Particular Aspects of the Overactive Bladder Syndrome in Patients with Gynecological History

I. Ciofu[1,2], I. Ceausu[1,2], C. V. Poalelungi[1,2], B. Buzescu[3], R. Cartas[1,3], C. Persu[1,3]

[1] "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania
[2] "Dr. I. Cantacuzino" Clinical Hospital, Department of Obstetrics and Gynecology, Bucharest, Romania
[3] "Prof. Dr. Th. Burghele" Clinical Hospital, Department of Urology, Bucharest, Romania

ABSTRACT

The overactive bladder syndrome (OAB) is defined by urinary urgency, usually with urinary frequency and nocturia, with or without urgency urinary incontinence. It greatly affects the quality of life, sleeping, self-esteem and social relationships of the patients, and is a huge burden for the public health system.
Although it affects both men and women, women tend to have a higher prevalence of symptoms. Since an important part of the female population is known to have relevant gynecological history, we present the most common conditions and their relationship with OAB – pelvic organ prolapse, childbirth and total and radical hysterectomy. We present up to date information that should prompt adequate patient counseling regarding the risk of OAB development, worsening or improvement associated with their primary condition or treatment.

Key-words: childbirth, OAB, pelvic organ prolapse, radical hysterectomy, total hysterectomy, subtotal hysterectomy

Correspondence to:
Dr. Cristian Persu M.D.
"Prof. Dr. Th. Burghele" Clinical Hospital, Department of Urology
20 Panduri St., district 5, code 061344, Bucharest, Romania
Tel: +40214106910
e-mail:cristian.persu@umfcd.ro

INTRODUCTION

The overactive bladder (OAB) syndrome is defined by the International Continence Society as urinary urgency, usually with urinary frequency and nocturia, with or without urgency urinary incontinence [1]. Its prevalence in general population ranges from 11.8% to 35.6% according to large scale studies. When taking into consideration the gender of the patients, several conclusions were noted. The prevalence seems similar between men and women, symptoms increase with age in both genders, and it affects quality of life, sleeping and general mental health. OAB symptoms rarely appear isolated, so most of the patients present with a combination of symptoms. However, women seem to have a higher prevalence of urge incontinence, but also urgency, frequency, and nocturia than men [2].

This condition is a huge burden for patients and public health care and will get more significant in the future, considering the ageing population. The prevalence is likely underestimated at the moment because of social and cultural factors, as well as a lack of awareness that treatment is available [3]. The etiology and pathogenesis of OAB is still unclear and many theories have been proposed to explain symptoms and to guide treatment options.

An important segment of population affected is comprised of women with obstetric and gynecological history. Condensing existing information regarding the relation between their primary condition and OAB could influence decision making and lead to better management of these cases. We present data concerning four of the most common topics – pelvic organ prolapse, childbirth, and total and radical hysterectomy.

MAIN GYNECOLOGYCAL CONDITIONS BEHIND OAB

Pelvic organ prolapse (POP) is strongly associated with OAB. Community-based studies found OAB frequency in POP patients to be between 22.5% and 52.0%, while hospital-based studies found frequencies of up to 88% [4].

One of the most debated aspects is whether there is a relation between OAB development and compartment-specific defects. Studies performed on these patients reached conflicting conclusions. Ellerkmann et al. studied 237 women with all ranges of POP stage and evaluated them clinically, but also performed questionnaire assessments of condition-specific symptoms and quality of life. Two-thirds of the women complained of frequency and urgency. In the subgroup with urinary incontinence, 5% reported only urge incontinence and 76% reported a combination of both urge and stress incontinence. However, the symptoms do not necessarily correlate with specific compartment defects and the severity of POP is only weakly to moderately associated with urinary symptoms [5]. On the other hand, Karjalainen et al. studied 2933 women with POP, performed specific surgery and analyzed OAB symptoms before and after. After grouping patients into two groups, one with patients undergoing anterior/apical and the second only posterior compartment interventions, the study team found a strong relation between OAB symptoms and anterior/apical compartment defects. This group started with worse symptoms and experienced greater improvement after surgery [6]. Kinno et al. even performed imaging testing on 118 patients to find anatomical particularities that could explain the relation between POP and OAB and the pathophysiological mechanisms involved. Analysis of dynamic magnetic resonance imaging showed coexistence of the two conditions in patients with levator ani impairment and defective supports of the apical compartment. Moreover, the severity of the symptoms does not seem to be related to pelvic organ mobility and support [7].

However, Burrows et al. studied urinary symptoms, bowel and sexual function on 330 patients with POP and linked POP severity and certain bladder symptoms. Advanced POP is more likely less associated with stress urinary incontinence, patients with stress urinary incontinence have a median of 5 cm less prolapse, while patients with urgency and urge incontinence have also a lower degree of prolapse, with a median of 3 cm or less [8].

