OVERACTIVE BLADDER: CORRELATION BETWEEN URODYNAMIC VALUES AND PSYCHO-EMOTIONAL INDICES IN WOMEN

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ABSTRACT

Introduction. Overactive bladder (OAB) is a syndrome consisting in symptoms of urinary urgency, with or without urge incontinence, often associated with urinary frequency and nocturia, in the absence of a pathological cause. Compared to men, women have a higher susceptibility to develop symptoms of OAB and, additionally, women tend to have an increased prevalence of depression and anxiety.

The objective of the study was to determine the interrelation of OAB symptoms with psychoemotional indices, urodynamic values, and quality of life.

Material and methods. A retrospective clinical study of 28 patients with OAB symptoms was conducted using the data available from chart reviews. All patients completed an ICIQ-OAB questionnaire, a 24-hour voiding diary, and the health-related quality of life questionnaire. The psychoemotional state was evaluated

RÉSUMÉ

Introduction. La vessie hyperactive (VH) représente un syndrome qui contient une série de symptômes comme l’incontinence par impériosité, mictions fréquentes et nycturie souvent sans savoir la cause. Les femmes sont plus à risque de développer les symptômes de VH et aussi d’avoir la dépression ou l’anxiété.

L’objectif de l’étude a été de déterminer l’influence de symptômes de VH sur les problèmes mentaux aussi qu’avec les valeurs urodynamiques.

Matériel et méthodes. On a réalisé un étude clinique rétrospectif sur 28 patients qui ont présenté des symptômes de la VH en utilisant les données disponibles dans les revues graphiques. Tous les patients ont
Using the PHQ-9 (Patient Health Questionnaire) and GAD-7 (General Anxiety Disorder-short form) questionnaires and the level of stress disorder was analyzed using PTSD (posttraumatic stress disorder questionnaire).

**Results.** In patients with mild to moderate levels of mood changes, there was a statistically significant difference demonstrating higher maximum detrusor pressure (p<0.05) compared to patients with no psychological disorders (62.95±42.48 cmH2O). Patients with detrusor overactivity (DO) confirmed on urodynamic tests were positively correlated (R2=0.86) with mild anxiety in 50% of cases and mood changes in 35.7% of cases.

**Conclusions.** The comparison of psychometric parameters with clinical and urodynamic results revealed an association between the GAD-7 and PHQ-9 scores and DO. Mild and moderate degrees of change of mood and anxiety are prevalent in women with OAB and correlate with the severity of OAB symptoms, detrusor overactivity, and lower quality of life.

**Keywords:** overactive, urinary bladder, urodynamics, anxiety, stress.

**List of abbreviations:**
- BC - bladder compliance
- DO - detrusor overactivity
- DTVV - daytime total voided volume
- DV - daytime voiding
- FBC - functional bladder capacity
- FDV - first desire to void
- FS - first sensation of bladder filling
- GAD-7 – General Anxiety Disorder-short form
- ICIQ – International Consultation on Incontinence Questionnaire
- IN - index of nocturia
- IPN - index of nocturia polyuria
- LUTS - lower urinary tract symptoms
- MCC - maximum cystometric bladder capacity
- MDP - maximum detrusor pressure
- NTVV - nighttime total voided volume
- NV - nighttime voiding
- OAB - overactive bladder
- PHQ-9 – Patient Health Questionnaire
- PTSD – posttraumatic stress disorders
- PVR - postvoid residual urine volume
- Qave - average flow rate
- Qmax - maximum flow rate
- SDV - strong desire to void
- UDS – urodynamic testing
- UTI - urinary tract infection

Compléte le ICIQ-OAB questionnaire, le journal de la miction sur 24-h, ont évalué leur degré d’urgence de la miction avec le questionnaire sur la qualité de vie. Les troubles psycho émotionnels ont été évalués avec PHQ-9 et GAD-7 questionnaires et a été analysé le niveau de trouble de stress à l’aide du PTSD (questionnaire sur le trouble de stress post-traumatique).

**Résultats.** Dans les patients avec le degré léger et modéré de la changements d’humeur on a noté une différence significative de la pression du détrusor en comparaison avec les patients sans troubles psychologiques (62,95±42,48 cmH2O). L’hyperactivité du détrusor confirmée par les tests urodynamiques a été liée (R2= 0,86) à l’anxiété en 50% de cas et faible changements d’humeur en 35,7% de cas.

