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The Intersection of Female Sexual Function and Overactive Bladder

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Abstract

Purpose of Review In this review, we discuss the available literature regarding the intersection of female sexual function and overactive bladder (OAB). Specifically, this review includes how OAB and its treatments affect female sexual function and quality of life.

Recent Findings Women suffering from overactive bladder have worse sexual function, and there are multiple prospective studies evaluating sexual function before and after overactive bladder treatment.

Summary There is a growing body of evidence demonstrating that traditional overactive bladder treatments not only improve OAB but can also improve sexual function.

Keywords Overactive bladder · Female sexual health · Sexual dysfunction · Urinary incontinence

Introduction

Over 34 million people in the USA suffer from overactive bladder (OAB) [1]. In 2001, it was estimated that 16.6% of women over the age of 40 suffer from OAB, and the symptoms worsen with time [2]. Undoubtedly, the actual prevalence of OAB in the aging female population is much higher likely due to the reluctance of many women to seek medical attention.

The International Urogynecological Association (IUGA) and International Continence Society (ICS) define overactive bladder (OAB) as the presence of "urinary urgency, usually accompanied by frequency and nocturia, with or without urgency urinary incontinence (UUI), in the absence of UTI or other obvious pathology" [3]. The sequelae of overactive bladder such as impaired quality of life and decreased work productivity can be extremely bothersome and debilitating [4, 5]. OAB symptoms worsen with age, and although the exact etiology of this is unknown, OAB symptom severity has been shown to accelerate when a woman is in her 60s [6].

One of the most common, and yet infrequently discussed, side effects of OAB is female sexual dysfunction (FSD) [7]. Similar to OAB, risk factors for developing FSD are increasing age and hormone deficiency. Approximately 25% of women will be caught in the intersection of female sexual function and OAB, although the actual prevalence may be higher [8, 9]. In this review, we will discuss the most recent data regarding the relationship between OAB and sexual function.

OAB: Impact on Quality of Life and Sexual Function

The full impact of OAB on sexual function is unknown, but it is known that OAB has a negative effect on quality of life (QOL). This in turn translates into impaired sexual function and QOL that worsens in parallel with OAB symptom severity. More severe urinary incontinence (UI) and OAB symptoms have been associated with increased sleep disturbance, fatigue, depression, and inferior psychosocial health [10, 11]. Undoubtedly, these symptoms can directly affect a woman's normal sexual function due to both disturbances in energy and overall mood. Prior focus groups illustrated that women with OAB suffer from embarrassment from their incontinence and resultant loss of self-image which impacts their sexual health. They also have difficulty achieving orgasm due to fear of incontinence, pain, or anxiety related to intercourse [5]. In

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fact, when comparing sexual satisfaction scores among women with and without OAB, the scores of women with OAB were significantly lower than their matched cohorts without OAB [12]. Additionally, prior studies have demonstrated that the severity of urinary urgency and urge UI are most associated with FSD [13, 14••].

OAB and Coital Incontinence

Incontinence itself can have significant effects on a woman's QOL, both during day-to-day activities and sexual activity. Sixty percent of women with UI report having coital incontinence [15]. Coital incontinence can be associated with both stress urinary incontinence (SUI) and detrusor overactivity, although some studies report that coital incontinence is more common with SUI [16, 17]. Prior reviews have suggested that UI associated with OAB symptoms is more bothersome than with SUI [18]. Furthermore, urinary urge incontinence has also been found to have a significant effect on partner sexual satisfaction [13]. It is a logical presumption that the reported decrease in partner satisfaction is related to a woman's attitude, potential embarrassment, and reduced inclination to participate in sexual activity as a result of her UI.

OAB and the Female Sexual Function Index

Women suffering from OAB have been found to have lower Female Sexual Function Index (FSFI) scores than matched cohorts, controlling for age, parity, and menopausal status [12]. Taking a closer look at FSFI domains in women suffering from OAB with and without incontinence (OAB-wet versus OAB-dry), one study by Lin et al. found that the scores for desire, lubrication, orgasm, sexual satisfaction, and pain were similar between the two groups; however, the OAB-wet group had higher arousal scores than OAB-dry [19]. The difference in arousal score between OAB-wet and dry groups suggests that UI itself is not directly associated with female arousal, but that OAB in general is associated with FSD. They also found a significant difference in FSFI scores in women who had mild, moderate, or severe OAB symptoms ($p < 0.05$), with more severe symptoms reflecting worse FSFI scores.

Menopause, OAB, and Female Sexual Function

Menopause is defined as the absence of menstrual periods for twelve consecutive months due to a decline in estrogen levels [20]. Hormone therapy in postmenopausal women has been shown to significantly improve sexual function, including orgasm, pain, and lubrication [21, 22]. Additionally, OAB symptom severity decreases with the use of vaginal estrogen in postmenopausal women with atrophy [23, 24•].

