Systematic review of the accuracy of ultrasound as the method of measuring bladder wall thickness in the diagnosis of detrusor overactivity

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CRD summary
This generally well-conducted review concluded that there was lack of data to reliably estimate accuracy of bladder wall thickness (measured using ultrasound) in diagnosing detrusor overactivity; further research is needed. This cautious conclusion reflects the limitations of the data and is likely to be reliable.

Authors' objectives
To assess the accuracy of bladder wall thickness on ultrasound in diagnosing detrusor overactivity in women with overactive bladder symptoms.

Searching
MEDLINE, EMBASE, LILACS and CINAHL were searched from inception to January 2009 and search terms were reported. No language restrictions were applied. Bibliographies of included studies and review articles were screened. Experts in the field were contacted to identify additional studies.

Study selection
Studies that assessed the accuracy of bladder wall thickness (measured on ultrasound) for the diagnosis of detrusor overactivity in women with frequency, urgency, or urge incontinence were eligible for inclusion. Studies were required to use urodynamic diagnosis as the reference standard for determining detrusor overactivity.

All the included studies were performed in women with urinary symptoms, but one study also included a control group. Included studies used translabial or transvaginal ultrasound and measured detrusor wall thickness, or average bladder wall thickness.

Two reviewers independently assessed studies for inclusion, with any disagreements resolved by consensus or consultation with a third reviewer.

Assessment of study quality
The methodological quality of included studies was assessed using the following criteria: consecutive recruitment of participants; prospective study design; blinded interpretation of tests; inclusion of an appropriate patient spectrum; adequate description of index test; adequate description of the reference standard; verification of diagnosis by the reference standard in all cases. Each criteria was rated as 'yes', 'no', or 'unclear'.

The authors did not state how many reviewers performed the quality assessment.

Data extraction
Where possible, data were extracted to populate 2x2 contingency tables (numbers of true positive, false negative, false positive, and true negative test results). These data were used to calculate sensitivity and specificity with 95% confidence intervals (CIs). Where insufficient data were reported, primary authors were contacted.

Two reviewers independently extracted data, with any disagreements resolved by consensus or consultation with a third reviewer.

Methods of synthesis
Studies were combined in a narrative synthesis.
Results of the review
Five studies, with 1,556 participants (range 66 to 686), were included in the review. All studies included an appropriate spectrum of participants, provided adequate descriptions of index test and reference standard, and verified all diagnoses using the reference standard. Three studies were prospective, three recruited consecutive patients, and three reported blinded interpretation of tests.

Only two studies reported sufficient data to construct 2x2 contingency tables, and these used different reference standards; one used ambulatory urodynamics plus laboratory urodynamic tests, and the other used only laboratory urodynamic tests.

Using a bladder wall thickness cut-off of over 5mm, the diagnostic sensitivity estimate was 40% (95% CI 33.1 to 47.7) and the specificity estimate was 78% (95% CI 74.0 to 81.5) in one study; in the other study, the sensitivity estimate was 84% (95% CI 75.8 to 89.7) and the specificity estimate was 89% (95% CI 78.8 to 96.1).

Authors’ conclusions
There was lack of data to reliably estimate accuracy of bladder wall thickness in detrusor overactivity.

CRD commentary
The review stated a clear research objective. Inclusion criteria were defined for population, index test, reference standard, and target condition. A range of sources were searched, without language restrictions, for relevant studies, which reduced the chance of missing relevant articles. However, the search included methodological terms for test accuracy studies; this approach is not recommended by the Cochrane handbook and has been shown to reduce the sensitivity of searches. Measures were taken to minimise error and/or bias in the study selection and data extraction processes, though it was unclear whether similar measures were applied to quality assessment.

The methodological quality of included studies was assessed and the results were reported in full. The use of a narrative synthesis was appropriate to the limited and heterogeneous data available.

The authors’ cautious conclusion reflects the limitations of the data and is likely to be reliable.

Implications of the review for practice and research
Practice: The authors made no recommendations for clinical practice.

Research: The authors stated that an ideal future study would be a prospective multicentre diagnostic accuracy study recruiting consecutive women presenting with frequency, urgency with or without urge incontinence symptoms. They further stated that, as the first step, it is necessary to standardise measurement of bladder wall thickness.

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