINTUBATED UROFLOWMETRY AND SYMPTOMS AS DIAGNOSTIC TOOLS IN WOMEN WITH STRESS URINARY INCONTINENCE AND URODYNAMIC OBSTRUCTION

Hypothesis / aims of study

SUI is a common condition affecting millions of women in the world. Although UDS are not essential for the routine evaluation of patients with SUI, stress incontinence could have a multitude of presentation from a simple entity to an intricate combination of disorders. In a recent report it has been reported a high prevalence of urodynamic obstruction in women with SUI¹. However, primary informations about symptoms associated to SUI were not reported. Aim of the present study, therefore, was to confirm the coexistence of SUI and urodynamic obstruction and to determine what clinical indicator between NIF and urinary symptoms better predicts urodynamic obstruction.

Study design, materials and methods

All women seen in our urodynamic unit who were assessed with UDS from December 2004 to June 2005 were considered for the study. Patients with an urodynamic diagnosis of SUI and an interpretable NIF were enrolled. A normal NIF was defined as the contemporary co-existence of a bell-shaped curve, a Qmax >15 ml/s and a PVR volume <50 mL with a minimum total bladder volume of 150 mL before voiding (volume voided+residual). The presence of clinically significant adjunctive symptoms of voiding disorders was also investigated. Symptoms suggestive of voiding disorders were ascertained by a detailed interview with no scoring system and were: storage symptoms (increased daytime frequency, nocturia and urgency), voiding symptoms (hesitancy, slow stream, straining) and post-micturition symptoms (feeling of incomplete emptying). Urgency, hesitancy, slow stream, straining and feeling of incomplete emptying were rated as clinically significant if they occurred more than occasionally. We defined occasionally any event occurred less than one time out of three. In this regard, if an initial question (e.g. is the flow of urine slow when you void?) was answered in the affirmative, this was followed up with "does this happen just occasionally or more often?". Nocturia and increased daytime frequency were rated clinically significant when they were reported as two or more episodes per night⁶ and as eight or more micturitions⁷. In this regard, we asked "during the night, how many times do you have to get up to urinate, on average?". All enrolled patients underwent a multichannel urodynamic study (Urobenchmark 2000/3, SI.EM., Milan, Italy) performed in duplicate. As primary endpoints we estimated the prevalence of urodynamic obstruction in a population with urodynamic defined stress incontinence. As secondary endpoint we verified whether an abnormal NIF and urinary symptoms were predictive of urodynamic obstruction. A diagnosis of urodynamic obstruction was achieved according to Defreitas and co-workers criteria (Qmax \leq 12 ml/s and PdetQmax \geq 25 cmH₂O)⁹. Statistical analysis was performed using SPSS 11.0 (SPSS, Inc., Chicago, Illinois) software. An alpha value threshold of 0.05 was used. All statistical tests were two-tailed. Because some of our study variables were not normally distributed (Shapiro-Wilk test p<0.05) continuous variables were presented as medians and interquartile range (25th and 75th percentile) and analyzed using a Wilcoxon-Mann Whitney Rank Sum Test. Differences in the categorical variables were compared with chi-square test or Fisher's exact test when appropriate. As measure of association between urodynamic obstruction, abnormal-NIF and symptoms we used Phi correlation. A Pearson correlation was performed as measure of association between Qmax values obtained during NIF and Qmax values obtained during UDS. The sensitivity, specificity, PPV and NPV were also calculated.

