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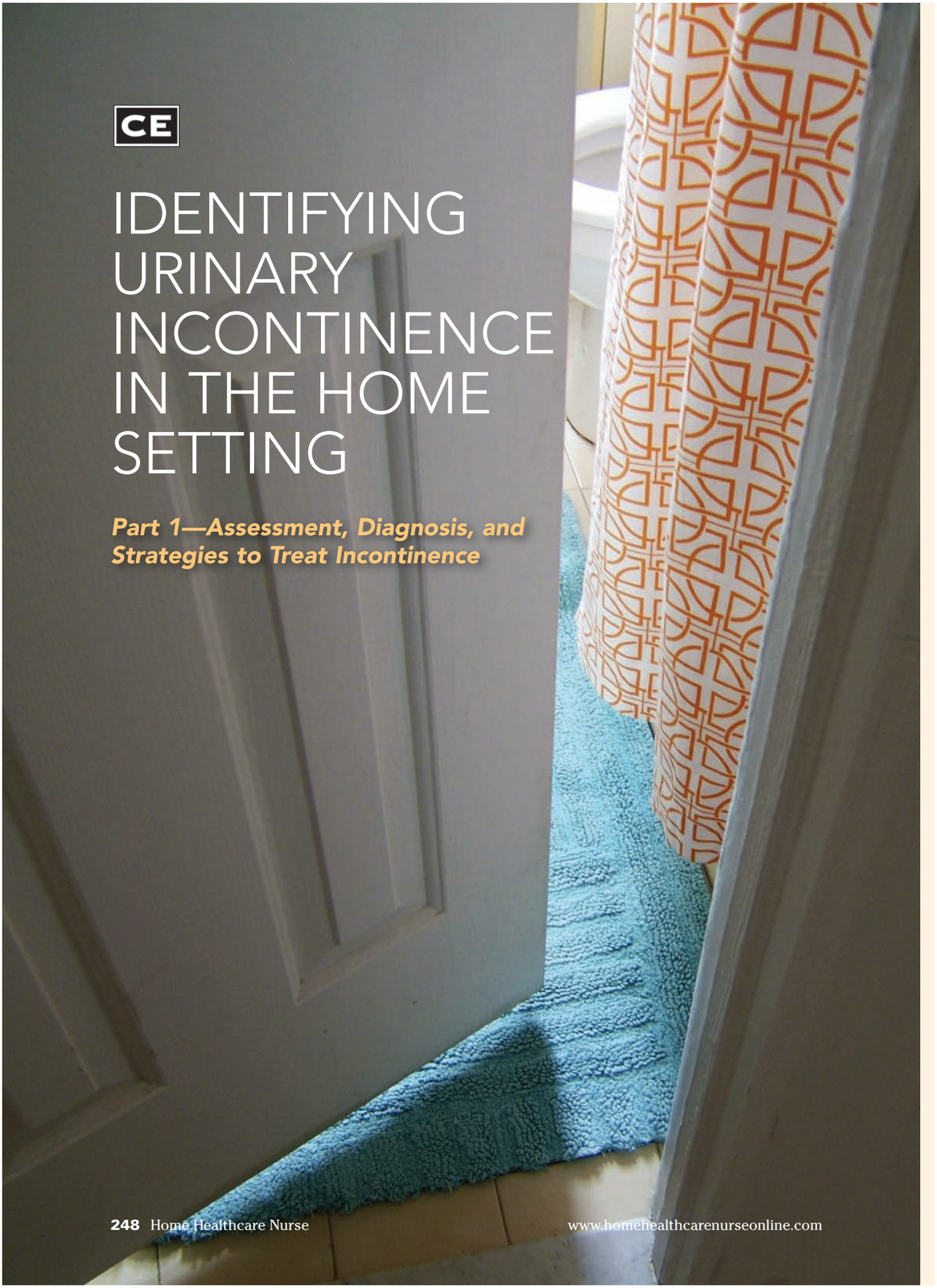
IDENTIFYING URINARY INCONTINENCE IN THE HOME SETTING

Part 1—Assessment, Diagnosis, and Strategies to Treat Incontinence



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Urinary incontinence is a prevalent but difficult dysfunction for many older adults. Living with urinary incontinence can have a profound impact on one's quality of life. The purpose of this case study and article is to identify and describe treatment techniques used to treat urinary incontinence.

