

Treating Women's Incontinence: A Review of the Literature and Recommendations for Practice

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Abstract

Urinary incontinence is common and nurse practitioners are often the first professionals to evaluate and treat this condition. A growing body of literature exists that supports non-surgical treatment approaches for women with stress, urge, and mixed incontinence. This article reviews the existing literature regarding non-surgical treatment of incontinence in women, including behavioral therapies, pharmacologic interventions, self-care strategies, and prevention. Recommendations for practice are also included.

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INTRODUCTION

Urinary incontinence (UI) is involuntary loss of urine sufficient to be a problem [1]. At any age, women are twice as likely as men to suffer from UI [2,3]. Although it is generally accepted that the prevalence of incontinence increases with age [4,5], advanced practice nurses (APNs) are likely to encounter women of all ages with UI [6,7,8,9,10] and are in an ideal position to effectively manage incontinence with non-surgical interventions [11]. The purpose of this article is to review the existing literature regarding non-surgical treatment strategies and to make recommendations for primary care of women who suffer from UI.

REVIEW OF THE LITERATURE

The literature regarding non-surgical treatment options for UI in women generally falls into three categories: behavioral techniques, pharmacologic measures, and self-care strategies. Moreover, most literature is concerned with three of the established subtypes of UI; stress, urge, or mixed UI. Subjectively, stress UI is usually described as urine loss

during activities that increase intra-abdominal pressure. The most common cause of stress UI in women is urethral hypermobility, however in some cases, an intrinsic urethral sphincter deficiency (ISD) is responsible for the symptoms [12]. Individuals usually describe urge UI as urine loss accompanied by a strong desire to void. This subtype of incontinence is most often associated with involuntary contractions of the detrusor muscle (located on the inside of the bladder), and is sometimes referred to as detrusor instability (DI). When individuals present with symptoms of both stress and urge UI, the incontinence is called mixed.

Some articles separate women by menstrual status, however the majority address a wide range of ages and a variety of interventions. In addition, the literature includes important information regarding health promotion and prevention of UI. Although it is outside the scope of this article, it is assumed that the APN performs a basic assessment (e.g., a focused history and physical examination, urinalysis [and if infection is suspected, a urine culture], and post void residual urine) prior to initiating treatment or referral [12,13].

BEHAVIORAL TECHNIQUES

In general, behavioral techniques including pelvic muscle re-education (Kegel exercises; pelvic muscle exercises) and bladder retraining effectively reduce UI without adding significant side effects [12]. Thus, these techniques are often recommended as a first choice for therapy in women with stress, urge, and mixed UI.

Pelvic muscle exercises (PMEs) are performed to strengthen

the voluntary periurethral and perivaginal muscles (e.g., the pubococcygeus muscle) [14,15], and are often recommended for stress UI associated with urethral hypermobility [16,17,18]. Benvenuti, et al [16] studied 26 community-dwelling women (ages 36-65; mean age, 50.8 years) during three months of PME therapy. Although this was an uncontrolled study, all of the women were “improved” and seven reported being “cured” of their UI. Bo, et al [17] randomized 52 women (mean age, 45.9) with stress UI into two groups. Group I received PME instructions and exercised on their own at home; Group II received the same instructions, but in addition, met with a trainer for 45 minutes once a week for six months. Group II reported significantly higher cure and improvement rates, underscoring the importance of continued follow-up and encouragement for women who are using PME to treat stress UI. In a unique study, Wells, et al [18] used a randomized design to compare the effects of PME or pharmacologic treatment for stress UI in 157 community-dwelling women over age 55. Despite different sites of action, treatment outcomes (e.g., subjective, and self-recorded data) were equally satisfactory in both groups. For postmenopausal women, PME can be as effective as pharmacologic therapy for treatment of UI, and can be initiated by APNs.