**Conclusions.** La comparaison des données psychométriques cliniques et urodynamiques ont démontré une association entre le GAD-2 PH-9 questionnaires et la HD. Des changements d’huieur et d’anxiété légers et modérés sont fréquents chez les femmes atteintes d’hyperactivité vésicale et sont en corrélation avec la gravité des symptômes de l’hyperactivité vésicale, l’hyperactivité du détrusor et la qualité de vie.

**Mots-clés:** hyperactive, vessie urinaire, urodynamique, anxiété, le stress.
INTRODUCTION

Overactive bladder (OAB) syndrome consists in symptoms of urinary urgency, with or without urge incontinence, often associated with urinary frequency and nocturia, in the absence of a pathological cause. Urodynamic studies are frequently used for the evaluation, diagnosis, and follow-up of lower urinary tract symptoms (LUTS). Urodynamic detrusor overactivity (DO) is defined as spontaneous or provoked urgency symptoms and detrusor contractions with varying durations and amplitudes, with or without urinary incontinence during filling cystometry. The International Continence Society has labeled the condition of OAB symptoms without urodynamic detected DO as “sensory urgency” and consider it to be part of the same spectrum as DO, perhaps an earlier stage. In the clinical practice, urodynamic DO is detected in approximately 50% of women with OAB symptoms.

Symptomatic OAB is a problem that can significantly reduce the quality of life of affected individuals. Individuals with OAB tend to curtail their participation in social activities and isolate themselves, further leading to their predisposition to changes of mood (depression). The prevalence of OAB has been reported to be at least 16% in Europe and 17% in the USA in the general population. OAB symptoms have a considerable effect on the daily living activities and health-related quality of life (HRQL), including work productivity, social and family relationships, and sleep patterns. OAB negatively affects self-esteem and is associated with anxiety and changes of mood (depression).

Research has shown that women are more susceptible to develop OAB symptoms compared to men. Additionally, women tend to experience more symptoms of depression and anxiety than the male population. Depression and anxiety disorders make up the biggest percentage of mental health illnesses in the world. The frequency of mood changes in the population over the age of 65 years is estimated to be greater than 40%. In a systematic meta-analysis conducted by Melotti et al., the authors showed a correlation between OAB symptoms and psychiatric disorders. The study demonstrated the prevalence of symptomatic OAB to be 22.5% and 33.7% for women in the UK and Sweden, respectively, and established that patients with OAB were significantly more likely to seek treatment and undergo psychiatric therapy for anxiety and changes of mood compared to healthy subjects. There is growing evidence that individuals with mood changes and anxiety may experience symptoms of OAB more frequently than the general population. These conditions appear to be associated with brain disturbances and specific neurotransmitters, especially 5-HT, serotonin, which has been shown to exert a facilitating effect on voiding via modulation of bladder afferents, volume thresholds, and bladder contractions.

The association between affective symptoms and OAB has already been established. The clinical presentation of OAB is sometimes unremarkable, anxiety scores are significantly higher in women with confirmed OAB than in asymptomatic controls. The estimates of OAB prevalence in women with diagnosed anxiety vary widely in the literature, due in part to differing terminologies, diagnostic approaches, and populations studied. The prevalence of anxiety disorders is estimated to be 11–18%, while OAB has been noted to affect 12–16% of adults. Research has not elucidated if anxiety is a causal factor for OAB symptoms or if anxiety is a result of these bladder symptoms. The link between anxiety and OAB is complex and multifactorial.

THE OBJECTIVE OF THE STUDY was to analyze the influence of OAB symptoms on mental health problems and to evaluate whether there are correlations between the urodynamic values and mental health disorders.

MATERIAL AND METHODS

A retrospective clinical study of 28 patients with OAB symptoms was conducted using the data available from medical charts. All 28 patients were examined between 2019 and 2022 in the Department of Urology and Surgical Nephrology, “Nicolae Testemitanu” State University of Medicine and Pharmacy, Chisinau, Republic of Moldova.

All 28 patients included in the study were women who were clinically and urodynamically diagnosed with OAB. The patients were examined in the same clinic, they were refractory to drug treatments, and aged between 18 and 58 years. The study protocol was approved by “Nicolae Testemitanu” SUMPh Research Ethics Committee (approval no. 24/05.03.2021). Patients who underwent the urodynamic testing (UDS) procedure were asked to indicate that they understood the nature of the procedure and signed an informed consent.