The pathophysiology behind these conditions is not yet clear. The most widely accepted theory

states that POP causes bladder outlet obstruction, leading to partial bladder denervation. The hypoxic tissue has increased sensitivity to acetylcholine (Ach) and marked cell membrane instability causing depolarization of cells that no longer activate synchronously because of impaired cell-to-cell propagation. Other mechanisms rely on stretch receptors in the urothelium that release ATP, Ach and P2X3 and trigger detrusor contractions [4].

Another step in investigating the relation between POP and OAB is analyzing whether treating the primary condition, POP, results in OAB symptoms change. De Boer et al. reviewed all the existing studies up to 2009 that could shed some light into the causal relationship between the two conditions. They found that treatment of POP with pessaries improved both urgency and urge incontinence. In practically all studies they found that treatment with either surgery or pessaries leads to an improvement of OAB symptoms [4]. In a more recent study, Karjalainen et al. also showed improvement in symptoms after any vaginal compartment repair – bothersome frequency resolved in 82% of the anterior/apical compartment subgroup, and in 63% of the posterior compartment subgroup; bothersome urge urinary resolved in 75% and 61% respectively in the two subgroups. Furthermore, the symptoms present after surgery had comparable severity for both subgroups [6]. However, reported de novo cases raise questions regarding the real benefit of the treatment. De novo bothersome OAB symptoms after surgery are estimated to appear in 5-13.5% of the patients [9, 10].

Childbirth and delivery mode have always been a hot topic regarding their role in pelvic floor disorders. Since no large longitudinal, RCT study has been done so far, we rely on results from smaller scale studies that have conflicting results in some aspects. There is a consensus that Cesarian sections are protective of pelvic floor disorders compared to vaginal deliveries and especially operative ones [11]. There also seems to be no difference after 5-10 years between C sections performed before labor, during labor or at complete cervical dilation [12].

Blomquist et al. enrolled 1528 women 5 to 10 years after giving birth. They were followed up annually for 9 years and were divided in three groups, depending on delivery type – spontaneous vaginal birth, operative vaginal birth and C section. The 15-year cumulative incidence for OAB after first delivery was 21.8%. For OAB alone, the adjusted hazard ratio for C section compared to vaginal delivery was 0.51 [13].

Handa et al. also followed up women at 5-10 years after delivery. The 1011 enrolled women were grouped as following – spontaneous vaginal birth, operative vaginal birth, C section without labor, C section during active labor and C section at complete cervical dilation. They analyzed pelvic floor disorders in relation to mode of delivery, including OAB. They found OAB adjusted relative odds of 0.74-1.17 for C sections, 1.66 for vaginal births and a remarkable 4.89 for operative vaginal births [12].

In another study performed by Handa et al. they analyzed only vaginal births in order to investigate possible associations between pelvic floor disorders and episiotomy, perineal laceration and operative deliveries. The participants were also enrolled at 5-10 years after giving birth and were then assessed for stress incontinence, OAB, anal incontinence and POP. OAB affected 10% of the participants. The adjusted relative odds for OAB after vacuum delivery was 1.76 for forceps delivery, however, it was 2.92 at 5-10 years. Episiotomy did not have an impact on any pelvic floor disorder [14].

Brummen et al. enrolled 344 women one year after first delivery and measured bothersome lower urinary tract symptoms. Bothersome urge urinary incontinence was reported by 58 patients (16.9%) during pregnancy and was still present in 51 (14.8%) of them one year after delivery. They found that C section could be protective for bothersome stress urinary incontinence, but urge urinary incontinence has a higher incidence compared to spontaneous vaginal delivery, at least for the first year. However, their results are not statistically significant [15].

Some authors reported no relation between parity and OAB/urgency [16], while others found higher prevalence of urgency in parous women [17].

The pathology behind OAB in regard to childbirth is not clearly understood, but the mechanism seems to differ from those of OAB in nulliparous women. When comparing nulliparous women with women that underwent vaginal birth or C section, Fang et al. found abnormal voiding patterns in 65.16% of the nulliparous women compared to parous women (38.0% and 42.11%) and higher prevalence of detrusor overactivity in nulliparous women (69.68%) compared to parous women (46.41% and 48.25%). Although the etiology of OAB is not clear, it seems that the hypertonicity of the pelvic floor muscles and compensative detrusor overactivity are characteristic to nulliparous patients and might not play a role in parous patients [18]. Sultan et al. advocate for pudendal nerve damage associated with both labor and vaginal delivery [19].

Total hysterectomy is one of the most common gynecological interventions and is usually done for benign pathology. Meta-analysis shows a 30% increase in urinary incontinence odds after hysterectomy, but whether it is a risk factor overactive bladder is still under debate. Von der Vaart et al. studied urge and bothersome urge incontinence in 1626 women. The adjusted odds of urge incontinence were 1.9, while the adjusted odds for bothersome urge incontinence were 2.6 after hysterectomy [20].

