

DETRUSOR WALL THICKNESS AS A TEST FOR DETRUSOR OVERACTIVITY IN WOMEN

Hypothesis / aims of study

The measurement of detrusor wall thickness (DWT) has been used as a screening test for detrusor overactivity and bladder outlet obstruction in men and women[1]. However, the correlation between DWT and DO in women remains unclear. Khullar et al. found high sensitivity and specificity when using a cutoff of 5 mm. for DWT as a screening test for DO[2]. In another larger study however, there was no statistically significant association between DO and DWT[3]. The aim of this study was to define receiver operator characteristics for DWT as a test for DO and urge incontinence in women.

Study design, materials and methods

From November 2002 to January 2006, 792 women with lower urinary tract symptoms underwent urodynamic study and transperineal ultrasound at a urodynamic clinic. Their notes were reviewed retrospectively. The urodynamic study included free uroflowmetry, filling and voiding phase cystometry using a fluid-filled system. Transperineal ultrasound was performed after catheter removal and bladder emptying, at a maximum bladder volume of 50 ml. Detrusor wall measurements were taken at the bladder dome in the same manner as previously described by the authors. After exclusion of missing data (largely due to residuals of over 50 ml), 686 datasets remained. A blinded test- retest series in an unrelated study yielded an Intraclass correlation coefficient of 0.82 (CI 0.63- 0.91), signifying excellent agreement. SPSS 13.0 for windows (SPSS Inc, Chicago, Illinois) was used for statistical analysis. Receiver operator characteristics (ROC) curves were used to determine the diagnostic yield of DWT in predicting DO. $P < 0.05$ was considered significant.

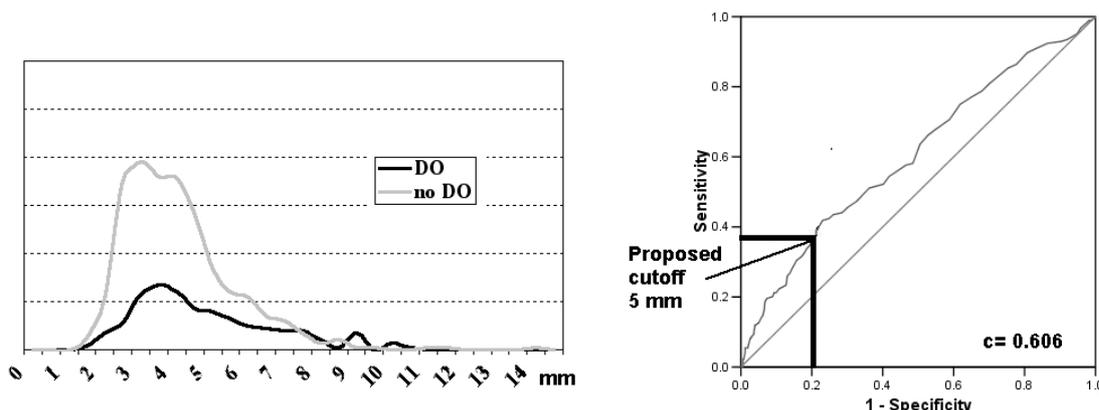


Figure 1: Left = Frequency distribution graph of DWT in the DO group (grey line) and non-DO group (black line). Right = ROC curve for DWT to predict DO.

Results

Mean age was 53.7 ± 13.4 (range 17.9-89.4) years. We did not find a correlation between DWT and age ($r = 0.001$, $P = 0.492$). The most common irritable bladder symptom reported in the study population was urge incontinence (UI) (503, 73.3%). 36.6% of women had symptoms of frequency, and 46.6% had nocturia. Of those 503 UI cases, 171 (34.0%) had detrusor overactivity detected on urodynamics (odds ratio = 6.7, 95% CI = 3.7-12.2, $P < 0.0001$). The average DWT in the DO group was 4.7 ± 1.9 mm. compared to 4.1 ± 1.6 mm. in the non-DO group, which reaches statistical significance ($P < 0.001$). There was no significant correlation between DWT and sensory urgency ($P = 0.14$). Figures 1 and 2 give histograms and ROC characteristics, showing that, for a cutoff of 5 mm, the sensitivity and specificity of DWT was 37.0% and 79.3%, respectively, with an area under the curve of only 0.606. No other potential cutoff performed substantially better. The same holds true when considering DWT as a test for urge incontinence (see Figure 2).

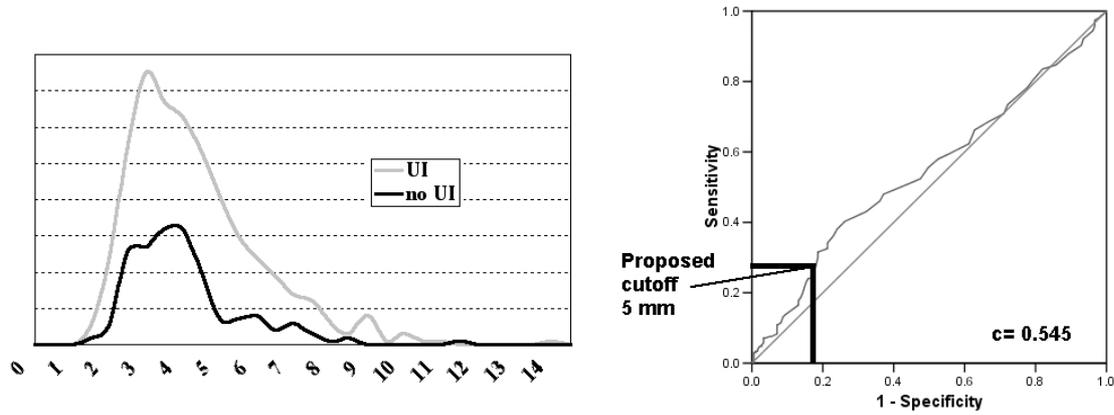


Figure 2: Histogram and ROC curve for DWT to predict urge incontinence

Interpretation of results

Increased DWT seems to be associated with DO. We found a statistically highly significant correlation between DWT and DO, with DO patients showing higher measurements (4.7 ± 1.9 mm vs. 4.0 ± 1.5 mm, $P < 0.0001$). However, receiver operator characteristics demonstrate that DWT is of little use as a diagnostic test for detrusor overactivity, giving an area under the curve of only 0.606. The sensitivity and specificity of a previously published cutoff were 37.0% and 79.3% respectively. There was no association between patient age and DWT.

Concluding message

Measurement of Detrusor wall thickness should not be used as a diagnostic parameter for detrusor overactivity in women. While there is an association between increased DWT and detrusor overactivity on urodynamic testing, ultrasonic measurement of DWT clearly can not replace urodynamics.

References

1. BJOG: an International Journal of Obstetric & Gynaecology, 2002. **109**(2): p. 145-148.
2. Br.J.Obstet.Gynaecol., 1996. **103**(9): p. 904-908.
3. Journal of Ultrasound in Medicine, 2003. **22**(8): p. 777-82.

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HUMAN SUBJECTS: This study was approved by the Wentworth Area Human Research Ethics Committee and followed the Declaration of Helsinki Informed consent was not obtained from the patients.