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Ibrahim S[1], Najdy M[2]

1. *Dorset county hospital, AL GALAA TEACHING MATERNITY HOSPITAL,* ***2.*** *Yeovil District Hospital, Al Galaa Teaching Maternity Hospital*

MEASURING BLADDER WALL THICKNESS IN CASES OF DETRUSOR INSTABILITY USING TRANSVAGINAL ULTRASOUND

Hypothesis / aims of study

To assess the accuracy of mean bladder wall thickness measurement by transvaginal ultrasound as a diagnostic tool for patients with overactive bladder.

Study design, materials and methods

Design: A blinded prospective study.

Participants: Sixty cases attending the outpatient clinics, cases will be divided into two groups: **STUDY GROUP:** composed of thirty patients attending the urogynaecology clinic and complaining of symptoms of frequency & urgency and/or urge incontinence & diagnosed as detrusor instability via urodynamic studies. **CONTROL GROUP:** composed of thirty patients without lower urinary tract symptoms ,D.M., malignancies and any systemic disease or drugs interfering with their urinary function. The STUDY GROUP was subjected for urodynamic assessment prior to the sonographic evaluation . Transvaginal ultrasound was performed for each of the two groups blindly. The bladder wall thickness was measured in three places: 1. perpendicular to the luminal surface of the thickest part of the trigone, 2. at the dome of the bladder, and 3. at the anterior wall of the bladder. Mean bladder wall thickness was then calculated.

Results

we chose the cut-off point of **4.48mm**, as it showed **the best sensitivity** for detecting the cases of OAB. Values below it show both less sensitivity and specificity, while values above it show more specificity but less sensitivity. By applying the cut point of mean BWT **> 5mm** of in our study, it showed sensitivity of 53.3% and specificity of 86.7%. The PPV was 16/20 = 80% and the NPV was 26/40 = 65%. It showed more specificity than our cut-off point (**4.48mm),** but it was less sensitive.

Comparison between study group and control group as regards mean BWT at cut point 5mm

Mean	*Control group*		*Study group*	
	No	%	No	%
≤ 5	26	86.7%	14	46.7%
> 5	4	13.3%	16	53.3%

Mean at cut point 5mm, diagnosed 16 (53.3%) of 30 positive cases, and 26 (86.7%) of negative cases

Interpretation of results

As regards mean BWT, in the ***study group***, the maximum mean BWT was 7.79mm, while the minimum mean BWT was 3.33 mm with mean value (5 ± 1.09), while in the ***control group***, the maximum mean BWT was 6.60mm, the minimal was 3.03 mm with mean value (4.17 ± 0.91).

A receiver operating characteristic (ROC) curve was plotted to describe the sensitivity and specificity of different cut-off points.

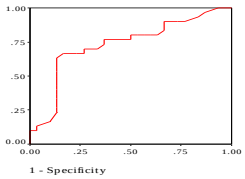

Diagram illustrates Receiver operator characteristic (ROC) curve. Area under the curve is 73.

So the test is maximally accurate at the point closest to the upper left corner of the ROC curve (cut point) **4.48 mm.** It was found that this cut-off point has sensitivity 70%, specificity 74%, PPV 73% and NPV 71%. At cut point **4.33 mm,** the sensitivity was 70%, specificity was 66%, PPV was 67% and NPV was 69%. At cut point **4.53 mm** and **4.58 mm,** the sensitivity was 67%, specificity was 74%, PPV was 72% and NPV was 69%. At cut point **4.68 mm,** the sensitivity was 67%, specificity was 84%, PPV was 81% and NPV was 72%. So we chose the cut-off point of **4.48mm**, as it showed **the best sensitivity** for detecting the cases of OAB. Values below it show both less sensitivity and specificity, while values above it show more specificity but less sensitivity. By applying the cut point of mean BWT **> 5mm** of in our study, it showed sensitivity of 53.3% and specificity of 86.7%. The PPV was 16/20 = 80% and the NPV was 26/40 = 65%. It showed more specificity than our cut-off point (**4.48mm),** but it was less sensitive. Mean at cut point 5mm, diagnosed 16 (53.3%) of 30 positive cases, and 26 (86.7%) of negative cases.

Concluding message

This blinded prospective case-control study was conducted at Ain Shams University Maternity Hospital and AL Galaa Teaching Maternity Hospital during the period of March 2006 to February 2007, 60 patients were included in the study and were divided into study group (30 patients cystometrically diagnosed as OAB) and control group (30 asypmtomatic females without LUTS) . It was designed to assess the accuracy of mean BWT measurement by transvaginal US as a diagnostic tool for patients with

suspected OAB. Mean BWT measured with transvaginal US appears to be a sensitive method for diagnosing OAB. We found that the best cutoff value for the mean BWT was 4.48 mm with specificity 74%, sensitivity 70%, PPV 73% and NPV 71% in total number of 60 females (30 with OAB and 30 asymptomatic normal controls). There was no significant rise in mean BWT associated with age.

References

1. Khullar et al., 1996
2. Abrams P et al., 2002
3. Stewart et al., 2001

Specify source of funding or grant	**none**
Is this a clinical trial?	**No**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**Yes**
Specify Name of Ethics Committee	**AIN SHAMS UNIVERSITY HOSPITALS ETHIC COMMITTEE**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**