

UROFLOWMETRY PARAMETERS IN WOMEN CORRELATE WELL WITH THE URODYNAMIC DIAGNOSIS (THE LARGEST REPORTED SERIES)

Hypothesis / aims of study

Non invasive uroflowmetry has been used widely to indicate different pathology in men with lower urinary tract symptoms (LUTS), whereas the value of this test in women is still less prominent. The purpose of our exploratory study is to check if women with different urodynamic diagnosis have different uroflowmetry parameters.

Study design, materials and methods

The records of adult women (≥ 16) who had routine or video urodynamics at our urodynamic department between 1993 and 2004 were traced. As a routine, one recording of non invasive uroflowmetry (free flow) is taken before filling and voiding cystometry. In this study, we compared the free flow parameters between four groups of patients who had different urodynamic diagnosis. Due to the previous reports on the effect of voided volume on the free flow measurements, only those with voided volume ≥ 150 mls were included in the analysis (1).

Although the individual outcomes may not be normal, because of the very large number of observations in each test, the t-test was applied. The distribution of the means can be assumed to closely approximate normality, even though the outcomes themselves do not. A test of equal variance between the groups in the comparisons was carried out, and then the appropriate t-test.

Results

7644 records of women who had pressure flow studies were examined, of those 5095 had complete data of pre test uroflowmetry (free flow). The urodynamic diagnosis made for these patients was classified into four categories: urodynamic stress incontinence (USI), detrusor overactivity (DO), both (USI + DO) and normal urodynamic results.

Table 1 gives the mean of maximum flow rate (Qmax), voided volume (VV) and post void residual (PVR) taken during the free flow for each urodynamic diagnosis group.

UDS diagnosis	USI	DO	USI+ DO	Normal
No of records (%)	2016 (40)	1359 (27)	972 (19)	748 (14)
Mean Qmax	28	25	29	25
Mean VV	392	343	401	373
Mean PVR	17	27	17	21

Table 1: uroflowmetry parameters for each UDS diagnosis

Qmax: Qmax was significantly different between all groups ($p < 0.001$), except between DO and normal patients ($P = 0.68$). Patients with USI tended to have higher Qmax compared to those with detrusor overactivity (DO) or normal diagnosis. Qmax measured during the free flow was compared between patients with different voided volumes. There was statistically significant difference ($p < 0.001$) between patients with voided volume less than 150 mls (mean Qmax of 12.0) and those with $VV \geq 150$ mls (mean Qmax of 27.1).

Voided volume: As expected, patients with DO had significantly lower voided volume compared to those with USI or normal urodynamics ($p < 0.001$). On the contrary, USI patients had higher VV compared to normal diagnosis ($p < 0.05$).

Post void residual: Interestingly, PVR was significantly higher in DO patients compared to USI and normal diagnosis ($p < 0.001$) but not different between USI and normal patients.

Qmax, VV, age and bladder voiding efficiency [BVE = $VV / (VV + PVR)$] were used in a logistic regression model to predict the binary outcome DO or USI. A backward step-wise algorithm was used. The variable VV was shown to be the best predictor of DO whereas all 4 variables remain in the model as significant predictors of USI.

Interpretation of results

The use of uroflowmetry in diagnosing LUTS in women is still debatable. Although it is generally accepted to be sufficient in making a diagnosis of voiding difficulties (2), it is thought to be unhelpful in diagnosing the type of incontinence as its parameters did not correlate with the UDS outcome (3). However, these studies had small number of patients which makes it difficult to test for correlation.

Our data show significant difference in uroflowmetry measurements between patients with different LUTS pathology. For example, patients with DO found to have lower Qmax and voided volume (which could reflect bladder capacity) and higher residual volume compared to patients with USI. However, any interpretation of the analysis for the outcome variable VV should be done cautiously, due to the decision of excluding all cases where $VV < 150$. In general, all pairs of subgroups will have had different proportions of the low values of VV excluded.

Our study confirms the relation between Qmax and voided volume and show that Qmax is higher if the VV is high.

Concluding message

Female patients with different diagnosis on the PFS have different uroflowmetry parameters. Uroflowmetry represents the compound effect of bladder and urethral function which makes it difficult to interpret. However, it gives valuable information about the possible pathology. Further analysis of the data is ongoing to see if we can predict the urodynamic diagnosis accurately using uroflowmetry test.

References:

- 1- J Obstet Gynaecol. 2003 Mar;23(2):191-2.
- 2- Int Urogynecol J Pelvic Floor Dysfunct. 1998;9(1):33-6.
- 3- Int Urogynecol J Pelvic Floor Dysfunct. 2000 Jun;11(3):142-7.