

## SYMPTOMS AND SIGNS TO DISTINGUISH DETRUSOR UNDERACTIVITY FROM MIXED DETRUSOR UNDERACTIVITY AND BLADDER OUTLET OBSTRUCTION IN MALE PATIENTS

### Hypothesis / aims of study

It has been recognised that detrusor underactivity (DU) is one of the preoperative factors that mitigates against a good outcome from prostate surgery in men. Hence, if there were effective non-surgical treatments for DU, and its clinical syndrome underactive bladder (UAB), these would offer men considerable advantages. As both DU and bladder outlet obstruction (BOO) affect voiding function, they can be expected to have many similar features with respect to lower urinary symptoms (LUTS), flow rates and post void residual urine. The aim of this study is to see whether there are features that allow DU to be distinguished from DU combined with BOO without the need for catheter urodynamic studies (UDS), as at present.

### Study design, materials and methods

Symptomatic, urodynamic and other data, from a large computer database, were analysed retrospectively. Differences between DU and BOO patients have been published previously [1]. As a follow-up, in this analysis, symptoms and signs which showed a statistically significant difference between DU and DU+BOO were identified.

DU was defined as bladder contractility index (BCI) < 100, bladder voiding efficiency (BVE) < 90%, and bladder outlet obstruction index (BOOI) < 20. DU+BOO was defined as BCI < 100, BVE < 90%, and BOOI >= 40.

Logistic regression models including patient group and age as factors were used for each binary variable. Rank ANCOVA models using patient group as factor and age as covariate were used for each numerical variable.

### Results

Male data were available for 129 DU and 60 DU+BOO patients, none of whom had neurological symptoms nor detrusor overactivity during urodynamics. Of the results with statistical significance, the continuous data are summarized in Table 1 and the categorical data in Table 2.

### Interpretation of results

In the DU males, compared to the DU+BOO males, the following statistically significant differences were observed:

The number of daytime micturitions were lower, and slow stream were reported less often, whereas a history of transurethral resection surgery and urinary tract infections were reported more often in the DU group.

Volume at first desire to void, maximum bladder capacity, voided volume and abdominal pressure at maximum flow were greater in the DU group.

Knowledge of these differences can guide the clinician as to the likelihood of a patient fitting the profile of a particular group. Further research could combine these likelihoods to better enable distinguishing between patient groups.

The reporting of incontinence in these patients needs further investigation, since the data is from patients without DO in the urodynamic test, and urge incontinence would therefore not be expected to occur. Comparisons with other databases will be necessary to see if this is an artefact of the questionnaire used or whether it is a real phenomenon.

### Concluding message

These preliminary data suggest that by combining symptoms (e.g. straining), with features of the medical history (e.g. prostate surgery), and signs that could be measured without the need for invasive UDS (e.g. bladder capacity), it may be possible to identify men with UAB secondary to DU in a non-invasive way. By doing so, men with DU could be separated from men with both DU and BOO, with sufficient specificity to allow the use of any new treatment modalities.

Variable	DU Group N / median (Q1-Q3)	DU & BOO Group N / median (Q1-Q3)	p-value for difference
Day time micturitions, as recorded on bladder diary	86	44	< 0.01
	6.0 (5.0 - 8.0)	8.0 (6.5 - 10.0)	
Volume infused at first desire during UDS (mL)	114	59	< 0.01
	347 (200 - 502)	240 (142 - 390)	
Volume voided during UDS (mL)	129	60	< 0.05
	233 (130 - 360)	195 (134 - 266)	
Cystometric capacity during UDS (mL)	129	60	< 0.05
	500 (323 - 685)	376 (307 - 525)	
Abdominal pressure at maximum flow rate during UDS (cmH20)	127	60	< 0.0001
	55 (40 - 75)	40 (32 - 49)	

Table 1. Statistically significant continuous variables compared between men with DU and with combined DU and BOO. Figures displayed are Number of patients with non-missing data, and Median value (1<sup>st</sup> quartile – 3<sup>rd</sup> quartile).

Variable	DU Group	DU & BOO Group	Odds Ratio for difference (95% CI)	p-value for difference
Stress incontinence reported by patient	17 / 69 (24.6%)	0 / 26 (0%)	NA (one group n=0)	NA
Urge incontinence reported by patient	23 / 68 (33.8%)	2 / 26 (7.7%)	6.16 (1.34, 28.38)	0.0197
Patient reported decreased urinary stream	55 / 95 (57.9%)	44 / 49 (89.8%)	0.15 (0.06, 0.42)	0.0003
Patient reported history of >= 1 urinary tract infection	29 / 102 (28.4%)	5 / 48 (10.4%)	3.42 (1.23, 9.49)	0.0183
History of transurethral resection surgery	36 / 50 (72.0%)	7 / 17 (41.2%)	7.46 (1.93, 28.83)	0.0036

Table 2. Statistically significant categorical variables compared between men with DU and with combined DU and BOO. Figures displayed are number of patients / number of that group with reported variable (with %) and Odds Ratio (95% confidence interval range). NA is stated where odds ratio and p-value are not estimable since n=0.

#### References

1. Gammie A, Kaper M, Dorrepaal C, Kos T, Abrams P. Signs and Symptoms of Detrusor Underactivity: An Analysis of Clinical Presentation and Urodynamic Tests From a Large Group of Patients Undergoing Pressure Flow Studies. Eur Urol. 2016; 69:361-9.

#### Disclosures

**Funding:** The analysis in this paper was funded by a grant from Astellas **Clinical Trial:** No **Subjects:** HUMAN **Ethics not Req'd:** the analysis was on retrospective, anonymised data only **Helsinki:** Yes **Informed Consent:** No