Results

A total of 101 patients were enrolled. The participation rate was 27.3% (101/370 subjects) and all enrolled patients were analyzed. Of 101 women with SUI, 27 had an abnormal-NIF and 74 had a normal-NIF. No statistical difference between groups in age (p=0.7), parity (p=0.47) and menopause years (p=0.61) was observed. A statistically significant difference between two populations was found for all considered parameters: Qmax during UDS (p=0.001), PdetQmax (p=0.0011), PdetMax (p=0.001), BOOI (p=0.0013) and PVR after UDS (p=0.0015) (Table I and Figure 1). In order to evaluate whether flow patterns observed during UDS were the true patterns or urodynamic artefacts, a correlation between Qmax values obtained during NIF and Qmax values obtained during UDS was performed. A significant correlation was obtained (r=0.741; p<0.0001). The estimate of obstruction prevalence was achieved by urodynamic criteria and was equal to 15.7% (16/101) in our SUI population. This prevalence increased in presence of abnormal NIF (55.5%; 15/27) and decreased in presence of normal NIF (1.3%; 1/74) (p<0.0001). We identified that 2% (2/101) of urodynamic obstructed women had prior anti-incontinence surgery, 3% (3/101) had dysfunctional voiding, 6% (6/101) had no recognized etiology of obstruction and 5% (5/101) had a stage 3 or 4 cystocele. Of the 16 women urodynamically obstructed, 15/16 (93%) had clinically significant symptoms suggestive of voiding disorders. Storage symptoms were the most common complaints 56.3% (9/16) and voiding (31.3%; 5/16) and post micturition symptoms (6%; 1/16) appeared to be less common. Only one of the women urodynamically obstructed reported as symptom stress incontinence alone (6%). The correlation between abnormal NIF, clinical variables and urodynamic-defined obstruction was investigated. The best correlation with urodynamic obstruction was found for abnormal-NIF (Phi coefficient=0.718; p<0.0001). A very weak correlation for storage symptoms (Phi coefficient=0.25; p=0.011) was found. The diagnostic performance indicators have been determined for those variables significantly correlated with

urodynamic obstruction. In this regard, the diagnostic performance of abnormal-NIF in predicting urodynamic obstruction showed that it had a relatively low PPV value (51.8%) with high NPV (97.3%), sensitivity (87.5%) and specificity (84.1%). The diagnostic performance of storage symptoms was weak (sensitivity 56.6%; specificity 75.3%; PPV 30%; NPV 90.1%).

Interpretation of results

Here we confirm the coexistence of obstruction and SUI since in our SUI population we observe a prevalence of urodynamic obstruction equal to 15.7%. This increased (55.5%) in the group of women with abnormal NIF and decreased (1.3%) in the group with normal NIF. The use of a NIF allowed us to discriminate whether the flow patterns observed during UDS were the true flow pattern or urodynamic artifacts. The good correlation observed between Qmax values obtained during NIF and Qmax values obtained during UDS suggested that flow patterns were representative of voiding phases of our population. Although a good correlation between urodynamic obstruction and abnormal-NIF was found, the likelihood of having an abnormal-NIF in presence of an urodynamic obstruction is relatively low (PPV=51.8%). This seems to indicate that an abnormal-NIF cannot always confirm the presence of urodynamic obstruction. Differently, the likelihood of having a normal-NIF, giving a UDS not suggestive of obstruction, is quite high (NPV=97.3%) indicating that a normal-NIF accurately predicts the presence of a normal UDS. Symptoms, instead, were weak predictors of urodynamic obstruction. In this population an abnormal-NIF cannot always confirm the presence of urodynamic obstruction (PPV=51.8%) and a complete UDS might be indicated. Conversely, a normal NIF seems to predict accurately a normal UDS (NPV=97.3%) and might render the execution of this test not essential.

Concluding message

Our study confirms the coexistence of obstruction and SUI. In this population an abnormal NIF cannot always confirm the presence of urodynamic obstruction and a complete UDS evaluation might be indicated. Conversely, a normal NIF seems to predict accurately a normal UDS and might render the execution of urodynamic study not essential. Symptoms represent a poorly clinical indicator of voiding disorder.

References

1. J Urol; 171, (2Pt1) 757; 2004.
2. Urology 64 (4), 675; 2004.

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HUMAN SUBJECTS: This study was approved by the University of L'Aquila-IRB-AQBOARD and followed the Declaration of Helsinki Informed consent was obtained from the patients.