The inclusion criteria for the study were: women (> 18 years old) with a diagnosis of idiopathic OAB. Additional inclusion criteria were patients refractory to anticholinergic therapy for more than 6 weeks, because of ineffectiveness or tolerability. Only patients who performed UDS, completed the voiding diary/24h and valid questionnaires were included in the study. Patients were excluded if they had an
overt neurological condition or other condition that could affect sensation, pure stress incontinence, painful bladder syndrome, or incomplete data collection. None of the 28 patients had a vaginal prolapse higher than the 2nd grade, abnormal bladder compliance, or a post-void residual greater than 100 mL. Also, patients diagnosed with neurogenic urinary bladder, bladder pain syndrome/interstitial cystitis, bladder outlet obstruction confirmed on urodynamics, detrusor underactivity, DO with inadequate contractility, acute urinary tract infection (UTI), or lithiasis/bladder tumours were excluded.

To be included in the study, a patient had to complete an International Consultation on Incontinence Questionnaire Overactive Bladder (ICIQ-OAB), as well as a 24-h bladder diary and the health-related quality of life questionnaire (OABq-HRQoL).

Potential psychiatric disorders, such as changes in mood and anxiety, were measured by the Patient Health Questionnaire (PHQ-9; patients were considered to have mood changes (depression) if the score was greater than or equal to 18 out of a maximum score of 27), and by the Generalized Anxiety Disorder 7-Item Scale (GAD-7; patients were categorized as having anxiety if the GAD-7 score was greater than or equal to 14)⁵.

The patients were evaluated for the presence of potential associated risk factors for inducing OAB through a questionnaire evaluating posttraumatic stress disorders (PTSD, score greater than or equal to 14 was considered being the presence of disorder)⁶, total daily fluid intake/24h, level of education, marital/relationship status. Most of the demographic data were extracted from the medical records and patient’s history.

UDS were performed to diagnose OAB and DO using urodynamics equipment Medica SpA, Memphis Division (Medolla-Italy).

All patients with a medication regimen that included anticholinergic medication stopped the medication for at least six weeks before the UDS procedure. Six hours before UDS procedure, the patients were instructed to avoid diuretic drinks such as coffee and black tea. It was used 23 ml/min as the filling rate to reduce urothelial impact in comparison with the filling of the bladder was performed with saline solution prepared at room temperature. The filling was stopped once the patient reached the maximum cystometric capacity, and subsequently, the patient urinated.

Statistical Analysis

The statistical analysis of the data was performed using unifactorial dispersion analysis designed in Microsoft Excel 2019 database and IBM SPSS Statistics 22 programs, using descriptive statistics, and Pearson correlation, with a significance level of 0.05. The categorical data were presented as absolute and relative values, and the continuous data were reported in the form of mean and standard deviation or as percentages.

Results

The study initially involved 42 women with a clinical diagnosis of OAB. Ten patients failed to meet the inclusion criteria, nine of them had a grade III prolapse and five patients had neurosurgical conditions. The data of 28 patients were included in the analysis of this study. The mean age of the patients was ~42 years old (18–67 years), with a mean duration of the symptoms over six years. In the group of study, 18 (64.29%) patients were in their reproductive period (Figure 2), 14 (22.6%) patients were single (Figure 3), 15 (42.2%) women were employed full-time (Figure 4) and all patients (100%) had a minimum of elementary school education. All patients were clinically diagnosed with OAB. Urinary symptoms such as urinary frequency, urinary urgency, and nocturia were present in 100% of cases, and urge urinary incontinence was present in 5.5% (Table 1).

Regarding the obstetric history, 26 women were pregnant before the investigation, of whom 12 patients underwent vaginal delivery. There was no significant difference (p>0.05) in the occurrence of psychological disorders between nulliparous (22.58%) and natural delivery patients (19.35%) (Figure 1).

Based on ICIQ-OAB scores ≥8, a total of 28 study subjects were categorized as having OAB,
Overactive bladder: correlation between urodynamic values and psycho-emotional indices in… – IVANOV et al

with a mean score of symptom severity 8.43±2.06. It was observed from the results of HRQL that OAB symptoms affected the quality of life including the symptoms of bothering, coping, awareness, sleep, and socialization. The evaluation of the psychometric questionnaire established that minimal and mild psychological disorders had the same prevalence as posttraumatic stress disorders (Table 2). Before this study, all patients were not diagnosed with anxiety or mood changes.

