

## DETRUSOR OVERACTIVITY IS BETTER DETECTED IN THE ERECT POSITION, A PROSPECTIVE STUDY

### Hypothesis / aims of study

The demonstration of pre-operative detrusor overactivity (DO), with its associated overactive bladder (OAB) symptoms, is known to have an adverse effect on surgery performed for stress incontinence or for prostatic obstruction (1-3). DO is a urodynamic observation, whereas OAB is a symptom syndrome. The principal aim of urodynamics (UDS) is to reproduce the patient's symptoms and produce a pathophysiological explanation for these symptoms. Most patients with OAB due to DO complain about their symptoms when in the erect position (sitting or standing), and not when they are lying in bed. The purpose of this study was to answer the question "what is the best provocative position for bladder filling to better detect DO?"

### Study design, materials and methods

This was a prospective study. Adult male and female patients with symptoms of OAB and previous evidence of idiopathic DO were recruited. The original DO diagnosis was made with filling cystometry in the vertical position at 50ml/min. Patients with any history of neurological disease were excluded. A group of healthy volunteers with no OAB symptoms was also recruited as a control group.

The participants were invited to attend for two visits. At each visit, the participant underwent three or four filling and voiding cystometries: a supine slow fill (20ml/min), a supine fast fill (100ml/min) and a fast fill (100ml/min) in the erect position; sitting for females and standing for males. Later on, a further intermediate fill cystometry (50ml/min) in the erect position was introduced. Efforts were made to change the order of the filling cycles between patients and between visits. This was to minimise order bias. Healthy volunteers had four cystometries but one visit only. Methods, definitions and units all conformed to the standards recommended by the ICS.

### Results

51 patients agreed to participate in the study. One patient was excluded due to a technical difficulty. In 8 patients, no DO could be demonstrated during the first study visit in all positions and were excluded from the analysis. Out of the 42 patients with DO, 19 males and 18 females attended for a second visit. The median gap between the two visits was 38 days and 14 days for males and females respectively. Only 2 females failed to show DO in the second visit compared to the first visit. Hence, the percentages were calculated as a proportion of the total number of patients (Table I).

Patients (median age)	Visit	No of patients	DO in any position	No. had fill at 50 ml/min	DO (%) in supine 20 ml/min	DO (%) in supine 100 ml/min	DO (%) in sitting/standing 100 ml/min	DO (%) in sitting/standing 50 ml/min
Females (55 yrs)	1st	21	21	14	9 (43)	7 (33)	20 (95)	11/14 (79)
	2nd	18	16	18	7 (44)	4 (22)	13 (72)	13 (72)
Males (68 yrs)	1st	21	21	12	15 (67)	18 (86)	20 (95)	11/12 (92)
	2nd	19	19	19	15 (79)	16 (89)	17 (95)	18 (95)

Table I: percentage of patients who had DO at different positions and speeds.

Position compared	Female patients	Male patients	All patients
Supine 20 v Supine 100	0.63	0.29	0.74
Supine 100 v Erect 100	<0.001	0.50	<0.001
Erect 50 v Erect 100	0.63	1.0	0.69

Table II: the statistical significance (p-value) of the difference between different positions and speeds based on McNemar test.

32 healthy volunteers participated in the study. The results are summarised in Table III.

Sex	No of participants	DO in any position	DO (%) in supine 20 ml/min	DO (%) in supine 100 ml/min	DO (%) in sitting/standing 100 ml/min	DO (%) in sitting/standing 50 ml/min
Females	15	5	1	0	4	2
Males	17	4	3	3	3	4

Table III: percentage of healthy volunteers who had DO with different positions and speeds

Sex	Visit	Supine 20 ml/min		Supine 100 ml/min		Sitting/Standing 100 ml/min		Sitting/Standing 50 ml/min	
		Grade 2 (%)	Grade 3 (%)	G2	G3	G2	G3	G2	G3
Females	1st	11	11	14	29	5	55	0	55
	2nd	0	25	0	50	0	46	0	46
Males	1st	36	14	22	11	35	15	27	36
	2nd	47	7	18	6	50	6	39	6

Table IV: The percentages of patients with grade "2" DO (marked DO with multiple waves or high detrusor pressure during the contractions) or grade "3" (DO incontinence).

### Interpretation of results

This prospective study shows that filling in the erect position in female patients has a marked effect on detecting DO. Thirteen out of the 20 DO cases (65%) in the first visit, and 69% in the second visit, would have been missed if the female patients had been filled in a supine position, compared to sitting at the same speed (100ml/min). The difference is less marked in males. However, the trend is towards a higher pick up rate in the standing position. The results in healthy volunteers are also suggestive of an effect of position on DO in women but the number of DO cases is too small to make a definite conclusion.

Female patients filled in the sitting position at 100ml/min had an increased chance of demonstrating incontinence compared to those in a supine position at the same filling speed. Male patients, on the other hand, had more marked DO in the standing compared to the supine position at 100ml/min speed.

It is interesting to find that the speed of filling had no significant effect if patients were filled in the erect position, but played a noticeable role on the degree of DO or incontinence if filled supine.

### Concluding message

Detrusor overactivity is best demonstrated when filling cystometry is performed in the erect position. This will better reproduce the patient's symptoms and demonstrate DO and associated incontinence, especially with respect to females. It would be important for those units that perform UDS in the supine position to change their practice, unless the patients are physically disabled.

### References

1. J. Urol. 117(1):70-1
2. Br. J. Obstet Gynaecol. 95(6):607-10
3. Obstet Gynecol 71(6 Pt 1):818-22

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<b><i>Was this study approved by an ethics committee?</i></b>	<b>Yes</b>
<b><i>Specify Name of Ethics Committee</i></b>	<b>Southmead Local Research Ethics Committee</b>
<b><i>Was the Declaration of Helsinki followed?</i></b>	<b>Yes</b>
<b><i>Was informed consent obtained from the patients?</i></b>	<b>Yes</b>