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ASSESSING PELVIC FLOOR FUNCTION IN THE ELDERLY USING TRANSABDOMINAL DIAGNOSTIC ULTRASOUND

Hypothesis / aims of study

Investigations have previously shown that transabdominal diagnostic ultrasound is reliable and valid for non-invasively assessing pelvic floor function in young and mid-aged adults (1). The aim of this study was to examine ultrasound displacement measures of the pelvic floor in healthy community dwelling elderly people aged over 60 years.

Study design, materials and methods

Healthy male and female community dwellers, aged between 60 and 85 years were recruited. Ethics approval was gained from the local Human Research Ethics Committee. All subjects completed a questionnaire regarding their general health, symptoms of urinary incontinence, exercise and mechanical stressors related to the condition of their pelvic fascia. Subjects underwent a bladder filling protocol prior to imaging with a Logiq Book ultrasound machine (GE Medical, Milwaukee, USA). Testing was performed in the crook lying position using a 2-5 MHz curved linear array transducer placed on the subject's lower abdomen in the mid-sagittal plane to image the pelvic floor. Subjects performed three maximum voluntary contractions which were held for three seconds with rests of ten seconds between them. Contraction images of the pubocervical fascia were captured and measured using the electronic callipers on the ultrasound monitor screen. The average of three measurements was used for data analysis. Results were analysed using Excel software. Differences between groups were examined using unpaired t-tests.

Results

Twenty-six subjects were recruited, 17 females and 9 males. Overall, 17 (65%) of the group complained of urinary symptoms. Of these, 12 (71%) were females and 5 (29%) were males, 6 (35%) of the incontinent group reported symptoms of stress incontinence, 8 (47%) reported symptoms of urge incontinence and 3 (18%) reported both stress and urge symptoms. Twenty-four (92%) of this cohort exercised at least once per week. All 17 females were parous (1-4 children). Ultrasound displacement measures of the pelvic floor are reported in Table 1.

Table 1. Sagittal plane displacement measure (cm)

Group	Range (cm)	Mean (cm)	SD (cm)	Sample size
Parous female	-0.64-1.49	0.49	0.69	17
Male	0.36-1.32	0.73	0.35	9
Urinary incontinent	-0.64-1.49	0.52	0.63	17
Continent	-0.60-1.32	0.67	0.56	9

There was no significant differences in the ultrasound excursion measurements of the pelvic floor between the females and males ($t=0.246$, $df=24$) nor between incontinent and continent groups ($t= 0.546$, $df=23$).

Interpretation of results

While there were no significant differences demonstrated between male and female groups, the males were more homogenous in the displacement values compared to the women (SD 0.35cm vs 0.69cm respectively). Of the 17 incontinent subjects, 12 were women. This is reflected in the similar displacement values for the female group compared to the incontinent group (mean 0.49cm vs 0.52cm). A previous study by(1) investigated the displacement of the pelvic floor in a younger group aged 18 to 54 years. A comparison of results showed there was a greater displacement of the pelvic floor in the younger than older parous females (mean 0.99cm vs 0.49cm respectively). However the displacement values in males in both younger and older cohorts were similar (mean 0.72cm vs 0.73cm respectively).

There was no significant difference in ultrasound displacements between continent and incontinent subjects. The relationship between ultrasound measures and pelvic floor function is yet to be elucidated. However it is important to remember that ultrasound only measures the excursions of the pubocervical fascia. These excursions are dependent not only on the pelvic floor muscle but on the fascia and innervation of the pelvic floor.

Concluding message

Transabdominal ultrasound is a non-invasive tool for visualizing pelvic floor contraction by imaging pelvic floor displacements. This study demonstrated a smaller pelvic floor displacement in older parous women compared to younger parous women investigated in a previous study by our group (1).The older male group did not show age related differences suggesting there could be other factors operating for women, such as hormonal effect on the pelvic floor. As almost all the older cohort exercised regularly, the effect of disuse atrophy on pelvic tissues is likely to be similar across this group. This study also demonstrated a wide variability in both female and incontinent group, who were predominantly women.

References

1. Transabdominal diagnostic ultrasound as a clinical tool and outcome measure in the conservative management of pelvic floor dysfunction. (2002) Unpublished thesis.