Given that menopause in itself is a known risk factor for sexual dysfunction, and OAB severity worsens with age, it seems intuitive that postmenopausal women with OAB would have a worse QOL compared to their premenopausal counterparts. A study by Juliato et al. specifically evaluated this in a cross-sectional study of 267 women with a diagnosis of OAB [25]. FSFI and ICIQ-OAB (International Consultation on Incontinence Questionnaire Overactive Bladder) scores were compared and they found that two-thirds of all women with OAB were at risk for sexual dysfunction, and 86.2% of postmenopausal women (compared to 65.6% premenopausal) were at risk for FSD [25]. Interestingly, they found that only the postmenopausal cohort had a statistically significant correlation between higher OAB scores and risk of FSD.

As menopause is a risk factor for both sexual dysfunction and OAB due to hormonal deficiency and OAB is also an independent risk factor for sexual dysfunction, then consideration should be given to prescribing both vaginal estrogen and an OAB treatment to menopausal women. To this point, Chugtai et al. reported on improved OAB symptoms and sexual function in postmenopausal women when treated with fesoterodine and vaginal estrogen [26].

OAB Treatment and Effects on Sexual Function

Given that OAB is an independent risk factor for FSD, many studies have focused on how treating a woman's OAB may help resolve her associated sexual dysfunction. The American Urological Association guidelines for the treatment of OAB include first-, second-, and third-line therapies. First-line treatments for OAB include conservative options such as behavioral modification and pelvic floor physical therapy (PFPT). Second-line therapy for OAB is oral medication including anticholinergic and beta-3 agonist medications. Third-line therapies include neuromodulation (posterior tibial and sacral nerve stimulation) and detrusor onabotulinumtoxinA injections [27]. Although some study results may show a stronger or weaker association between OAB treatment and FSD, ultimately there do not appear to be any negative side effects on sexual dysfunction as a result of treating OAB.

Behavioral Modification

There is no literature specifically addressing behavioral changes for OAB and their effect on FSD. Behavioral modifications for OAB can include bladder training with urge suppression, weight loss for reduced incontinence, reducing

fluid intake, and limiting bladder irritants such as caffeine [27]. Improvement in OAB symptoms with these techniques can improve the overall quality of life, and this would presumably improve sexual function as a result.

Pelvic Floor Muscle Training

Pelvic floor muscle training (PFMT) can be used to treat a variety of pelvic floor disorders including OAB. PFMT helps strengthen the pelvic floor, which in turn suppresses the sensation of urinary urgency. The mechanism of urge suppression has been theorized as the following: a sustained pelvic floor muscle contraction results in a decrease in detrusor pressure, with concurrent increase in urethral pressure, preventing internal sphincter relaxation, and subsequent suppression of the micturition reflex [28]. Strengthening of the pelvic floor musculature with PFMT has also been shown to be helpful in women with sexual dysfunction, especially in the postmenopausal cohort who suffer from pelvic floor muscle weakness [29]. Therefore given that OAB is more common in the postmenopausal population, PFPT is an excellent treatment modality to treat both OAB and FSD.

Celenay et al. performed a randomized-controlled study to specifically evaluate the effect of PFMT on FSD and urinary symptoms in women with OAB. The randomized, intervention arm of the study was required to perform pelvic floor muscle strengthening exercises daily for 6 weeks at home, with a once weekly clinic check in with a physical therapist. They found a significant decrease in OAB symptom scores and a significant increase in Female Sexual Function Index (FSFI) scores in all domains except lubrication in the intervention group. Therefore, PFMT can be an effective treatment in women with OAB and FSD, but it requires patient engagement with a pelvic floor physical therapist and personal motivation to continue performing exercises.

In addition to PFMT indirectly improving sexual function by improving OAB, PFMT can improve sexual function directly by increasing pelvic floor strength. Sartori et al. evaluated 140 healthy, continent women age 30 years and older and showed a correlation between the level of sexual activity and orgasm with pelvic floor muscle endurance [30].

OAB Medications

Many studies have been performed evaluating the effects of OAB medication on sexual function. We will highlight some of the most recent reviews. Due to the inherent availability of anticholinergic medications, numerous studies have focused on the relationship of these medications and their effects on sexual function. One study by Zachariou and Filiponi found that tolterodine ER 4 mg once daily had a significant improvement in FSFI scores in their prospective study compared to their control group [31]. A more recent study by Lin et al. prospectively evaluated women with OAB-wet and dry treated with tolterodine 2 mg twice daily for 3 months [19]. Compared to the control group, FSFI scores improved significantly after a 3-month introduction of tolterodine, and the arousal score in the OAB-wet group was significantly increased compared to OAB-dry. Cakir et al. prospectively reviewed the effects of tolterodine, darifenacin, solifenacin, propiverine (ER) and (IR), and fesoterodine on sexual function among 216 patients with OAB and 165 controls [32•]. They found that over 85% of participants had clinically relevant increase in sexual function, and there were no significant differences in efficacy among the different medications. The combination of daily fesoteridine and vaginal estrogen for 12 weeks has been shown to improve sexual quality of life compared to fesoteridine alone, although not significantly ($p = 0.098$) [26]. Mirabegron 50 mg, a beta-agonist, has been shown to improve overall sexual function with significant FSFI score changes in both pre and postmenopausal women after 3 months of treatment [33•].

