

THE EFFECT OF DETRUSOR OVERACTIVITY AND ARTIFICIAL BLADDER FILLING ON VOIDING PARAMETERS IN FEMALES?

Hypothesis / aims of study

The value of non-invasive uroflowmetry in female patients is still debatable. The effect of different bladder dysfunctions on that test is poorly documented in comparison to the case in males.

The purpose of this study is to examine the effect of detrusor overactivity (DO) on the voiding parameters measured during uroflowmetry (free flow): maximum flow rate (Qmax), voided volume (VV) and post-void residual (PVR) in female patients and to establish whether artificial bladder filling during urodynamics (UDS) affects those parameters.

Study design, materials and methods

The records of adult female patients diagnosed with DO on UDS in our institute between 1992 and 2004 were retrospectively identified. All those who had uroflowmetry followed by pressure flow studies were included. Patients with associated neurological urinary problems or concomitant urodynamic stress incontinence (USI) were excluded from the analysis.

Due to previous report on the effect of small voided volumes on voiding parameters (1), the analysis was performed before and after excluding the records of patients who had a VV <150 mls.

The mean values of Qmax, VV and PVR measured during uroflowmetry were compared with the same parameters taken during pressure-flow studies (PFS) using the paired t-test, $p < 0.05$ was considered as statistically significant.

Results

During the 12-year study period, 2599 women had uroflowmetry followed by routine or video PFS and were found to have DO. Patients with missing data ($n = 434$) and those with associated neurological conditions ($n = 143$) were excluded from the analysis.

Table 1 shows the mean values of the main voiding parameters taken at uroflowmetry and those taken during voiding cystometry.

<i>Voiding parameter (2022 patients)</i>	<i>Uroflowmetry Mean (+/- SD)</i>	<i>Pressure-flow Mean (+/- SD)</i>	<i>P value</i>
Qmax	21 (+/- 11.4)	18 (+/- 8.7)	0.000
VV	249 (+/- 177.6)	269 (+/- 135.8)	0.000
PVR	25 (+/- 70.8)	18 (+/- 53.7)	0.008

Table 1: voiding parameters for patients with any VV

To test the effect of voided volume on the uroflowmetry measurements, the analysis was repeated excluding those with VV <150, table 2.

<i>Voiding parameter (1020 patients)</i>	<i>Uroflowmetry Mean (+/- SD)</i>	<i>Pressure-flow Mean (+/- SD)</i>	<i>P value</i>
Qmax	21 (+/- 11.4)	18 (+/- 8.8)	0.000
VV	386 (+/- 149.5)	311 (+/- 122.4)	0.000
PVR	26 (+/- 70.9)	19 (+/- 53.1)	0.008

Table 2: voiding parameters for patients with VV ≥ 150 mls

Interpretation of results

Although uroflowmetry in females is generally accepted to be sufficient in making a diagnosis of voiding difficulties, it is thought to be unhelpful in diagnosing the type of incontinence as its parameters did not correlate with the UDS outcome (2).

The mean Qmax, voided volume and PVR in healthy female volunteers measured during uroflowmetry were previously reported to be 30.5, 337.5 and 0 respectively (3). The same participants had pressure flow studies and their voided volume was 424.9. Our DO patients had lower Qmax and VV values than their normal counterparts.

There was a statistically significant difference between the Qmax, VV and PVR measured during uroflowmetry and those obtained during voiding cystometry. The same result was obtained after excluding the records of those with VV <150 mls, which question the effect of voided volume on uroflowmetry parameters.

Although patients with detrusor overactivity have involuntary detrusor contractions the detrusor fibres might not work in coordination during voiding to produce effective high flow rate. Urgency in DO patients tends to reduce bladder

capacity and this explains the lower voided volumes in those patients. The filling medium is different from natural urine and the higher filling speed than natural urine production, as well as test conditions during artificial filling cystometry, might explain the difference in the voiding parameters from those obtained during uroflowmetry.

Ambulatory UDS have suggested that the finding seen here, may be as a result of slightly reduced detrusor contractility due to supra-physiological bladder filling rate during standard urodynamics

Concluding message

This study shows that DO patients had lower maximum flow rate and voided volume compared to healthy volunteers. Artificial filling of the bladder have an affect on voiding parameters in female patients with DO. Our results suggest revisiting the cut off value of VV above which interpretation of voiding parameters is deemed to be useful.

References:

- 1- J Obstet Gynaecol. 2003 Mar; 23(2):191-2.
- 2- Int Urogynecol J Pelvic Floor Dysfunct. 1998; 9(1):33-6.
- 3- J. Urol. 1999; 16:899-902.

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HUMAN SUBJECTS: This study did not need ethical approval because The study is retrospective, no contact with patients and no interventions but followed the Declaration of Helsinki Informed consent was not obtained from the patients.