

ULTRASOUND STUDY OF THE LOWER URINARY TRACT IN CONTINENT WOMEN

Aims of Study

The position and mobility of the bladder neck and urethra are important factors in the aetiology of genuine stress incontinence (GSI). The aims of the present study were to analyze the ultrasound parameters of the lower urinary tract in continent women and assess normal reference values of US parameters. The findings of our study have been used for the prediction of stress urinary incontinence.

Methods

Seventy one continent and premenopausal women participated in the study (Group 1). Their mean age was 32.8, mean body mass index (BMI) 23.1, and mean parity 0.8. A second group involved 40 continent and postmenopausal women (Group 2). Their mean age was 54.7, mean BMI 25.7, and mean parity 1.6. Thus the whole group of continent women who participated in the study comprised 111 women. Perineal and introital ultrasound examinations of the patients in supine position were performed by Acuson 128 XP 10, curved array probe 5 or 3.5 MHz and vaginal ultrasound probe 7.5 MHz. The position and mobility of the bladder neck was assessed transperineally with a curved array probe. The examination was performed when a patient had the desire to void after drinking an undefined volume of liquid. The mean volume of the bladder was 283 mL and was assessed by US examination. The following parameters were described: γ angle is the angle between the line connecting the inferior point of symphysis with the bladder neck and the axis of symphysis, p is the distance between the inferior point of symphysis and UV junction. Measurements of ultrasound parameters were performed at rest and during Valsalva manoeuvre. Funneling was described as the increase in distance between the inner edges of proximal urethra during Valsalva manoeuvre. The bladder was then evacuated and the thickness of the urinary bladder wall in the sagittal plane in defined regions (base, vertex, and anterior wall) was measured.

Results

Based on our ultrasound imaging, we found statistically significant differences in the position of urethrovesical junction (UVJ) between groups 1 and 2 and none between mobility (Fig.1a,b). The differences in US parameters are summarized in Table1. The urinary bladder wall thickness was always less than 4 mm. The mean value in distance between the inner edges of proximal urethra during Valsalva manoeuvre (funneling) was not larger.

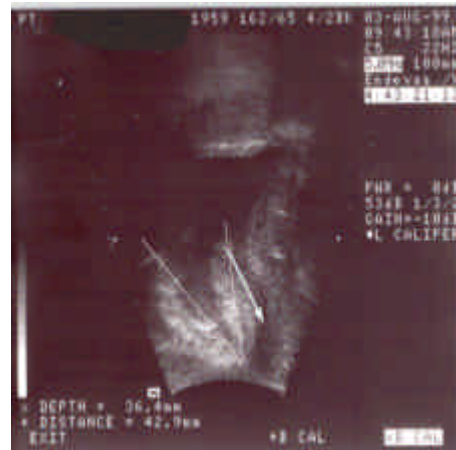
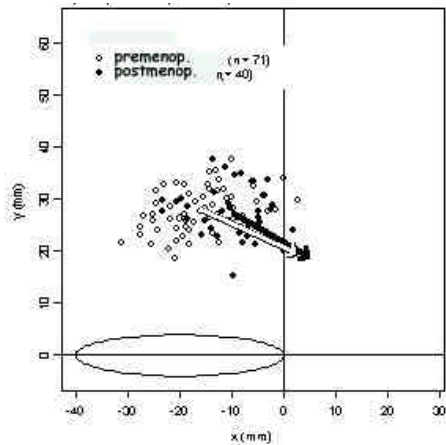
Tab.1. Ultrasound parameters

		The gamma angle			The vector of movement of UVJ (mm)
		At rest	Valsalva	Diff.	
Continent premenop. women (n=71)	x	61.1	99.5	38.5	20.9
	SD	12.9	32.0	27.1	
Continent postmenop. women (n=40)	x	71.1	104.1	33.1	17.24
	SD	8.6	17.2	14.1	

x – the mean value SD – the standard deviation

Diff – differences between the γ angle during Valsalva and the γ angle at rest

Fig. 1a,b The vector of movement of UVJ from the position at rest to the position during Valsalva manoeuvre (mm)



The differences between the γ angle during Valsalva and the γ angle at rest (Diff) were $> 50^\circ$ in 32 patients (28,8%) of the whole group ($n = 111$). This means that in these cases there was hypermobility of UVJ. We did not observe funnelling of proximal urethra in these patients.

Conclusions

This study provides normal reference values of the bladder neck mobility in pre- and postmenopausal continent women in our population. From our results we can conclude that hypermobility of UVJ can be assessed in 28,8% continent women but is not associated with funnelling of proximal urethra, which is typical for incontinent patients. The mean gamma angle in the whole group is approximately 65° and mobility of UVJ from the rest position to the position during Valsalva manoeuvre about 35° . The mean thickness of the bladder wall is less than 4 mm.

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