Biofeedback can be useful in assisting women who have difficulty identifying the correct muscle for PME, or as a means of improving extremely weak muscles. Biofeedback usually involves a measurement of both pelvic and/or abdominal tracings that are visible to the patient, thus providing “feedback” about the effectiveness and identification of the pelvic floor muscles. Burgio, Robinson, & Engle [19] studied 24 women (ages 29-64) with stress UI and found that biofeedback was more effective than verbal instruction in PME during pelvic examination. In another study, Burgio, Whitehead, and Engle [20] evaluated biofeedback in elderly (ages 60-86) women (n = 30) and men (n = 9) with stress or urge UI. The authors concluded that behavioral therapies (including biofeedback) were successful in treating UI in this population. Similarly, McDowell, et al [21] used an interdisciplinary, behavioral approach to treat mixed, stress, and urge UI in elderly (ages 56-90), community-dwelling women (n = 27) and men (n = 2). A combination of biofeedback, PMEs, and other non-medical strategies resulted in significant reductions in episodes of UI.

Vaginal weights that strengthen the pelvic muscles can also be used to augment PME. Weights of the same size but

increasing weight are retained in the vagina by contracting the pelvic muscles, thereby allowing the woman sensory biofeedback to perform a pelvic muscle contraction when she feels the weight slipping out. The literature regarding the use of vaginal weights in pre-menopausal women with stress UI is quite positive.

Jonasson, et al [22] compared vaginal weight training to “traditional” PMEs in a group of 83 young women (ages 19-36; all post-partum). After a 12 week training period, those using vaginal weights had significantly stronger pelvic muscle strength than those performing PMEs without weights. In a preliminary, non-controlled study of 34 women (mean age = 47; 14 were postmenopausal) with stress UI, Wilson and Borland [23] reported significant subjective (68% improved) and objective (decreased daily UI, pad changes, and voids) findings in women using vaginal weights to augment PME. Although encouraging, the results are preliminary and vaginal weights continue to require further research, especially in postmenopausal women.

Electrical stimulation (e-stim) has also been used in conjunction with PMEs for treatment of stress and urge UI. This modality involves either a removable vaginal or anal probe, or surface electrodes that deliver stimulation to either the perivaginal/periurethral muscles (if the woman suffers from stress UI), the detrusor muscle (if urge UI is being treated) or both (for individuals with mixed UI). Two recent randomized controlled trials have been reported [24,25]. Sand, et al [24] studied 52 women with stress UI and evaluated both subjective and objective outcome criteria. After 12 weeks of either intravaginal e-stim (treatment) or use of a sham (control) device, those in the treatment group experienced significant objective improvements in UI episodes, leakage amount, and vaginal muscle strength. Those treated with the sham device did not experience any significant changes. Smith [25] compared e-stim with Kegel exercises in 18 women with stress UI, and e-stim versus an anticholinergic drug in 38 women with urge UI. In both instances, e-stim produced greater improvements than either the Kegel exercises (for stress UI) or anticholinergic therapy (for urge UI) groups, but not at statistically significant levels. However, the author concluded that e-stim is safe and effective for a large number of women with stress or urge UI, and in some cases, may be more desirable than Kegel exercises alone, or than drugs for treating urge UI.

Bladder retraining is used primarily to manage urge UI [12]. Fantl, Wyman, & McClish, et al [26] conducted a controlled,

randomized clinical trial of bladder retraining in 131 community-dwelling women over age 55. The bladder retraining protocol for subjects in the treatment group was based on techniques of behavior modification (e.g., learning to inhibit urges to void) in combination with a voluntary voiding schedule. Subjects with urge UI initially voided every 30-60 minutes; as the study progressed they used behavior modification and inhibition techniques to increase the intervals between voids. After treatment those who received bladder retraining had evidence of significantly fewer episodes of UI, less fluid loss, and fewer irritative symptoms (e.g., frequency, nocturia) than those in the control group. The magnitude of the effect was dependent on the severity of UI, but not on age.

In summary, behavioral techniques have few side effects, can improve control of detrusor and pelvic muscle function, and can be used in alone, or in combination with other therapies for the treatment of stress, urge, or mixed UI[12].

