

DETRUSOR CONTRACTILITY IS GREATER IN MALE PATIENTS WITH DETRUSOR OVERACTIVITY

Hypothesis / aims of study

It has been suggested that detrusor contractility is greater in male and female patients with detrusor overactivity (1) (DO). Accepted methods of assessing detrusor contractility are the isovolumetric detrusor pressure ($p_{det, isv}$) and bladder contractility index (BCI). The aim of this study is to test the hypothesis that bladder contractility, measured by $p_{det, isv}$ and BCI is greater in male patients with DO, independent of the degree of bladder outlet obstruction(BOO).

Study design, materials and methods

A study was conducted to evaluate the use of a penile cuff (similar to a neonatal blood pressure cuff) inflated during voiding, as a method of determining isovolumetric bladder pressure. (2). As the cuff inflates, it reaches a point where flow stops. It is at this point that the detrusor contracts against a closed outlet. This represents $p_{det, isv}$ and is the total pressure measured as shown in the Figure 1.

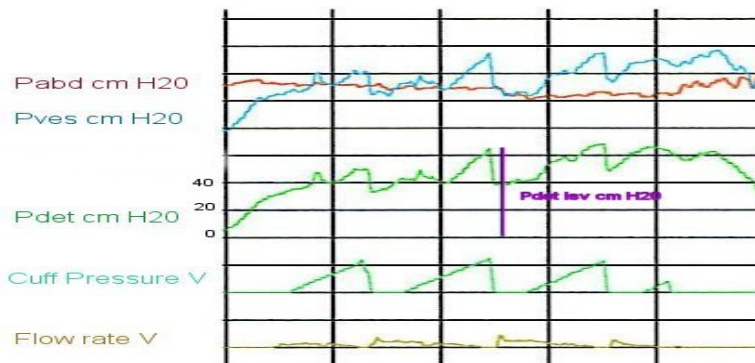


Figure 1: Measurement of $p_{det, isv}$

Male patients with LUTS were recruited from two urology departments. A specially designed penile cuff (Mediplus, UK) was placed around the penis and inflated during voiding using the Newcastle technique (2). Once voiding commenced the cuff was automatically inflated until flow was interrupted or a cuff pressure of 200cmH2O was reached. The cuff was deflated to allow voiding to continue. Simultaneous intravesical pressures were recorded using a 6fr double lumen, fluid filled catheter (Mediplus, UK), connected to external pressure transducers in accordance with the recommendations of the ICS standardisation committee. Patients had normal pressure flow studies (PFS) prior to the cuff study, for which the BCI and BOO index was calculated for each patient. Men were classified according to the ICS nomogram as obstructed, equivocal and unobstructed (3). The highest $p_{det, isv}$ was recorded for each patient. The diagnosis of DO was made on filling cystometry.

Results

248 men (mean age 66years, range 20-87) underwent simultaneous cuff test and invasive pressure flow studies. 23 patients were excluded for voiding their urethral catheters and declining recatheterisation, inability to void, equipment failure, missing urodynamics traces, low voided volume and failure of recovery after cuff deflation or failure to interrupt flow.

225 men had data suitable for the analysis for the $p_{det, isv}$ generated on cuff inflation. 146 had urodynamic proven detrusor overactivity, (mean age 65, range 20-87). 79 had no evidence of detrusor overactivity (mean age 66, range 44-82). A table below shows the distribution of the male patients according to the ICS nomogram and the presence of DO, with the mean and standard deviation of the $p_{det, isv}$ recorded in table 1 and graphically in Figure 2.

ICS Nomogram	DO Group (n=149)				Non DO group (n=79)			
	%	$p_{det, isv}$ Mean	cm H ₂ O SD	Mean BCI	%	$p_{det, isv}$ Mean	cm H ₂ O SD	Mean BCI
Obstructed	56	108	34	133	38	90	30	133
Equivocal	20	86	39	103	32	66	18	101
Unobstructed	24	76	29	116	30	59	15	116

Table 1 Mean and standard deviation of $p_{det, isv}$ and BCI for the different groups

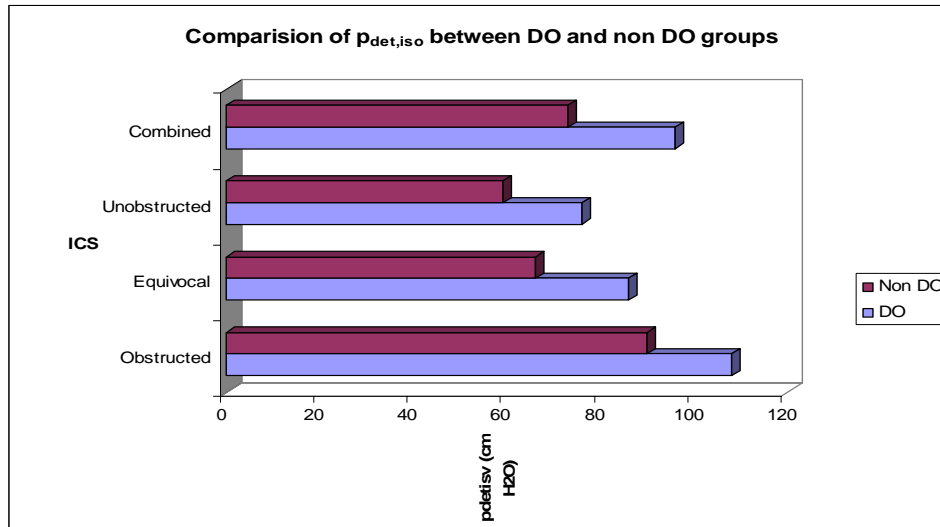


Fig 2 The mean $p_{det, isv}$ across the different groups

A two sample t- test was calculated for all the groups, comparing DO with non DO groups. This showed statistical significance on a 2 tail test in the obstructed, equivocal and unobstructed groups with $p=0.01$, $p=0.02$ and $p=0.01$ respectively. Combination of all the groups showed statistical significance with a 2 tail test with a p value of 0.0001. There was no statistical significance with a 2 sample t-test in the mean BCI between the DO and Non DO groups ($p=0.14$).

Interpretation of results

The results show that in male patients with detrusor overactivity there is a higher $p_{det, isv}$ generated, compared to the non DO group. This holds true for the obstructed, equivocal and unobstructed groups. This shows that in male patients with DO, there is greater detrusor contractility regardless of the degree of BOO.

It is interesting that the DO groups did not show a higher BCI. In fact the BCI was highest in the groups where the $p_{det, isv}$ was highest. The BCI is a theoretical prediction of $p_{det, isv}$, but these results show that these 2 measures of detrusor contractility do correlate. The $p_{det, isv}$ may reflect closer to the maximum detrusor contraction since $p_{det, isv}$ is at zero flow and all the energy is transferred to detrusor power generation instead of generating flow.

Concluding message

Isovolumetric detrusor pressure and therefore detrusor contractility is greater in male patients with detrusor overactivity, independent of the degree of BOO.

References

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3. The standardisation of terminology of lower urinary tract. *Neurourology and Urodynamics*, 21, 167-78. 2002.