Among older persons, urinary incontinence (UI) is common, underdiagnosed, and associated with substantial functional impairments (Mardon et al., 2006). Estimates from the National Health and Nutrition Examinations Survey from 2001 to 2008 indicate that the prevalence of UI is 51.1% among women and 13.9% among men (Markland et al., 2011). Research in support of effective treatment for UI include bladder training, pelvic floor muscle strengthening, biofeedback, vaginal weight training, pelvic floor electrical stimulation, pharmacological therapies, and surgery. A scientific review (Holroyd-Leduc & Straus, 2004) showed that UI appears to be significantly underreported by patients and underdiagnosed by clinicians, resulting in unmet need for continence treatment (Mardon et al., 2006). In addition, many people are too embarrassed to acknowledge they are incontinent, and others think incontinence is a normal part of aging (Cavallaro Goodman & Fuller, 2009). Living with UI can directly impact one's quality of life. Incontinence is a significant contributory factor related to falls in older adults because of this population hurrying to try to get to the bathroom in time. Pressure sores, urinary tract infections, institutionalization, depression, and isolation are also factors related to living with UI (Cavallaro Goodman & Fuller, 2009).

Background

The most recent national estimate of annual direct cost of incontinence in all ages was more than $16 billion in 1995, including $12.4 billion (76%) for women and $3.8 billion (24%) for men (Wilson et al., 2001). Costs for community-dwelling

women were $8.6 billion, which was greater than institutionalized women at $3.8 billion (Wilson et al., 2001). Costs for women older than 65 years of age were more than twice the costs for those younger than 65 years at $7.6 and $3.6 billion, respectively (Wilson et al., 2001). The cost of treatment for overactive bladder was $12.6 billion in the year 2000; community residents made up $9.1 billion and $3.5 billion for institutional residents (Hu et al., 2004). Overactive bladder symptoms can lead to urge UI. Nearly half of the costs for UI are for medical services paid by Medicare (Continence Coalition of the Society of Urological Nurses and Associates and Wound, Ostomy and Continence Nurses Society, 1999). In a cross-sectional study by Subak et al. (2006), 90% of women with mean age of 56 and having severe incontinence reported incontinence-related costs of $900 out of pocket annually for routine incontinence care. Most of the cost related to incontinence is for medical testing, but certainly medications for treatment, daily protective garments, and the cost of laundering clothing related to UI may also be factored in.

UI can increase social isolation, decrease mobility (suffers not wanting to get too far from a bathroom), and be quite a financial burden because of the cost associated with daily protective garments and treatment.

Defining UI

UI is defined as any involuntary loss of urine (Abrams et al., 2003). According to the International Continence Society, there are three main types of UI: stress UI, urge UI, and mixed UI (Abrams et al., 2003). Stress incontinence is the involuntary leakage on effort or exertion or with sneezing and coughing (Abrams et al., 2003). Stress UI is the most common type of incontinence among women at 24.8% (Markland et al., 2011). Typical activities that involve stress UI include anything that increases intra-abdominal pressure, such as exercising, lifting, laughing, walking, or jogging. Symptoms of stress UI can include a small amount of urine leakage with exertion tasks. Causes of stress UI are pelvic floor muscle weakness or poor muscle coordination. The pelvic floor muscles do not contract enough—or in time—in response to increased abdominal pressure with coughing, sneezing, lifting, or laughing. Supportive anatomical dysfunction, such as urethral laxity due to fascial damage, can also contribute to stress UI. Fascial laxity can result in poor urethral closing during increased intra-abdominal pressure.

