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ASSOCIATION BETWEEN METABOLIC SYNDROME AND PELVIC ORGAN PROLAPSE SEVERITY

Hypothesis / aims of study

The prevalence of POP has been rising with the increasing proportion of elderly women in the population. The cause of POP is considered to be multifactorial. Some of the risk factors increase the risk of developing POP but not its severity once patients become symptomatic. For example, although obesity increases the risk of developing vaginal prolapse, BMI is not correlated with POP severity assessed with the Pelvic Organ Prolapse Quantification System (POP-Q) [1]. Most studies showing a positive correlation between obesity and POP focused on the theory of increased abdominal pressure. Obesity-related metabolic and vascular complications have received relatively little attention in the discussion on the pathophysiology of POP.

Decades of research have revealed abdominal obesity to be a precursor and crucial aspect of metabolic syndrome (MS), a cluster of interrelated risk factors for cardiovascular disorders, which occur together more often than by chance alone [2]. A possible relationship between MS and POP has not been addressed in much detail. Kim et al. [3] analyzed correlations between MS and the severity of POP symptoms assessed with the Pelvic Floor Distress Inventory-20 (PFDI-20) in Korean women recruited during a routine medical screen. In the study by Kim et al. [3], among the MS criteria, only elevated waist circumference and elevated triglycerides were significant risk factors for POP symptoms. The assessment of POP symptoms in the latter study was based on the self-report, performed in a primary care, and limited to Asian women [3]. It remains to be established whether a similar relationship exists between MS and the severity of POP diagnosed on the basis of physical examination and the POP-Q staging in urogynecological patients of Caucasian origin.

The purpose of the present pilot, cross-sectional study was to evaluate the MS risk factors in urogynecological patients with different POP severity. Given the data reported by Kim et al. [3], we hypothesized that patients with a greater overall POP-Q stage are more likely to be diagnosed with MS and that some components of MS may be significant risk factors for more severe POP.

Study design, materials and methods

Women who referred with pelvic floor disorders (PFD) to the Outpatient Clinic of the Department of Gynecology of the Military Institute of Medicine, Warsaw, Poland in 2012 were considered potential participants. One hundred and twenty patients diagnosed with POP with the POP-Q staging system were screened for eligibility. The POP-Q system was used to quantify the severity of pelvic organ prolapse at a maximum Valsalva strain [1]. The final study group included 100 Caucasian women with the overall POP-Q stage 1 to 4 (stage 1, N=22, stage 2, N=21, stage 3, N=46, stage 4, N=11). The patients were diagnosed with MS if any three (or more) of the following five risk factors were present: i) abdominal obesity, i.e. waist circumference $\geq$80 cm, ii) hyperglycemia, i.e. fasting glucose ≥100 mg/dL (or treatment for elevated glucose), iii) hypertriglyceridemia, i.e. fasting triglycerides ≥150 mg/dL (or treatment for elevated triglycerides), iv) high-density lipoprotein cholesterol <50 mg/dL (or treatment for reduced high-density lipoprotein cholesterol), and v) elevated blood pressure, i.e. systolic pressure ≥130 mmHg and/or diastolic pressure $\geq$85 mmHg (or antihypertensive drug treatment in patients with a history of hypertension) [2].

Results

The χ^2 test revealed that the diagnosis of MS and the presence of elevated triglycerides increased with the overall POP-Q stage. BMI and the other MS risk factors were not significantly associated with the overall POP-Q stage (Table 1). The calculation of ORs with 95% CI confirmed that elevated triglycerides and the diagnosis of MS were significant predictors of POP-Q stage $\geq$3 [OR (95% CI): 3.5 (1.5-8.2) for MS, 3.4 (1.4-8.2) for elevated triglycerides, *p*s<0.01] (Table 2).