Six (21.4%) patients had absent or low levels of anxiety, twenty (71.4%) had mild anxiety, two (7.14%) had moderate anxiety and no patient had severe anxiety according to their GAD-7 score. From the PHQ-9

Table 1. Demographic data of patients with overactive bladder

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>(n = 28)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>41.93±12.94</td>
</tr>
<tr>
<td>Reproductive period (18 - 44 years)</td>
<td>18 (64.29%)</td>
</tr>
<tr>
<td>Menopause (56 - 65 years)</td>
<td>10 (35.71%)</td>
</tr>
<tr>
<td>Marital status (n)</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>14 (22.6%)</td>
</tr>
<tr>
<td>Married/living with partner</td>
<td>7 (11.3%)</td>
</tr>
<tr>
<td>Divorced</td>
<td>5 (8.1%)</td>
</tr>
<tr>
<td>Widowed</td>
<td>2 (3.2%)</td>
</tr>
<tr>
<td>Education (n)</td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>10 (16.1%)</td>
</tr>
<tr>
<td>College</td>
<td>9 (14.5%)</td>
</tr>
<tr>
<td>University</td>
<td>9 (14.5%)</td>
</tr>
<tr>
<td>Employment (n)</td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>15 (24.2%)</td>
</tr>
<tr>
<td>Part-time</td>
<td>8 (12.9%)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>2 (3.2%)</td>
</tr>
<tr>
<td>Student</td>
<td>2 (4.8%)</td>
</tr>
<tr>
<td>Disease duration (years)</td>
<td>5.61±3.9</td>
</tr>
<tr>
<td>Symptoms</td>
<td></td>
</tr>
<tr>
<td>Urinary frequency</td>
<td>36 (100%)</td>
</tr>
<tr>
<td>Urinary urgency</td>
<td>36 (100%)</td>
</tr>
<tr>
<td>Nocturia</td>
<td>36 (100%)</td>
</tr>
<tr>
<td>Urge urinary incontinence</td>
<td>2 (5.5%)</td>
</tr>
<tr>
<td>Natural births</td>
<td>12 (19.4%)</td>
</tr>
<tr>
<td>DO</td>
<td>20 (55.5%)</td>
</tr>
<tr>
<td>Conservative treatment</td>
<td>28 (100%)</td>
</tr>
<tr>
<td>Anticholinergic medication (Solifenacin, Trospium Chlorid, Tolterodine)</td>
<td>23 (82.1%)</td>
</tr>
<tr>
<td>Selective β3-adrenoceptor agonists (Mirabegron)</td>
<td>5 (17.8%)</td>
</tr>
<tr>
<td>Behavioral treatment</td>
<td>28 (100%)</td>
</tr>
</tbody>
</table>

Note: DO - detrusor overactivity

Figure 1. Delivery types in patients with OAB

Figure 2. Prevalence of fertility period in patients with OAB

Figure 3. The marital status in patients with OAB

Figure 4. The employment status in patients with OAB
scores, more than 50% of patients had mild or moderate mood changes with depressive tendencies. According to the PTSD scale, posttraumatic stress was identified in 35.7% of cases, with a mean score of 12.43±5.5 (Table 3).

There was a positive correlation ($R^2=0.81-0.89$) between the severity of mood changes/anxiety symptoms and OAB. The patients with severe scores of mood changes and anxiety also had a significant association with nocturia. In patients with anxiety and posttraumatic stress disorder, in 7.14% of cases, urgency urinary incontinence was identified (Figure 5).

The patients with OAB and psychoemotional disorders reported more severe OAB symptoms, worse quality of life, and more psychosocial difficulties compared to OAB patients without anxiety and mood changes. In 78.57% of cases, OAB symptoms had a positive correlation ($R^2=0.90$) with anxiety, and in 57.14% cases with mood changes ($R^2=0.89$).