PHARMACOLOGIC MEASURES

Because the genital and urinary tracts share a common embryology and because high concentrations of estrogen receptors are found in the lower urinary tract and urethra, estrogen replacement therapy (ERT) is commonly used for the treatment of stress, urge, and mixed UI in postmenopausal women. However, the specific effects of ERT remain unclear as published research is inconsistent, and quite variable with regard to patient selection, diagnostic criteria, study design, interventions, follow-up, and outcome criteria [27,28,29,30]. Despite these limitations, a number of studies have shown subjective improvement in urinary symptoms in postmenopausal women. Ekerling and Goldman [31] studied 195 postmenopausal women with pelvic prolapse and stress UI. Subjects received a combination of intravaginal, intramuscular, and oral estrogen for up to one year. This is one of the early examples of the use of ERT as an alternative to surgery; many women did not require surgical intervention after ERT, and of those who did, operative results were excellent, presumably as a result of properly estrogenized tissues. Similarly, Schleyer-Saunders [32] studied the effectiveness of estradiol implants on dysuria and incontinence (n = 160). Seventy percent of the subjects reported a good or fair improvement in symptoms and surgical interventions were reduced. More recently, Samsioe, et al[33] used a double-blind, crossover design to test the effects of oral estriol (3mg/day for 3 months) in thirty-four, 75 year-old women. Subjectively, the effect of ERT was excellent in women with urge and mixed

UI, but not in those with pure stress UI.

Others have examined both subjective and objective outcome criteria. In 1977, 41 postmenopausal women with stress UI were treated with 2mg of oral estriol for two to four months [34]. At the end of the study, 34% noted subjective improvement in symptoms and 95% were objectively improved (e.g., an increased urethral pressure profile). None of the subjects were completely cured of their UI. Bhatia, et al [35] reported that intravaginal estrogen cream (2mg/day for 6 weeks) subjectively improved or cured 54% of the women studied (n = 11). Subjects who had a favorable response to ERT also had objective evidence of improvement including an increased urethral closure pressure (p<0.05) and a significant change in the maturation of urethral cells (p<0.02). Two additional studies examined women with stress UI who were treated with conjugated estrogens plus progestogens [36] or a transdermal estrogen patch [37]. Both studies reported significant subjective results however, only Sartori, et al [36] reported significant objective findings.

Finally, Fantl, et al [38] recently completed a randomized, placebo-controlled, double-blind study of 83 postmenopausal women with stress or urge UI. Over a three-month period, subjects received oral ERT (0.625mg) combined with medroxyprogesterone (10mg) cyclically. The investigators were unable to prove any subjective or objective improvement in UI as a direct result of the ERT however, they suggested that ERT may have an adjunctive role in the treatment of UI. For example, some investigators have found that ERT in combination with alpha-adrenergic agents significantly increases urethral pressure and decreases urinary leakage in postmenopausal women with stress UI [39,40,41].

Other medications used to treat stress UI include alpha-sympathomimetic agonists (e.g., pseudoephedrine; ephedrine) and tricyclic antidepressants (e.g., imipramine). These medications can improve the symptoms associated with stress UI because stimulation of urethral alpha receptors causes smooth muscle contraction and increases bladder outlet resistance [30]. (See Table 1)

Figure 1

Table 1: Pharmacologic Therapy for Stress Incontinence

Type of Drug	Name of Drug	Minimum/Maximum Dosage
1. Estrogen cream ^{*,†}	Conjugate equine estrogens (Premarin)	Initial: 1/2 - 1 applicator, 3X/week
	17 B-estradiol (Estrace)	Maintenance: 1/3-1/2 applicator, 1-2X/week
	Estropipate (Ogen)	
2. Alpha-sympathomimetic agonist	Ephedrine	25mg TID/50mg QID
	Pseudoephedrine (Sudafed, Actifed)	15mg BID/60mg QID
	Phenylpropanolamine Tablets	25mg BID/75mg QID
	Sustained release (Entex LA, Ornade Spansules)	75mg BID
3. Tricyclic antidepressant	Imipramine (Tofranil)	10mg BID/75mg BID

(revised with permission from: Weinberger, MW. (1995). Conservative treatment of urinary incontinence. *Clinical Obstetrics and Gynecology*, 38(1); 175-88.)

