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NORMAL VALUES FOR DETRUSOR WALL THICKNESS IN YOUNG CAUCASIAN WOMEN

Hypothesis / aims of study

Detrusor muscle thickness has been shown to be associated with symptoms of the irritable bladder and urodynamically diagnosed detrusor overactivity[1]. It has been speculated that this is due to detrusor hypertrophy[2] in women with bladder irritability although it remains unclear whether detrusor hypertrophy is the cause or effect of such symptoms. In either case, there are no data on the natural history of detrusor hypertrophy: the condition may be congenital or acquired, and symptoms may precede or follow the establishment of hypertrophy. The aim of this study was to define detrusor muscle thickness in a cohort of young nulligravid Caucasian women in order to determine the incidence of detrusor hypertrophy in asymptomatic and symptomatic young women.

Study design, materials and methods

52 young nulligravid volunteers were recruited for a study of pelvic floor dysfunction and underwent 3D volume ultrasound of the pelvic floor using a Kretz Voluson 730 system with 7-4 MHz Volume transducer with automated image acquisition. These volumes were retrospectively analyzed for bladder wall thickness with the help of GE Kretz 4D View software on a desktop computer[3]. Three measurements each were taken for the trigonal area and the bladder dome. 14 women were excluded due to the bladder dome being outside the acquired volume which generally occurred with residual volumes of 30 ml or over.

A blinded test- retest series on detrusor wall thickness (bladder dome) performed in all 38 women yielded an Intraclass correlation coefficient (average measures, absolute agreement definition) of 0.82 (CI 0.63- 0.91) which signifies excellent agreement.

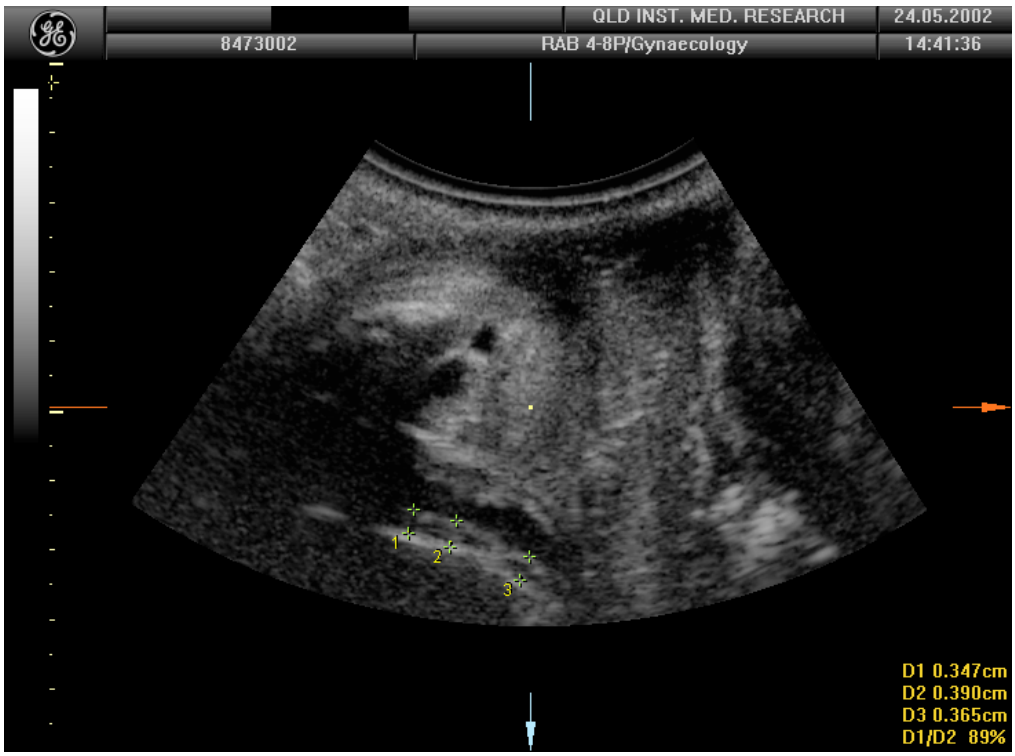

Figure 1: Measurement of detrusor wall thickness in young nulligravid Caucasian women (age 18-24). The average dome measurement in this case was 3.7 mm.

Results

Average age was 20.5 (17.9- 24.2). Six women reported stress incontinence, one urge incontinence, one nocturia. Frequency was reported by the latter two and four other women. Average bladder neck descent was 18.0 (SD 9.5) mm. Average detrusor thickness at the trigonal site was 4.1 (SD 0.6, range 3.3- 5.8) mm, at the dome 2.8 (SD 0.7, range 1.3- 4.6) mm. This difference was significant ($p<0.001$). Average measurements for both sites showed a mean of 3.4 (SD 0.5, range 2.3- 4.7) mm. Symptoms of frequency, nocturia and urge incontinence were not associated with increased detrusor wall thickness measurements. In asymptomatic women, detrusor wall thickness at the dome measured 2.8 (0.7) mm, at the trigone 4.1 (0.6) mm, and on average 3.5 (0.5) mm.

	Yes	**No**	**P**
Urge incontinence	2.4 (-)	2.8 (0.7)	n.s.
Frequency	2.5 (0.5)	2.8 (0.7)	n.s.
Nocturia	2.1 (-)	2.8 (0.7)	n.s.
Any symptom	2.5 (0.5)	2.8 (0.7)	n.s.

Table: Detrusor wall thickness vs. symptoms of the irritable bladder in young nulligravid Caucasian women. In total, six women reported symptoms of bladder irritability.

Interpretation of results

Young healthy nulligravid Caucasian women showed detrusor wall thickness measurements well below the published cutoffs for detrusor hypertrophy (5 mm) when dome measurements alone or the average of dome and trigone were considered. This did not just apply to asymptomatic women, but also to the few individuals in this group who were reporting symptoms of the irritable bladder. It therefore appears likely that increased detrusor muscle thickness is an acquired rather than a congenital condition. The most likely explanation is muscle hypertrophy over an extended period of time, due to isometric contractions of the detrusor when voiding is actively prevented. This would imply that detrusor hypertrophy is more likely effect rather than cause of symptoms of the irritable bladder.

The high number of exclusions (n=14 or 27%) was due to the bladder dome not being imaged in women who emptied incompletely. Incomplete emptying was common, probably as a result of stress in these young nulliparous women, many of whom had never undergone a gynaecological examination. As the prevalence of symptoms was very similar in those excluded, and as our methodology ensured assessment at very low bladder volumes, this factor is unlikely to have biased our results.

Concluding message

In a group of 38 young nulligravid Caucasian women, all detrusor wall thickness measurements obtained by translabial ultrasound were well below the published cutoffs of 5 mm, even in those 6 women who reported frequency, nocturia or urge incontinence. Detrusor wall thickness over 5 mm seems to be an acquired condition and may be the effect (rather than the cause) of symptoms of bladder irritability.

References:

1 Br J Obstet Gynaecol 1996; **103**: 904-908.
2 Neurourol Urodyn 2002; **21:**284-285.
3 Ultrasound Obstet Gynecol 2005; **23**: 615- 625.