Posttraumatic stress disorder (according to the PTSD score) was present in 35.71% of patients with severe and moderate symptoms (Figure 6). Mild anxiety was present in 71.26% cases, while moderate anxiety in only 7.14% of cases. The severe manifestation

<table>
<thead>
<tr>
<th>Table 2. Clinical and psychometric data in patients with OAB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Questionnaires</strong></td>
</tr>
<tr>
<td>Symptoms severity</td>
</tr>
<tr>
<td>HRQL</td>
</tr>
<tr>
<td>Anxiety</td>
</tr>
<tr>
<td>Mood (depression)</td>
</tr>
<tr>
<td>Posttraumatic stress</td>
</tr>
</tbody>
</table>

Note: PTSD – posttraumatic stress disorder; GAD-7 - generalized anxiety disorder assessment; PHQ-9 – depression test questionnaire; ICIQ-OAB – overactive bladder symptoms score; OAB-HRQL – overactive bladder quality of life questionnaire.

<table>
<thead>
<tr>
<th>Table 3. Psychometric values in patients with severe and moderate OAB</th>
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<tbody>
<tr>
<td><strong>PTSD</strong></td>
</tr>
<tr>
<td><strong>MODE- RATE</strong></td>
</tr>
<tr>
<td>ICIQ-OAB symptoms%</td>
</tr>
<tr>
<td>Patients (n)</td>
</tr>
<tr>
<td>ICIQ-OAB symptoms%</td>
</tr>
<tr>
<td>Patients (n)</td>
</tr>
</tbody>
</table>

Note: PTSD – posttraumatic stress disorder; GAD-7 - generalized anxiety disorder assessment; PHQ-9 – depression test questionnaire; ICIQ-OAB – overactive bladder symptoms score.

<table>
<thead>
<tr>
<th>Table 4. Voiding diary values in patients with OAB</th>
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<tbody>
<tr>
<td><strong>Voiding diary parameters</strong></td>
</tr>
<tr>
<td>Fluid intake/24h (mL)</td>
</tr>
<tr>
<td>DTVV (mL)</td>
</tr>
<tr>
<td>NTVV (mL)</td>
</tr>
<tr>
<td>IN</td>
</tr>
<tr>
<td>IPN (%)</td>
</tr>
<tr>
<td>FBC (mL)</td>
</tr>
<tr>
<td>Voidings/24h</td>
</tr>
<tr>
<td>DV</td>
</tr>
<tr>
<td>NV</td>
</tr>
</tbody>
</table>

Note: DTVV - daytime total voided volume; NTVV - nighttime total voided volume; FBC - functional bladder capacity; IN - index of nocturia; IPN - index of nocturia polyuria; DV - daytime voiding; NV - nighttime voiding.
of OAB was associated only with urinary incontinence (Figure 7).

The voiding diary analysis was based on total voided volume, functional bladder capacity, nocturia index and nocturia polyuria index, number of daytime voiding, total index of urgency, and frequency urination. The quantity of fluid intake (735.71±198.54 mL) and daytime voiding (1224.64±740.68 mL) were in normal ranges, but the presence of nighttime voiding (385±249.01 mL) and index of nocturia confirmed the clinical status of patients suffering from nocturia (Table 4).

Twenty patients (71.4% of cases) were confirmed to have DO. The bladder contractility index (CI) was found to be within the normal range, appreciated by International Continence Society standards, in 100% of cases in DO patients. Based on UDS data, the diagnosis of OAB with DO was confirmed by the presence of phasic contractions of the detrusor muscle (3.9±1.1) and increased values of detrusor pressure (45.9±23.9 cmH₂O) (Table 5). In all patients the PVR was measured before surgery, with an average value of 7 mL (ranging from 0 – 10 mL).

Urodynamic parameters, such as bladder capacity at each sensation and detrusor pressure, were affected by the presence of DO in women with OAB. The low values of indices obtained at filling cystometry: first sensation of bladder filling (91.14±62.09 mL), first desire to void (130.43±115.46 mL), strong desire to void (179.50±141.19 mL) and maximal cystometric capacity (210.21±154.91 mL) had a positive correlation with OAB symptoms (urgency, frequency and nocturia) from the ICIQ-OAB validated questionnaire (R²=0.79). It was established that the bladder capacity at each sensation was lower, being inversely proportional to the detrusor overactivity in women with OAB (Table 5).
In patients confirmed with severe and moderate depression, the maximum detrusor pressure was higher than in patients with mild levels of depression or absence of any psychological disorders (62.95±42.48 cmH₂O). The bladder filling sensation, first sensation, first desire, strong desire, and maximum bladder capacity values did not significantly differ (R²=0.86) from patients with or without minimum psychological disorders evaluated based on validated psychometric questionnaires (Table 6).