Medications commonly used for treatment of urge UI include anticholinergic drugs (e.g., propantheline bromide), and antispasmodic agents (e.g., oxybutinin hydrochloride), because they are thought to act on the detrusor muscle to inhibit DI. Imipramine is often used for women who suffer from mixed UI as it has both alpha-sympathomimetic and anticholinergic properties. (See Table 2).

Figure 2

Table 2: Pharmacologic Therapy for Urge Incontinence

Type of Drug	Name of Drug	Minimum/Maximum Dosage
1. Estrogen cream	*	*
2. Anticholinergic	Propantheline bromide (Pro-Banthine)	7.5mg TID/30mg QID
	Oxybutinin hydrochloride (Ditropan)	2.5mg daily/5mg QID
	Dicyclomine hydrochloride (Bentyl)	10mg BID/40mg QID
Antispasmodic	Hyoscyamine sulfate (Cystospaz, Cystospaz-M, Levsin, Levsinex, Levsid)	0.125-0.5mg TID-QID; or 0.375mg BID as extended release product
3. Tricyclic antidepressant	*	*
4. Calcium channel blocker	Nifedipine (Procardia)	10mg BID/20mg BID

(*Refer to Table 1; BID = twice daily; TID = three times daily; QID = four times daily)

(Revised with permission from: Weinberger, M.W. (1995). Conservative treatment of urinary incontinence. *Clinical Obstetrics and Gynecology*, 38(1); 175-88.)

In 1990, Tapp, et al [42] studied 37 postmenopausal women (mean age = 61) to determine the effectiveness of oxybutinin chloride on idiopathic DI. A double-blind, placebo-controlled, fixed dose (5mg QID), cross-over design was employed. Although the drug was significantly more

effective than placebo at reducing urgency (without leakage) and urge UI, the treatment group subjects experienced worrisome side effects including an increased residual urine. The authors concluded that although the drug was effective, reduced doses may be more appropriate for older women with urge UI.

In a study of mixed UI, Karram and Bhatia [43] compared the effects of medical (various combinations of oxybutinin, imipramine, and estrogen) versus surgical (retropubic urethropexy) therapies in 52 (ages 24-80) women. The investigators used a non-randomized, non-controlled, retrospective approach to compare the two groups with regard to cure, improvement, and failure rates. Despite design limitations, no significant differences were found between the two groups. Thus, the authors concluded that in some cases it is appropriate to manage UI medically prior to suggesting surgical intervention.

In summary, pharmacologic therapies offer women additional non-surgical options for the treatment of UI. Several medications have been proven to be beneficial, however as with all pharmacologic interventions, individual risk-benefit ratios must be considered prior to recommendation by the APN.

SELF-CARE STRATEGIES

Women employ a variety of self-care strategies to manage their incontinence [2,44,45,46,47,48]. These practices are often less than desirable and in some cases, may contribute to misdiagnosis or prolongation of UI. For example, in a study of both men and women in the United Kingdom, McKeever [49] found that non-compliance with diuretics and self-restriction of fluids were common, yet potentially detrimental to the individuals who used them.

Sandvik, Kveine, and Hunskaar [48] recently evaluated self-care practices of 187 older (mean age 75) and younger (mean age 51) community-residing women with stress and urge UI. Subjects reported self-care strategies that included those the authors classified as "controlled by the person" (e.g., frequent toileting, restricted fluids, special clothing) or "controlled by other" (e.g., PME, medications), and use of products including menstruation pads, incontinence products, plastic bedcovers, towels and toilet tissue. Two earlier studies reported similar strategies [45,46]. Norton, et al [45] discovered a wide variety of responses among a group of 201 women (ages 16-86) in the United Kingdom. These included: avoidance of fluids, wearing pads, avoiding public transportation, and decreasing lifting or carrying heavy

objects. Moreover, 25% of the incontinent women avoided people and 40% of them avoided sexual intercourse. In a study of exercise and incontinence Nygard, et al [46] found that women who experienced UI during exercise either stopped the exercise (20%), changed the way they performed the exercise (18%) or wore a pad during exercise (55%). The most recent study [44] examined self-care behaviors of 147 older women who lived in a rural community. Most (98.1%) used at least one self-care practice to manage their UI. These included locating or staying near a bathroom, voiding more often, or wearing a protective undergarment.

