

## DOES BLADDER WALL THICKNESS DISCRIMINATE DETRUSOR OVERACTIVITY FROM OVERACTIVE BLADDER AND NORMALITY?

### Hypothesis / aims of study

In the diagnosis of lower urinary tract disorders, bladder wall thickness has been shown to be of value in discriminating between detrusor overactivity (DO) and urodynamic stress incontinence (USI) [1]. We set out to compare bladder wall thickness in women with DO and those with symptoms of the overactive bladder syndrome (OAB), and asymptomatic normal controls.

### Study design, materials and methods

We recruited asymptomatic women by intranet advertisement and posters at our tertiary referral centre. They were defined by means of a standardised questionnaire as "denying urinary system abnormalities". They underwent a transvaginal ultrasound measurement of mean bladder wall thickness (trigone, anterior wall, and dome; volume less than 50mls; Sonosite portable ultrasound machine with a 7.4MHz transvaginal probe). They received a shopping voucher as an honorarium.

Women with troublesome lower urinary tract symptoms, who had been referred to our unit, and had completed a frequency-volume chart (FVC) and a validated disease-specific quality of life questionnaire (King's Health Questionnaire), agreed to participate in the study. As part of a larger study to investigate an electronic diary reader (Life-Tech, Inc., Texas, U.S.A.), all subsequently underwent a full urodynamic assessment in our one-stop clinic, consisting of history, examination, transvaginal ultrasound measurement of mean bladder wall thickness, uroflowmetry, and subtracted videocystometry, following ICS principles of good practice, using a Laborie Aquarius 120 urodynamics machine. Women with symptoms of OAB were identified for sub-group analysis – those with evidence of detrusor overactivity on subtracted cystometry were labelled 'DO'; those with a normal cystometrogram were labelled 'OAB'; the symptomatic women were labelled 'normal'.

Written consent was obtained from all participants and ethics committee approval was granted. Bladder wall thickness was compared using an independent samples t-test (SPSS, v12).

### Results

We recruited 61 asymptomatic women (mean age 45 years) to the study who all underwent bladder wall thickness measurement as described.

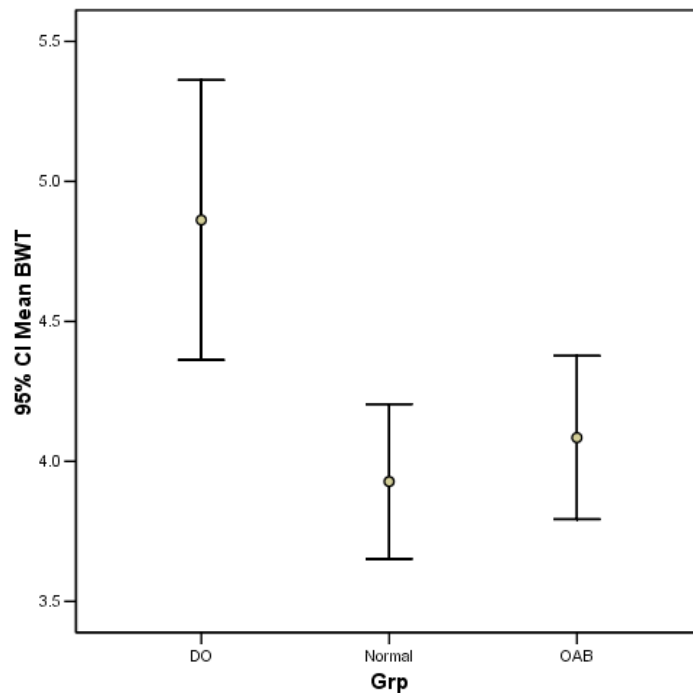
A further 194 symptomatic women were recruited to the study, of whom 26 were subsequently excluded from the data analysis because of inadequate completion of at least one part of the study. In total, 168 women (mean age 52 years) had data available for analysis. Thirty one women with DO (18.5%) and thirty three women with OAB (19.6%) were identified.

The bladder wall measurements are set out in table 1. Mean bladder wall thickness and 95% confidence intervals are compared graphically in Figure 1.

Table 1. The bladder wall thickness measurements of a mixed population of symptomatic and asymptomatic women.

	Group	Mean	p	Group	Mean	p
<b>Trigone mm</b>	DO	4.577	0.004	DO	4.577	0.001
	OAB	3.664		Normal	3.638	
<b>Anterior mm</b>	DO	4.773	0.193	DO	4.773	0.031
	OAB	4.339		Normal	4.066	
<b>Dome mm</b>	DO	5.267	0.003	DO	5.26	0.0001
	OAB	4.218		Normal	4.08	
<b>Mean mm</b>	DO	4.862	0.007	DO	4.86	0.001
	OAB	4.085		Normal	3.92	

Figure 1. Mean bladder wall thickness across diagnostic categories



Interpretation of results

There is a clear difference between the mean bladder wall thickness in women with DO, and women with OAB or asymptomatic women. The 95% confidence intervals, as demonstrated graphically, suggest a useful discriminatory test. The difference may be most pronounced at the dome of the bladder, although larger studies are necessary to further investigate these effects. Urgency-frequency symptoms, in the absence of demonstrable detrusor contractions on the cystometrogram, may be due to causes other than DO or OAB syndrome, and alternative urological or urogynaecological pathologies should be considered.

Concluding message

Ultrasound assessment of bladder wall thickness remains a safe, cheap, and well tolerated investigation, which, whilst not diagnostic, may prove useful in the armamentarium of the clinician differentiating between detrusor overactivity and other causes of urgency-frequency symptoms.

1. Ultrasound: a non-invasive screening test for detrusor instability. BJOG 1996; 103(9):904-8

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