Voiding detrusor pressure (Pdet) was significantly higher in patients with DO (p < 0.05) and was significantly lower in the DO subgroup compared to patients with mild or moderate anxiety and depression (p < 0.05). The maximum urinary flow rate (Qmax) was significantly lower in all DO subgroups compared to patients with mild and moderate anxiety and mood changes (Table 6).

The analysis confirmed a relationship between OAB patients with DO and mood changes, anxiety, or posttraumatic stress disorder. From the analysis, we are unable to make a conclusion regarding which appears first: psychological disorders or OAB symptoms and which is the factor causing urodynamic abnormalities. The study found that patients diagnosed with DO on urodynamics test showed a significant positive correlation with mild anxiety in 50% and mood changes in 35.7% of cases (p<0.05). The incidence of PTSD was the same in both subgroups (DO+ and DO-) without any statistical correlations with OAB symptoms (Figure 8).

### Table 5. Urodynamic data in patients with OAB

<table>
<thead>
<tr>
<th>UDS parameters OAB patients</th>
<th>N</th>
<th>Mean (SD)</th>
<th>Minimum value</th>
<th>Maximum value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSV (mL)</td>
<td>28</td>
<td>91.14±62.09</td>
<td>27</td>
<td>247</td>
</tr>
<tr>
<td>FDV (mL)</td>
<td>28</td>
<td>130.43±115.46</td>
<td>34</td>
<td>512</td>
</tr>
<tr>
<td>SDV (mL)</td>
<td>28</td>
<td>179.50±141.19</td>
<td>38</td>
<td>561</td>
</tr>
<tr>
<td>MCC (mL)</td>
<td>28</td>
<td>210.21±154.91</td>
<td>48</td>
<td>570</td>
</tr>
<tr>
<td>BC (mL/cmH₂O)</td>
<td>28</td>
<td>45.44±80.05</td>
<td>7.1</td>
<td>311.3</td>
</tr>
<tr>
<td>PdetQmax (cmH₂O)</td>
<td>28</td>
<td>24.72±12.95</td>
<td>11</td>
<td>58</td>
</tr>
<tr>
<td>Pdet first phasic contraction (cmH₂O)</td>
<td>28</td>
<td>45.9±23.9</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>Qmax (mL/s)</td>
<td>28</td>
<td>12.22±6.2</td>
<td>5</td>
<td>29</td>
</tr>
</tbody>
</table>

Note: UDS - urodynamics; FSV - first sensation of bladder filling; FDV - first desire to void; SDV - strong desire to void; MCC - maximum cystometric bladder capacity; BC - bladder compliance.

### Table 6. Urodynamic values in OAB patients with mood changes, anxiety and posttraumatic stress disorder

<table>
<thead>
<tr>
<th>Urodynamic parameters in OAB patients</th>
<th>PHQ-9 Mild and moderate mood changes (n=8)</th>
<th>GAD-7 Mild and moderate anxiety (n=16)</th>
<th>PTSD (n=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean SD</td>
<td>Mean SD</td>
<td>Mean SD</td>
</tr>
<tr>
<td>Free flowmetry</td>
<td>Maximum voided volume (mL)</td>
<td>80.5 ± 29.5</td>
<td>114.5 ± 84</td>
</tr>
<tr>
<td></td>
<td>Qmax (mL/s)</td>
<td>11.48 ± 3.59</td>
<td>12.34 ± 7.05</td>
</tr>
<tr>
<td></td>
<td>Qave (mL/s)</td>
<td>2.75 ± 2.78</td>
<td>2.4 ± 1.9</td>
</tr>
<tr>
<td>EMG-cystometry</td>
<td>FS (mL)</td>
<td>96.75 ± 93.96</td>
<td>90.12 ± 75.5</td>
</tr>
<tr>
<td></td>
<td>FDV (mL)</td>
<td>179.7 ± 206.4</td>
<td>154.8 ± 149</td>
</tr>
<tr>
<td></td>
<td>SDV (mL)</td>
<td>199.25 ± 224.98</td>
<td>189.88 ± 168.9</td>
</tr>
<tr>
<td></td>
<td>MCC (mL)</td>
<td>214.25 ± 78.4</td>
<td>221.5 ± 186.4</td>
</tr>
<tr>
<td></td>
<td>MDP (cmH₂O)</td>
<td>62.95 ± 42.48</td>
<td>51.69 ± 39.9</td>
</tr>
<tr>
<td></td>
<td>Nr. contractions</td>
<td>3.9 ± 1.1</td>
<td>5.1 ± 3.4</td>
</tr>
<tr>
<td>Pressure-flow study</td>
<td>BC (mL/cmH₂O)</td>
<td>87.2 ± 130.36</td>
<td>52.7 ± 101.2</td>
</tr>
<tr>
<td></td>
<td>Qmax (mL/s)</td>
<td>1.25 ± 2.3</td>
<td>4 ± 6.79</td>
</tr>
</tbody>
</table>