Twenty-nine percent of individuals aged 60 to 70 years experience leakage when coughing, sneezing, or laughing compared with 17% of men and women aged 30 to 39 years (Muller, 2005). Studies have indicated that as many as 90% of men report stress UI in the first few weeks following prostate surgery after removal of the catheter (Moul, 2011). In approximately 20% of men, some degree of stress UI will continue to be a significant problem 1 year postsurgery for the treatment of prostate cancer (Burgio et al., 2005; Moul, 2011).

Urge incontinence is the involuntary leakage accompanied by or immediately preceded by urgency (Abrams et al., 2003). *Urgency* is defined as the sudden compelling desire to pass urine that is difficult to defer (Abrams et al., 2003). Behavioral triggers for urge UI include things such as hearing the sound of running water, putting a key in the lock of a door, and nervousness about getting to the bathroom in time. Frequency of urination with urge UI is increased usually with 7 or more voids in 24 hours (Abrams et al., 2003). According to the Bladder and Bowel Foundation (2012), normal voiding frequency is every 2 to 3 hours, averaging four to seven times throughout the day.

Urge UI may be caused by reduced bladder capacity, or detrusor instability (also referred to as overactive bladder, hyperreflexive bladder, or detrusor hyperreflexia). One in five adults older than 40 years is affected by overactive bladder or recurrent symptoms of urgency and frequency, and a portion of them also experience urge incontinence (Muller, 2005). Overactive bladder and urge UI occur twice as frequently in women as in men and become more prevalent with advanced aging (Stewart et al., 2003). Women with overactive bladder are significantly more likely to have other health disorders such as hypertension, obesity, and arthritis (Muller, 2005). Overactive bladder sufferers are two to three times more likely to regularly experience disturbed sleep, overeating, and poor self-esteem, than those without overactive bladder (Muller, 2005).

Mixed incontinence is the involuntary leakage associated with urgency and also with

exertion, effort, sneezing, or coughing (Abrams et al., 2003). Mixed incontinence shares the causes of both stress and urge incontinence. Symptoms include increased frequency of urination, increased urgency, and loss of urine with intra-abdominal pressure with poor pelvic floor muscle coordination. In a study of 460 women between the ages of 61 and 65 years, 29% had symptoms of mixed incontinence (Wallner et al., 2009).

Functional incontinence is another type of incontinence. *Functional incontinence* is defined as the loss of urine because of decreased functional mobility and an inability to reach the toilet in a timely manner (Abrams et al., 2003). Causes of functional incontinence include a slow gait, difficulty with sit-to-stand transfers, inability to remove clothing quickly because of mobility impairments, specific muscle weakness, general deconditioning, and being in an environment that is not conducive to reaching the toilet easily or quickly (Cavallaro Goodman & Fuller, 2009). From experience, gross muscle weakness of the lower extremities related to gait directly contributes to functional UI.

Risk Factors for UI

There are a wide range of risk factors associated with increasing the development of UI. See Figure 1 for a complete list. As a normal part of aging, there is a decreased size of urethral striated muscle (Perucchini et al., 2002). Estrogen production is decreased in normal aging, which diminishes urethral mucosa and vascularity to the pelvic floor muscles, which impairs overall pelvic floor muscle function (Pool-Goudzwaard et al., 2005). This loss of pelvic floor muscle strength has been linked to UI and pelvic organ prolapse. Poor pelvic floor muscle coordination/timing in response to an increase in intra-abdominal pressure is also a risk factor for UI. A study of 4,103 women with a mean age of 56 years old, 69% had pelvic organ prolapse with a co-occurrence of other pelvic floor dysfunctions like stress UI, overactive bladder, or anal incontinence (Lawrence et al., 2008).

Chronically increased intra-abdominal pressure can be caused by obesity, which is a risk factor for UI. In a study by Subak et al. (2002), a prospective cohort of 10 women with a body mass index (BMI) of 38 or more with a less than 5% weight loss had a more than 50% reduction in UI. Another study of 40 women with at least four UI episodes per week had a 50% to 60% reduction in weekly UI episodes for both stress and urge incontinence with weight loss (Subak et al., 2005). Other causes of increased intra-abdominal pressure include chronic coughing, asthma, and smoking, which all increase UI symptoms. Chronic constipation and straining due to constipation are also associated with UI (Coyne et al., 2008).

