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IS BLADDER WALL THICKNESS DEPENDENT ON PRESENCE OF URGENCY VS. MIXED URINARY INCONTINENCE SYMPTOMS?

Hypothesis / aims of study
To assess whether the bladder wall thickness is dependent on different variables that might affect its diagnostic accuracy for detrusor overactivity.

Study design
Multicentre diagnostic accuracy (cohort) study across 22 centres in the UK

Materials and methods
Consecutive women who presented with frequency, urgency, with or without urge incontinence or urge predominant mixed urinary incontinence were invited to participate in the study if they fulfilled the eligibility criteria.
In the BUS study, the index test was to measure bladder wall thickness on an empty bladder at 3 sites in millmetres using transvaginal probe perpendicular to the luminal surface of the bladder at the thickest part of the trigone, at the dome of the bladder in the midline(1). Urodynamics [UDS] which was the reference standard was carried out in these women by an independent blinded observer.
The accuracy statistics were calculated including ROC curves and area under the curve (AUC)

Results
Out of the 687 women who were recruited, the bladder ultrasound was performed completely in 645 patients and in 10 patients bladder wall measurements were partially obtained. Urodynamic was completed in 666 patients.
Overall, the bladder wall thickness (BWT) proved to be a poor test for determining the presence of DO with AUC: 0.520, 95%CI: (0.474, 0.566) (p=0.39 compared to AUC=0.50). When exploring further, other factors like clinical or urodynamic variables along with BWT were not found to be very significant in increasing the likelihood of detection of DO
**Accuracy of Bladder wall thickness in diagnosing DO in presence of different variables**

Variable	AUC	95% CI	P value compared to AUC=0.50)
Urgency alone on history	0.528	(0.450, 0.607)	p=0.48
Pure DO vs.DO +USI	0.521	(0.476, 0.566)	p=0.37
Wet DO only	0.548	(0.502, 0.594)	p=0.04
Incorporating incomplete USS measurements	0.522	(0.477, 0.568)	p=0.33
>4 weeks between tests (5% of completed tests)	0.524	(0.477, 0.571)	p=0.32

Interpretation of results
An ideal diagnostic test has AUC of 1 and the test is poor when AUC is 0.5-0.6. Hence, BWT in presence of any of the above variables is not discriminatory and fails as a test for predicting DO even though wet DO reaches statistical significance.
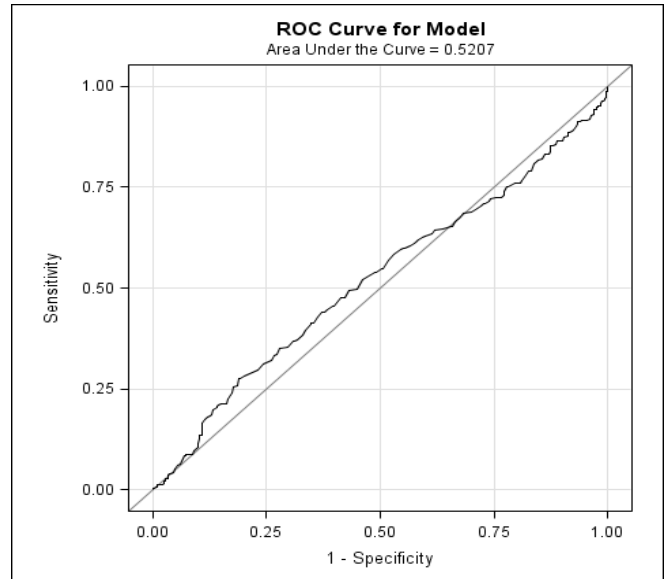
Concluding message
Bladder wall thickness in women with urgency alone on history as opposed to urge predominant MUI symptoms has got no discriminatory potential for DO.
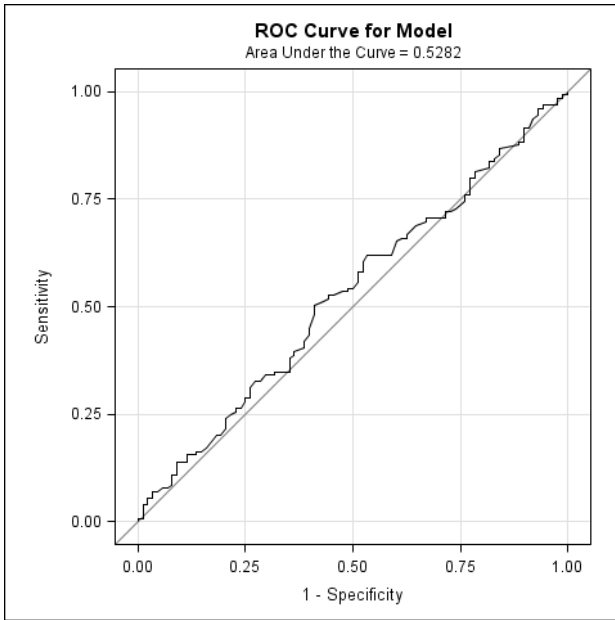
**Index vs reference standard final results:
ROC curve (urgency alone group)**
AUC: 0.528, 95%CI: (0.450, 0.607) (p=0.48 compared to AUC=0.50)

Index vs reference standard final results: ROC curve ('Pure DO' only group)
AUC: 0.521, 95%CI: (0.476, 0.566) (p=0.37 compared to AUC=0.50)

References
1. Latthe P.M., Champaneria R., Khan K.S. Systematic review of the accuracy of ultrasound as the method of measuring bladder wall thickness in the diagnosis of detrusor overactivity. Int Urogynecol J Pelvic Floor Dysfunct 2010; Aug;21(8):1019-24