Since the four groups (POP-Q stage 1 to 4) differed in the number of postmenopausal women, a separate analysis was performed to study the association between MS and POP-Q staging after the exclusion of 13 premenopausal patients. The numbers of stage 1 and stage 4 patients were relatively low, and thus the remaining postmenopausal subjects were pooled into two groups (postmenopausal/POP-Q stage 1-2 vs. postmenopausal/POP-Q stage 3-4). The proportion of women with MS was significantly higher in the postmenopausal/stage 3-4 group (31/55) as compared to the postmenopausal/stage 1-2 group [11/32; $\chi^2(1)=3.9$, $p<0.05$]. The proportion of women with elevated triglycerides was also significantly higher in the postmenopausal/stage 3-4 group (29/55) in comparison with the postmenopausal/stage 1-2 group [7/32; $\chi^2(1)=7.9$, $p<0.01$]. The postmenopausal/stage 3-4 and postmenopausal/stage 1-2 subjects did not differ in the prevalence of the other MS components (*p*s>0.05).

Interpretation of results

The diagnosis of MS and the presence of elevated triglycerides may be associated with the severity of POP in urogynecological patients. Longitudinal studies are required to assess whether the MS risk factors might predict the progression of POP and whether elimination of the risk factors might improve the prognosis in POP patients.

Concluding message

MS and some of its components may be associated with the severity of POP assessed with the POP-Q staging system in urogynecological patients seeking help for PFD.

Table 1 Metabolic syndrome and its components in patients with different POP-Q staging

Risk factor	Stage 1	Stage 2	Stage 3	Stage 4	Statistics
Elevated waist circumference	15/22†	19/21	39/46	8/11	$\chi^2(3)=4.5$, $p=0.2$
Elevated triglycerides	6/22	4/21	24/46	5/11	$\chi^2(3)=8.3$, $p=0.04$
Reduced high-density lipoprotein cholesterol	1/22	4/21	10/46	1/11	$\chi^2(3)=3.8$, $p=0.3$
Elevated blood pressure	14/22	17/21	28/46	5/11	$\chi^2(3)=4.4$, $p=0.2$
Elevated fasting glucose	4/22	6/21	19/46	4/11	$\chi^2(3)=3.9$, $p=0.3$
Metabolic syndrome††	3/22	8/21	26/46	5/11	$\chi^2(3)=11.4$, $p=0.009$

†n/N; ††The presence of any three (or more) of five risk factors constituted a diagnosis of metabolic syndrome [2]

Table 2 Metabolic syndrome and its components as predictors of increased POP-Q staging†

Risk factor	OR	95% CI	*p* value
Elevated waist circumference	1.2	0.4-3.5	$p=0.7$
Elevated triglycerides	3.4	1.4-8.2	$p=0.006$
Reduced high-density lipoprotein cholesterol	1.8	0.6-5.7	$p=0.3$
Elevated blood pressure	0.5	0.2-1.2	$p=0.1$
Elevated fasting glucose	2.2	0.9-5.4	$p=0.1$
Metabolic syndrome	3.5	1.5-8.2	$p=0.005$

†43 patients were classified as the POP-Q stage ≤2 and 57 patients were classified as the POP-Q stage ≥3; the univariate regression analysis was used to predict stage ≥3

References

1. Shalom DF, Lin SN, St Louis S, Winkler HA (2012) Effect of age, body mass index, and parity on Pelvic Organ Prolapse Quantification system measurements in women with symptomatic pelvic organ prolapse. J Obstet Gynaecol Res 38(2):415-419
2. Alberti KG, Eckel RH, Grundy SM, Zimmet PZ, Cleeman JI, Donato KA, Fruchart JC, James WP, Loria CM, Smith SC Jr (2009) International Diabetes Federation Task Force on Epidemiology and Prevention; National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; International Association for the Study of Obesity. Harmonizing the metabolic syndrome: a joint interim statement of the International Diabetes Federation Task Force on E
3. Kim YH, Kim JJ, Kim SM, Choi Y, Jeon MJ (2011) Association between metabolic syndrome and pelvic floor dysfunction in middle-aged to older Korean women. Am J Obstet Gynecol 205(1):71.e1-8

Disclosures

Funding: The study was supported by the Military Institute of Medicine (A.R., D.T., E.D. E.J., W.B.) and the Institute of Psychiatry and Neurology (P.B.), Warsaw, Poland. **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** The study protocol was approved by the Ethics Committee for Human Studies of the Military Institute of Medicine, Warsaw, Poland. **Helsinki:** Yes **Informed Consent:** Yes