- Altered local anatomy and physiology including: pelvic floor muscle weakness (e.g., pregnancy/multiple pregnancies, episiotomy, pelvic surgeries including hysterectomy or prostatectomy)
- Pelvic organ prolapse
- Congenital sphincter muscle weakness or damaged sphincter
- Pudendal nerve damage (e.g., childbirth, trauma, radiation, pelvic surgery)
- Neurological disorders (e.g., multiple sclerosis, brain injury, Parkinson's disease, cerebral palsy, spinal cord injury, stroke)
- Psychogenic (e.g., sexual trauma, negative sexual experiences, depression, emotional stress)
- History of benign prostatic hyperplasia
- Constipation
- COPD, chronic cough, asthma
- Tobacco use
- History of recurrent urinary tract infections
- Medications (antihistamines, decongestants, antibiotics, antiparkinson agents, diuretics, hormone replacement therapy, hypertensives, tranquilizers, sedatives, tricyclic antidepressants)
- Decreased estrogen
- Diabetes
- Bladder irritation (e.g., caffeine, alcohol, other dietary irritants)
- Restrictive clothing
- Decline in mobility with ADLs
- Impaired cognitive function
- Radiation therapy
- Obesity
- Race (White)
- Higher socioeconomic status

Figure 1. Risk factors for urinary incontinence.

Notes: ADL = activities of daily living; COPD = chronic obstructive pulmonary disease.
Source: Adapted from Cavallaro Goodman, C., & Fuller, K. S. (2009). *Pathology: Implications for the Physical Therapist.* (3rd ed.) St. Louis, MO: Saunders Elsevier.

Strategies for Treating UI

Management of UI depends on which of the three types of incontinence the person has, the person's age, and overall general health and mobility. Management efforts fall into three categories: (1) behavioral, (2) pharmacological, or (3) surgical (Cavallaro Goodman & Fuller, 2009).

Behavioral interventions should be considered first in the treatment of incontinence, regardless of the type. Behavioral interventions include diet and fluid management as well as lifestyles changes. Strengthening and neuromuscular reeducation exercises of the abdominal and pelvic floor musculature may improve overall pelvic girdle strength for mobility, which is an integral part of treating UI.

Dietary and Lifestyle Changes

According to the National Institutes of Health Food and Nutrition Board (2005) an adequate water intake for men is roughly 3 L (101 oz), and for women 2.2 L (74 oz) per day. Amount of exercise and environment temperature, and so on, will affect total water intake (National Institutes of Health, 2005). Hashim and Abrams (2008), found that by decreasing fluid intake by 25% from baseline, voiding urgency, frequency, and night time voiding episodes decrease. This method is an inexpensive, noninvasive way to help control the symptoms associated with overactive bladder (Hashim & Abrams, 2008). Decreasing hydration should be under careful consideration and management by the medical doctor because of possible medical complications of the patient. Some foods and drinks are other possible causes of increasing frequency and UI (Cavallaro Goodman & Fuller, 2009; Goldenholz, 2011). See Table 1 for a list of possible irritants to the bladder for teaching patients who have UI to avoid.

Voiding Diary

Keeping a record of the patient's behaviors related to voiding is important because some people may be unaware of how often they are voiding, and whether they are voiding to prevent

Table 1. Laycock 2008 PERFECT Grading Scale

Laycock 2008 MMT	
0	No contraction
1	Flicker of muscle detected
2	Weak squeeze, no lift
3	Fair squeeze with definite lift (Grade 3–5 are generally discernible on visual perineal inspection)
4	Good squeeze, good lift, able to hold against resistance, repeatable hold and lift
5	Strong squeeze, against strong resistance, repeatable squeeze and lift
Laycock PERFECT Scale	
Power	Test of voluntary muscle contraction. See Laycock grading chart.
Endurance	Hold time—the time (up to 10 s) a maximum voluntary contraction can be held before a reduction in power of 50% is detected.
Repetitions	Number of repetitions (up to 10) of the maximum voluntary contraction.
Fast twitch	Quick contractions—number of 1 s contractions that can be performed in 10 s.
Elevation	Lifting of the posterior vaginal wall toward the pubic bone and cephelad. Present or absent.
Cocontraction	Proper cocontraction of the deep abdominal muscles. Present or absent.
Timing	Involuntary pelvic floor muscle contraction. Present or absent.