Note: PTSD - posttraumatic stress disorder; GAD-7 - generalized anxiety disorder assessment; PHQ-9 - depression test questionnaire; Qmax - maximum flow rate; Qave - average flow rate; FS - first sensation of bladder filling; FDV - first desire to void; SDV - strong desire to void; MCC - maximum cystometric bladder capacity; MDP - maximum detrusor pressure; BC - bladder compliance; PVR - post-void residual urine volume.
Overactive bladder: correlation between urodynamic values and psycho-emotional indices in... – IVANOV et al

DISCUSSION

OAB is associated with decreased quality of life and is a cause of mood changes and anxiety. Women who suffer from OAB experience higher rates of anxiety and depression than the general population. In Melotti’s study, the authors demonstrated that 274 women with a confirmed diagnosis of OAB had severe or moderate depressive symptoms, which appeared in 59.8% of patients and severe or moderate anxiety was confirmed in 62.4% of patients.17 High scores of depression and anxiety were correlated with OAB severity. Similarly, in a study with 2,877 women aged 65 years or older, Sexton et al. found that depression was an important factor to the worsening of OAB symptoms.18 Another study found that patients with depression have worse OAB symptoms, and their quality of life is more seriously affected compared to those without depression.11,17,19

Anxiety and a history of gynecological surgery are factors associated with mild depression in older women with OAB syndrome.19

An epidemiological population-based study showed that nocturia is associated with increased prevalence of depression. Another important finding was that patients with severe depression had a higher nocturia score than those with mild depressive symptoms.17,19

Urgency, frequency, and UTI were found to be the most sensitive factors for predicting DO (61.0%) in female patients. DO is a “later form” of BO since a patient in the DO group is older and has a higher degree or frequency of UTI. First desire to void (FDV) was significantly smaller in the BO group in comparison with the DO group. Only two-thirds of OAB patients have DO and more than one-third of patients have a stable urodynamic trace without any abnormal increases in detrusor pressure with filling cystometry at a low filling rate. FDV may have a good predictive value for detecting DO at a low filling rate.2

The most striking feature of bladder dysfunction in depression/anxiety was OAB. Urodynamics in those patients showed increased bladder sensation, that most probably reflects depression/anxiety, in which biological changes can occur, particularly in brain areas associated with emotion (amygdala, hippocampus, hypothalamus, and medial prefrontal cortices).20

Our study included only women, because of the higher incidence of experiencing OAB symptoms and association often with urinary incontinence. Also, factors such as menopause, age and acute UTI may increase a woman’s risk of experiencing OAB. Women suffering from OAB symptoms live with a debilitating condition that greatly affects their psychological well-being and quality of life. The correlation between anxiety and worsening of OAB symptoms concludes that the control of psychological symptoms may be a target for future treatment.

CONCLUSIONS

This study that compared the psychometric parameters with clinical and urodynamic results revealed an association between anxiety, mood changes, indices of posttraumatic stress, and DO values. Mild and moderate changes of mood and anxiety are prevalent in women with OAB and correlate with the severity of OAB symptoms, detrusor overactivity, and quality of life. The correlation between anxiety and worsening of OAB symptoms confirmed that the psychological symptoms’ control may be a target for future treatment.
Author Contributions:

Compliance with Ethics Requirements:
“The authors declare no conflict of interest regarding this article”
“The authors declare that all the procedures and experiments of this study respect the ethical standards in the Helsinki Declaration of 1975, as revised in 2008(5), as well as the national law.”
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REFERENCES