HEALTH PROMOTION AND PREVENTION

Ideally, health promotion and prevention should be the priority for APNs who practice in a primary care setting. However, controlled studies that document the success of preventative strategies are limited. In a recent study of the effects of cigarette smoking on stress UI, Bump et al [50] reported that smokers with stress UI were significantly younger than non-smokers with stress UI. Moreover, the authors go on to suggest that despite strong urethral sphincters, smokers are likely to experience stress UI as a result of greater increases in abdominal pressure with coughing. Thus, avoiding cigarette smoking may be an important strategy for prevention of UI.

Additional suggestions for possible preventative strategies have been described by three nurse authors [51,52,53]. Swaffield [52] suggests that “there are many opportunities...during a woman’s life for the nurse to introduce health education and preventative care to avoid incontinence”. She describes strategies during childhood (e.g., keeping toilet facilities clean), adolescence (e.g., incorporating UI into sex education talks), pregnancy and childbirth, menopause, and old age (e.g., teaching PME, avoiding smoking). Webb [53] reviewed UI in younger women and suggested 14 strategies to prevent UI in this population. These include evaluation and instruction in PME for both symptomatic and asymptomatic females; counseling regarding weight reduction and consistent bowel and bladder habits; treatment of symptomatic perimenopausal women with ERT; teaching proper lifting techniques to avoid abdominal strain; and discussing the potentially detrimental effects of alcohol and smoking on continence.

Finally, Palmer [51] developed a conceptual model for continence promotion and prevention. In her model, primary prevention strategies include public education regarding prevention of urinary tract infections, constipation, straining

and normal genitourinary function; environmental modifications such as adequate toilet facilities in public buildings; and caregiver education that stresses the importance of maintaining independence and the expectation of continence. Secondary prevention strategies include treatment with behavioral strategies and drugs; tertiary prevention includes knowledgeable use of equipment and supplies, and surgical therapies.

RECOMMENDATIONS FOR PRACTICE

Urinary incontinence in women can be effectively managed by APNs in a primary care practice [11,54,55]. Based on the literature, the following are recommendations for practice:

1. Ask every woman about the presence of UI and evaluate as necessary [12,53].
2. Incorporate primary prevention strategies and health promotion into routine primary care visits [51,53].
3. Inquire about self-care strategies and assist women in developing a plan that aims to improve, cure, or prevent further UI [44,56].
4. Consider minimally invasive, non-surgical therapies first for women with stress, urge, and mixed UI. These include behavioral therapies and judicious use of medications.
5. Refer to specialists (e.g., continence nurse specialists, gynecologists, urologists, urogynecologists, etc.) if further assessment is necessary, or if appropriate treatments are unavailable in the primary care office [19,24,57,58,59,60].

CONCLUSIONS

Women of all ages develop UI and APNs are often the first professionals to discuss and evaluate this condition. A growing body of literature exists that supports primary care evaluation, and non-surgical treatment approaches for women with stress, urge, and mixed UI. Although further research is needed in the area of prevention, it is essential that APNs educate women about UI and incorporate preventative strategies into health care visits. Moreover, APNs are in an ideal position to evaluate UI and spend the time to verbally and manually instruct women in PMEs, bladder retraining, and suggest and follow the effects of medications including ERT, alpha-sympathomimetic agents,

and anticholinergic/antispasmodic drugs. Finally, APNs should be encouraged to collaborate and refer to other professionals who can compliment assessments and therapies initiated in the primary care setting.

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