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IS BALANCE DIFFERENT IN WOMEN WITH AND WITHOUT PELVIC ORGAN PROLAPSE?

Hypothesis / aims of study

Urinary incontinence and pelvic organ prolapse are closely associated with the pelvic floor muscles function, and these are also part of the stability mechanism of the body. Other muscles such as the abdominal muscles have been considered relevant to the continence mechanism and allow pelvic organs in their anatomical position. The transversus abdominis muscles and diaphragm are responsible for maintaining the intra-abdominal pressure (IAP), important for the stability of the lumbar and pelvic organs. Abdominal muscle weakness alters the position of the pelvis and leads to a hyperlordosis and back pain. Studies have shown that these disorders are related to changes in the activity of MAPS. Recent evidence suggests that women with stress urinary incontinence (SUI) have increased trunk muscle activity in association with challenges to postural control and have decreased balance ability compared to continent women. [1,2]. As the prolapse and stress urinary incontinence has the same pathophysiology, it is fair to assume that women with genital prolapse also show a deficit in balance. Thus, The first aim of this study was to determine whether there is a difference in center of pressure (COP) displacement in women with and without pelvic organ prolapse by use of baropodometry.

Study design, materials and methods

This is a cross-sectional observational study. Women admitted with they were between 60 and 80 years old. They were divided in two groups: untreated stage I pelvic organ prolapse or without prolapse, control group, and untreated stage III or IV prolapse women, prolapse group. Women with respiratory disorders, history of neurological injury (spinal cord injury, cerebral vascular accident, brain tumors, Parkinson's disease, hydrocephalus, central and peripheral degenerative diseases, surgeries on the central nervous system trauma), vestibular disorders, limbic, vertigo were excluded evaluated by Romberg and Fukuda test, women with altered sensitivity in the feet assessed by Semmes Weinstein, patients with crossbite, retinopathy, strabismus or serious eye problems, lameness, use of assistive devices, peripheral occlusive disease, a history of recent fractures in lower limbs, presence of painful symptoms and swelling in lower limbs were excluded. The outcome of primary interest was the severity of prolapse measured using the pelvic organ prolapse quanti- fication (POP-Q) by one gynecologist blind to the women's study group allocation. To detect defects in pelvic floor support, a pelvic examination was conducted using a split speculum with patients in the dorsal lithotomic position and straining maximally. The POP-Q consists of six defined points: two (Aa, Ba) on the anterior vaginal wall, two (C, D) on the superior vaginal wall, and two (Ap, Bp) on the posterior vaginal wall, which are all measured in centimeters with respect to the hymen. In addition, the total vaginal length (with the prolapse reduced) is measured, as is the length of the genital hiatus and perineal body. The six internal measurements plus the total vaginal length are used to calculate the stage of prolapse. Ground reaction forces were recorded with a single force plate (Footwalk Pro, AM CUBE, France) by a second reviewed. Individuals were standing with bipedal support and free support base, arms relaxed at your sides, with eyes located on an imaginary point in front. If need be, the participant could make vision correction through glasses. Two samples, one with eyes open and with eyes closed with one minute interval between each of them were made.The following COP measures were calculated: range of COP displacement and mean velocity of COP displacement. The sample size calculation was based on a pilot study of 12 elderly (6 women in each group), considering a significance level of 0.05 ($\alpha = 0.05$), a power of 80% ($\beta = 0.20$) and test non-directional and used the program GPower 3.1.5.For the statistical analysis, SPSS (Statistical Package for Social Sciences) version 20.0 was used.To determine normality of the data and to analyze the differences between the groups Komogorov-Smirnov and test-t Student's was used, respectively, as appropriate. A P-value of <0.05 was considered statistically significant.

Results

From November 2013 to march 2014, 34 possible eligible patients were recruited and four were excluded. In total, 30 women with an average age of 65,23 years (± 3,7) were divided between 12 untreated stage III or IV prolapse women, control group (CG) and 18 untreated stage I or without prolapse, prolapse group (PG).The mean age was 65.23 (±3.7). Table 1 shows the distribution of patients according to demographic characteristics collected. It is noticeable that there was no difference between groups in terms of age, body mass index, number of pregnancies, vaginal births.

Table 1: Distributions of patients according to demographic characteristics

Variables	Group	Median	Percentis			P-value*
			25	50	75	
Age (years)	Control Group Prolapse Group	64,0 65,0	62,75 64,0	64,0 65,0	67 68,5	0,49
IMC (Kg/m²)	Control Group Prolapse Group	26,5 26,0	25,75 25,0	26,5 26,0	28,5 28,0	0,39
Number of Pregnancies	Control Group Prolapse Group	6,0 4,0	3,75 2,50	6,0 4,0	7,0 5,75	0,51
Vaginal Births	Control Group Prolapse Group	3,0 3,0	0,75 1,25	3,0 3,0	6,0 4,75	0,95

* $\alpha = 5\%$

*value of p obtained through the Mann-Whitney

No statistically significant differences were observed when analyzing control group and prolapse group , regarding baropodometry variables. The median of COP displacement was 354,50mm and 321,50mm in control and prolapse group (p=0,305), respectively. The median of velocity of COP displacement was 6,0 mm/sec and 5,0mm/sec in control and prolapse group, respectively (p=267). (Fig. 1; fig. 2)

Fig1: The median of COP displacement

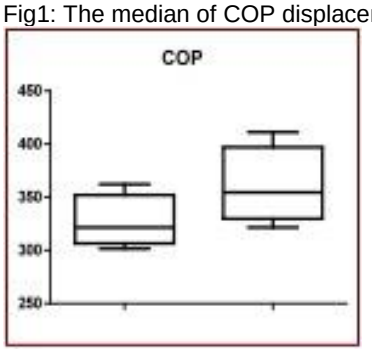
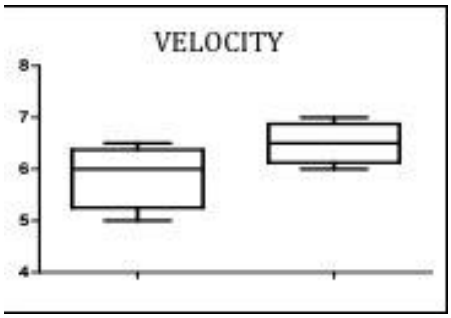


Fig2: The median of COP displacement velocity



Interpretation of results

Studies show that women with disorders in pelvic floor muscles as in urinary incontinence have postural imbalance strengthening the idea that the pelvic floor muscles also participate in this balance control. So, maybe disorders in these compartments allow postural imbalances. To our knowledge, there are no studies demonstrating that pelvic organ prolapse has any influence on balance. Conversely, there is a study that demonstrates that urinary incontinent women have decreased balance ability compared to continent women [1]. In our study no statistically significant differences were observed when analyzing the groups by COP variables. There seems to be no direct relationship between the changes from the genital prolapse with possible changes in center of pressure. Other components of postural control may have functioned as a true buffer system minimizing possible changes resulting from the condition that genital prolapse can offer. How has not been evaluated posture and positioning of the joints of the lower limbs, spine and head position, this can be a new field of study for the possible compensation of prolapse. In a way, it is mean that in spite of advanced pelvic organ prolapse, the bodies of these women were able to satisfactorily compensate its center of pressure

Concluding message

This study demonstrates that women with advanced pelvic organ prolapse have not difference balance ability compared to no prolapse women.

References

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Disclosures

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