Diez-Itza et al. investigated de novo OAB in 217 patients who underwent vaginal hysterectomies for POP. No patient had OAB symptoms prior to surgery. De novo OAB was diagnosed in 43 patients (19.8%), with a median time of onset of 3 months. Urge urinary incontinence was reported in 28 patients (12.9%). An even greater risk of developing de novo OAB was noted for patients with concomitant stress urinary incontinence [21].

Very common indications for hysterectomy are uterine fibroids and adenomyosis. Yuk et al. performed a large study on 2 groups of patients – the first comprised of 58195 women who underwent hysterectomy for fibroids/adenomyosis, and the second, the control group, with 58195 women. They were followed up for 8 and 7.9 years, respectively. By defining OAB only by prescription of specific drugs for more than 1 month, they found no difference in OAB development rate between hysterectomy and control groups (0.3% and 0.3%). There was also no difference when comparing the control group with subgroups based on adnexal surgery performed during hysterectomy [22].

There are also studies who addressed the differences between hysterectomy techniques. Aleixo et al. compared total and subtotal hysterectomy results in terms of risk for stress and urge urinary incontinence, frequency, POP and incomplete bladder emptying. After analyzing results from four studies, with a total of 566 women enrolled and follow-up ranging between 5 and 14 years, they reported that total hysterectomy bears a lower risk than subtotal hysterectomy for stress urinary incontinence, but there is no difference in the long term for frequency or urge urinary incontinence [23]. Andersen et al. followed up 197 women who underwent either total or subtotal hysterectomy for 14 years. While their study also showed a higher relative risk for stress urinary incontinence in the subtotal hysterectomy group, there was no difference on any other lower urinary tract symptom between the two surgical approaches [24].

Palsson et al. addressed the hypothesis that the hysteroscopic approach of the abnormal uterine bleeding or fibroids could bear a lower risk for LUTS. They compared a group of 3618 women who underwent hysterectomy with a group of 238 women who underwent hysteroscopic treatment for the same indications. The authors did not find statistically significant differences in LUTS development between hysterectomy and hysteroscopic interventions. There was also no significant difference when taking into account the hysterectomy approach – abdominal, vaginal or laparoscopic. However, out of the group of women with a larger uterus 85.5% reported relief of urinary urgency postoperatively [25].

Although there are no clear theories about the mechanisms of LUTS development after hysterectomy, the theory of trauma inflicted during surgery seems less plausible considering the lack of difference between total and subtotal varieties and the lack of injury to bladder vascularization and other neuroanatomical structures, as per Smith et al. [26]

Radical hysterectomy is performed for gynecological cancers, especially cervical cancer. It is part of the treatment, along with radiotherapy and chemotherapy. Bladder dysfunction rates after surgery are up to 70% for the classical surgical approach [27]. Due to its mechanisms of development, these cases are actually considered neurogenic bladders.

Chou et al. performed a large study with 39793 participants that were diagnosed with cervical cancer. They compared the 17936 women who underwent radical hysterectomy with the 17936 that did not undergo surgery. The incidence of neurogenic bladder was 3.3% after surgery compared to 2.76% in the non-surgery group. The adjusted hazard ratio of neurogenic bladder for the hysterectomy group was calculated to be 1.2 [28].

Scotti et al. found the adjusted odds ratio for urge urinary incontinence after radical hysterectomy done for cervical cancer to be 5.5. Combining it with radiotherapy, the odds ratio rose to 8.0 [27]. However, Nakayama et al. analyzed a group of 145 patients who underwent surgical treatment and found that while before surgery 4.8% (7 patients) had OAB, the rate rose to 13.1% (19 patients) after undergoing hysterectomy. Out of the 19 patients with OAB symptoms, 15 were de novo OAB cases [29].

The etiology of the neurogenic bladder is related to nerve damage done during dissection of the parametrium and uterosacral ligaments. Damage to the hypogastric nerve leads to dominance of the parasympathetic pelvic nerve. The imbalance between sympathetic and parasympathetic innervation results in functional disturbances such as OAB symptoms [29]. Nerve-sparing procedures and less radical parametrectomy techniques have been developed and studies showed positive effects on bladder function without causing oncological safety concerns [30, 31].

However, one should also take into account the added effect of the radiotherapy on the bladder function of these patients. Post-irradiation bladder syndrome accounts for urinary urgency, incontinence and pollakiuria and is clearly excluded from the OAB definition. In a study performed on 271 consecutive patients, Jaszczynski et al. found that these cases respond to anticholinergic drugs (solifenacin) with a decrease in urgency, incontinence, pollakiuria and nocturia [32]. More, some infectious diseases might worsen or even compromise the results of such treatments and this needs to be considered and discussed with the patient upfront [33].

CONCLUSIONS

Although the etiology of OAB is not always clear, there is enough evidence from large scale studies regarding the prevalence, evolution, risk factors and also its relation to other conditions. These data should prompt proper patient information about treatment for the primary pathology and whether it might improve, worsen or promote development of OAB and LUTS. This particular segment of population would benefit from individualized treatment plans when considering surgery or treatment for pathologies with known relation with the lower urinary tract.

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