A prospective, multicenter cohort study by Polland et al. specifically compared beta-agonists to anticholinergics and the effects on sexual function after 12 weeks of therapy [34••]. Although their follow-up was limited to ninety-one patients (which did not meet the study power criteria), they found that postmenopausal women in the beta-agonist group had significantly better overall FSFI scores than women in the anticholinergic group. In fact, there was worse arousal scores in the anticholinergic cohort. This is a key finding, as anticholinergics can have a drying effect on mucosal tissue.

Overall, studies have demonstrated that both beta-agonist and anticholinergic medications can improve sexual function in women suffering from OAB.

Neuromodulation

Neuromodulation is one of the third-line therapies recommended for OAB. Neuromodulation involves either tibial nerve or sacral nerve stimulation. Although there are limited studies evaluating neuromodulation for FSD and OAB, the results are promising.

Percutaneous Tibial Nerve Stimulation (PTNS)

PTNS is a minimally invasive neuromodulation treatment option for patients with refractory overactive bladder and non-obstructive urinary retention. PTNS indirectly stimulates the sacral plexus through the tibial nerve, which can be used to treat pelvic floor dysfunction [35]. Prior studies have demonstrated an improvement in sexual function in women suffering from OAB who have been treated with PTNS [35]. However, based on a review of the published literature, it is

unclear if PTNS directly effects FSD through stimulation of the sacral nerve plexus, or if treatment of OAB symptoms with PTNS accordingly improves sexual health.

Sacral Nerve Stimulation (SNS)

Similarly, there is a growing body of research evaluating the effects of SNS on FSD in women who suffer from OAB. However, these studies have been in small, underpowered cohorts of women suffering from lower urinary tract symptoms [36–39]. The pathophysiology of SNS is not completely understood, but studies have shown that SNS modulates large afferent nerve fibers of the bladder and can even modulate midbrain and cortical activity [40, 41]. Therefore, improved sexual function after SNS may be a result of afferent pelvic nerve stimulation leading to cortical changes or simply a result of local nerve modulation [42••]. One theory is the improvement of symptoms due to alterations of the pudendal nerve. Parnell et al. measured pudendal nerve latencies before and after SNS placement and found an improvement in speed ($p = 0.198$) after implant placement [43]. Although there are observational studies published with reported changes in sexual function after SNS, more research is needed to better evaluate the effects of SNS on women with FSD, without concomitant bowel or bladder dysfunction.

Intravesical OnabotulinumtoxinA

Intravesical onabotulinumtoxinA is a well-proven third-line treatment for patients suffering from OAB. There are a few studies that demonstrate the positive effects of intravesical onabotulinumtoxinA on sexual function. Miotla et al. conducted a prospective study evaluating fifty-six patients with OAB unresponsive to medications treated with 100 units of onabotulinumtoxinA and compared them to age-matched controls [44]. All patients in the study group resumed sexual activity within a month of treatment and over 90% have improvement in FSFI compared to baseline values. Balzarro et al. evaluated thirty-two women and found overall improvement in FSFI with 100 units of Botox, but there was no significant improvement in desire and pain scores [14••]. Similarly, Giannantoni et al. evaluated thirty-one patients with multiple sclerosis treated with 100 units onabotulinumtoxinA, and also found significant improvement in FSFI domains except for pain scores. In their study, patients with persistent incontinence after Botox had worse FSFI scores [45]. Overall, the results of onabotulinumtoxinA treatment for this patient cohort are promising, but the pooled number of participants in these prospective observational studies is only 119. Larger cohort studies are needed to specifically evaluate the relationship between FSD and onabotulinumtoxinA treatments.

Experimental Treatments

There is a growing body of literature evaluating vaginal lasers for SUI, but the data for OAB is scarce. One study by Lin et al. evaluated thirty patients with mixed incontinence who received Erbium:YAG laser treatment, and they specifically focused on OAB symptom improvement [46]. OAB symptom severity scores, especially urinary frequency, were significantly improved at 3-month follow-up, but the results were not sustained at 12-month follow-up.

Transvaginal electrical stimulation (TES) is thought to strengthen the pelvic floor and has been shown to be beneficial for women with mild forms of incontinence, both stress and urge. One study by Guiseppe et al. showed improvement in FSFI scores with the use of TES twice weekly for 15 to 30 min for a total of 3 months in women with UI, but more data specifically on women suffering from OAB is needed [47].

Conclusion

The prevalence of both FSD and OAB are likely underreported. As such, the number of aging women who find themselves at the intersection of FSD and OAB is likely much larger than presumed. There is a growing body of literature supporting the use of standard OAB treatment pathways to improve sexual function in this cohort of women. We believe that physicians need to engage their patients on the topic of sexual function and satisfaction, especially when they have underlying OAB.

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Data Availability N/A.

Declarations

Conflict of Interest Dr. Shoureshi and Eilber declare that they have no conflict of interest. Dr. Eilber is a speaker Abbvie, consultant for Boston Scientific, investigator, and speaker Coloplast, outside the submitted work.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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- •• Of major importance

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