440

Pajoncini C[1], Costantini E[1], Guercini F[1], Lilli P[1], Porena M[1]
1. Department of Urology - Perugia University

DOES ULTRASOUND INVESTIGATION DIAGNOSE OVERACTIVE BLADDER?

Hypothesis / aims of study

In patients with urinary incontinence it is commonly held that detailed information is required for the differential diagnosis between detrusor overactivity and stress incontinence. Despite this view, less invasive diagnostic techniques and a minimum of diagnostic work-up are preferred, particularly during the initial approach to these patients. Ultrasound scanning has been proposed as a first step in the diagnosis of urinary incontinence because the mean thickness of the bladder wall and the dimensions of the urethral sphincter have been correlated with the presence of an overactive bladder.
This study assessed whether ultrasound measurements of the urethral sphincter and bladder wall thickness, either alone or combined, can predict a urodynamically overactive bladder.

Study design, materials and methods

80 female patients with LUTS underwent clinical examination including a questionnaire for urinary symptoms, filling cystometry and ultrasound study. Patients were divided into 2 groups on the basis of presence of overactive bladder or irritative symptoms and each group was compared with a control group. During transrectal ultrasound scan we measured in cross-section the transverse total sphincter diameter (T total Sphincter D) and anterior-posterior total sphincter diameters (A-P Total Sphincter D), the total sphincter circumference (Total Sphincter Circumference) and the total sphincter area (Total Sphincter Area); transversal smooth inner sphincter diameter (T smooth sphincter D), anterior-posterior smooth inner sphincter diameters (A-P smooth sphincter D), smooth inner sphincter circumference (Smooth sphincter Circumference) and area of the smooth inner sphincter (Smooth sphincter Area). The mean bladder wall thickness (vesical plate + posterior wall + dome /3) was measured. The cut off for the overactive bladder was >5mm as established (1). Tests were performed with an empty bladder (max 30cc). We correlated these measurements with presence of irritative symptoms (frequency. urgency, nocturia) and non-inhibited detrusor contractions. Then we correlated the volume of non-inhibited detrusor contractions with the mean bladder wall thickness.

Results

Spearman's correlation coefficient and the Mann-Whitney test were used.
Table 1 shows the results. 25 pts presented with overactive bladder and 49 pts with irritative symptoms. No significant inter-group difference emerged in ultrasound measurements of the urethral sphincter in the presence of irritative symptoms or a urodynamically overactive bladder respect the control groups. The mean bladder wall thickness was increased in the patients with overactive bladder ($P<0.05$). 3/25 patients (12%) in the overactive group and 3/55 (5.4%) in the controls had mean bladder wall thickness above the cut-off. There was no correlation between non-inhibited detrusor contraction volume and mean bladder wall thickness.

Interpretation of results

Some studies report sphincter diameters as measured with intraurethral ultrasound are decreased in patients with overactive bladders (2) whereas others claim sphincter volume as measured with 3D perineal ultrasound is increased (3). We hypothesized detrusor overactivity can cause entire or partial urethral sphincter hypertrophy, because of its tendency to resist increased bladder pressure. We used transrectal ultrasound scanning as first choice test to determine whether variations exist in sphincter dimensions but observed no variations in sphincter volume.

Concluding message

Transrectal ultrasound failed to diagnose a functional irritative syndrome and an overactive bladder.
Although the mean bladder wall thickness was increased in patients with detrusor overactivity ultrasound has a low predictive value, leaving its clinical value in doubt.

References

1) Ultrasound: a noninvasive screening test for detrusor instability. Khullar V, Cardozo LD, Salvatore S, Hill S. Br J Obstet Gynaecol. 1996 Sep;103(9):904-8.

2) Major H, Culligan P, Heit M.: Urethral sphincter morphology in women with detrusor instability. Obstet Gynecol. 2002 Jan; 99(1):63-8.

3) Correlating structure and function: three-dimensional ultrasound of the urethral sphincter. Robinson D, Toozs-Hobson P, Cardozo L, Digesu A. Ultrasound Obstet Gynecol. 2004 Mar;23(3):272-6.

Table 1

Patients subdivided according to presence of detrusor overactivity or irritative symptoms

	25 Pts with DO	55 Pts without DO	*p*	49 Pts with irritative s.	31 Pts without irritative s.	*p*
T total sphincter D	17,5 (16,2-18,9)	17,9 (16,0-19,7)	NS	17,7 (15,6-19,5)	18,0 (16,4-18,9)	NS
A-P total sphincter D	12,7 (10,5-14,5)	11,6 (10,7-13,3)	NS	11,6 (10,4-14,2)	11,9 (10,6-13,2)	NS
Total sphincter Circumference	5,0 (4,5-5,4)	4,8 (4,4-5,3)	NS	4,8 (4,4-5,3)	4,7 (4,6-5,3)	NS
Total sphincter Area	1,5 (1,4-2,4)	1,6 (1,3-1,9)	NS	1,5 (1,3-2,0)	1,6 (1,3-2,0)	NS
T smooth sphincter D	13,8 (11,6-15,0)	12,6 (11,1-14,9)	NS	13,3 (11,0-15,1)	12,6 (11,1-14,7)	NS
a-p smooth sphincter D	9,8 (8,1-11,3)	9,3 (8,2-10,4)	NS	9,5 (8,2-10,8)	9,1 (7,6-10,4)	NS
smooth sphincter Circumference	3,8 (3,2-4,5)	3,7 (3,2-4,1)	NS	3,7 (3,2-4,2)	3,5 (3,2-4,1)	NS
smooth sphincter Area	0,5 (0,72-1,5)	0,94 (0,74-1,22)	NS	1,0 (0,73-1,3)	0,91 (0,73-1,2)	NS
Mean bladder wall thicknes	**4 (3,6-4,66)**	**3,5 (3,1-4,2)**	**< 0.05**	4,0 (3,8-4,66)	3,5 (3,3-4,0)	NS

Mann-Whithney test; Median and interquartile range