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PELVIC FLOOR MUSCLE FUNCTION AMONG OBESE WOMEN WITH AND WITHOUT URINARY INCONTINENCE

Hypothesis / aims of study

Epidemiological studies document overweight and obesity as an important risk factor for urinary incontinence (UI). Body mass index (BMI) and abdominal obesity are independent factors for both stress and urge UI in women (1). The mechanism of the association between obesity and UI is unknown, but it is thought that the excess body weight increases abdominal pressure, bladder pressure and urethral mobility. Obesity may cause chronic strain, stretching and weakening the muscles, nerves and other pelvic floor structures (2). There are no data about pelvic floor muscles (PFM) function among obese women.

The aims of the present study were: 1) to evaluate PFM function among a group of obese women, comparing the results between incontinent and continent women; 2) to assess possible correlation between BMI and abdominal perimeter, and PFM strength measurements; and 3) to identify predictive factors to present UI among obese women.

Study design, materials and methods

A comparative observational study among obese women (BMI>30 Kg/m2) was conducted in a third degree universitary hospital from January 2012 to January 2014. Patients were selected during their follow-up in the Obesity Endocrinological Unit and signed the informed consent. All patients filled in the International Consultation on Incontinence Questionnaire Short Form (ICQ-UI-SF), which is a validated questionnaire to detect the presence and severity of UI. According to the questionnaire score, patients were sorted in two groups: obese women with UI (ICIQ-UI-SF>0) as the study group; and obese women without UI symptoms as the control group (ICIQ-UI-SF=0). Demographical data were collected during visit of the study: age, weight, BMI, abdominal perimeter, parity, vaginal deliveries and hormonal status.

Functional testing was evaluated by digital examination using the modified Oxford graded scale, which subjectively scores from 0 to 5 the PFM strength. Asymmetry between the right and left side was also collected. PFM strength was also measured objectively using a perineometer (Peritron®, Cardio-Design-Victoria) to assess maximal contraction force, mean contraction force of 5-seconds examination (cm H20) and time contraction force (seconds). Digital examination correlated well with perineometer measurements among non-obese women (3). PFM evaluation was performed by a single examiner with 15 years experience.

To test differences between continent and incontinent patients in continuous variables, a T-test was performed for those variables that previously had showed normal distribution under Kolmogorv-Smirnoff test. For those who not, U-Mann Whitney test was undertaken. For categorical variables, exact Fisher's test was performed. Furthermore, to assess the influence of each parameter on UI, multiple regression models were tested.

Results

A total of 152 obese patients were included in the study: 89 incontinent women (study group), and 63 continent women (control group). Demographical data of both groups are shown in Table 1.

Table 1 - Demographical data comparing both groups of obese women.

	Continent (n=63)	Incontinent (n=89)	Statistically significant
Age (years) (X ± SD)	46.9 ± 12.1	50.2 ± 11.1	NS
Parity (X ± SD)	1.5 ± 1.2	1.8 ± 1.4	NS
Vaginal deliveries (X ± SD)	1.1 ± 1.2	1.5 ± 1.5	NS
Weight (Kg) (X ± SD)	109.6 ± 15.6	108.3 ± 15.6	NS
Body mass index (Kg/m2) (X ± SD)	43.1 ± 5.7	43.8 ± 5.7	NS
Abdominal perimeter (cm) (X ± SD)	125.1 ± 10.2	125.3 ± 11.2	NS
Menopause n(%)	27 (40%)	58 (62%)	p=0.007
Nulliparous n(%)	19 (28%)	19 (18%)	NS

No significant differences were found between groups considering age, parity, BMI, or abdominal perimeter. Nevertheless, there were more menopausal women among incontinent group compared to the control group (p=0.007).

Severity of UI of incontinent obese women, according to ICI-UI-SF, is shown in Figure 1.

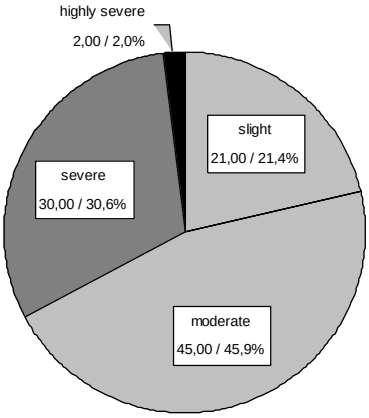

Fig 1 - Number and percentage of patients having a slight incontinence (1 ≤ ICIQ ≤ 5), moderate incontinence (6 ≤ ICIQ ≤ 12), severe incontinence (13 ≤ ICIQ ≤ 18) and highly severe incontinence (19 ≤ ICIQ ≤ 21).

Considering PFM evaluation, no statistical differences were found between groups, either subjective assessment (Oxford score), or objective measurements (perineometry). Conversely, asymmetry in PFM strength was found more frequently in the study group, compared with continent controls (p=0.001). Results are shown in Table 2.

Table 2 - Results of PFM evaluation comparing incontinent and continent obese women

	Continent (n=63)	Incontinent (n=89)	Statistically significant
Oxford (X ± SD)	2.8 ± 1.6	2.6 ± 1.6	NS
Maximal contraction force (cmH2O) (X ± SD)	41.9 ± 30.9	36.4 ± 24.2	NS
Mean contraction force (cmH2O) (X ± SD)	29.0 ± 21.0	26.4 ± 19.2	NS
Time force (s) (X ± SD)	9.1 ± 13.2	7.4 ± 4.1	NS
Asymmetry n (%)	4 (6.3%)	24 (27%)	p=0.001
Oxford<3 n (%)	26 (41%)	36 (40%)	NS

Positive correlation exists between age and parity and ICIQ-UI-SF score (p=0.02 and p=0.003) respectively). Conversely, age and parity showed inverse correlation with Oxford score and maximal contraction force and time force (p<0.05). However, any correlation was found between BMI or abdominal perimeter and PFM strength measurements.
Using a multiple regression model, it has been observed that many demographic and pelvic muscle function influence in the presence and degree of UI, such as age, vaginal deliveries, BMI, hormonal status, abdominal perimeter, PFM strength, asymmetry . However, none of them explains more than 6% of variability of the ICIQ-IU-SF score. Consequently, it is difficult to build a reliable UI prediction model with the data of this study.

Interpretation of results
No differences considering PFM strength between incontinent and continent obese women have been demonstrated. Besides, no correlation between BMI or abdominal perimeter and PFM strength measurements has been shown. The association between obesity and UI is complex and multifactorial, and it is not explicable by worse PMF function.

Concluding message
Obese women with UI do not have worse PFM function than parity- and age-matched obese continent women.

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Disclosures
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