Notes: EMG = electromyography; MMT = Manual Muscle Test.
Source: Data from Laycock, J., & Haslem, J. (2008). *Therapeutic Management of Incontinence and Pelvic Pain.* (2nd ed.) London, England: Springer.

incontinence or responding to a need to empty the bladder (Wyman et al., 2009). The tool most healthcare practitioners use is called a voiding diary. There are varying kinds of voiding diaries available (for a sample, visit http://www.womenshealthapta.org/credentialing/cappdocs/Voiding%20Diary%205-14-07.pdf or http://www.ip-voiding-diary.com/what-is-a-voiding-diary/, http://www.nafc.org/members/private/Professionals/Leaflets.htm).

From a functional standpoint, the most important documentation of the voiding diary includes the following: the patient's fluid intake (type, amount, and time), time and amount voided, number and size of any incontinent episodes, what activity was involved when the leakage occurred, and the number of protective garments used and how often they were changed. Other factors to consider include the urge to urinate, leaking, and food intake.

If specific food or drink irritants are identified from the voiding diary, the patient should be instructed to avoid these items. Voiding diaries are a very helpful tool in identifying problems. Changes to one's diet should be made based on this information.

A 3-day diary has been found to be superior to a 7-day diary in terms of data collection. It may also improve patient compliance (Tincello et al., 2007). Voiding diaries also allow for better tracking for functional improvements with bladder training. The average of daytime voiding is every 3 to 4 hours, assuming a 16-hour day correlates to a total of 5.3 voids per day and one nighttime void (Lukacz et al., 2009). The goal of normal voiding patterns is to achieve five to seven total daytime voids, and no more than one to two nighttime voids. The findings from a voiding diary can drive the goals for the UI plan of care.

Mobility Deficits

With functional incontinence that has no urological pathology, treatment should focus on correcting or improving the mobility problem, which is making it difficult to reach the bathroom in time. Physical therapy (PT) and occupational therapy should be involved in the treatment of this patient population to focus on activities of daily living (ADL) training and mobility needs. Therapy treatments to aid in functional incontinence include improving lower extremity strength, which may improve the speed and quality of sit-to-stand transfers, gait quality to the bathroom, as well as any clothing modifications that may need to be addressed. Such clothing modifications may be from wearing button pants to an elastic waist for easier dressing.

Case Study: Mrs. R

Mixed and urge UI are the most common among older adults (Reed et al., 2012). Therefore, this case study is on the assessment and treatment of mixed UI in the home care setting.

Mrs. R is a 75-year-old female who was referred for PT following an elective right-sided total hip arthroplasty (THA) secondary to advanced osteoarthritis. Mrs. R received inpatient rehabilitation for 2 weeks following the surgery. She is ambulating with a front-wheeled walker with contact guard assistance for 150 ft. She is a retired widow who lives alone, but has a supportive son staying with her to help with ADLs. She needs assistance for all ADLs including showering, dressing, cooking, walking, and so on. She is taking Oxycodone for pain as prescribed every 4 to 6 hours, as well as thyroid replacement therapy, warfarin for atrial fibrillation, and a stool softener for constipation. She was active in her community before her THA surgery.

Examination

Mrs. R had difficulty with transfers including sit to stand, supine to sit, and sit to supine because of lower extremity weakness, right LE 2/5 grossly in the hip and 3/5 knee and ankle, left LE 4-/5 grossly. Mrs. R was not able to assume a single limb stance on the right for more than 2 seconds before loss of balance, and on the left longer than 5 seconds. She experienced pain described as 7/10 with ADLs, which decreased to 3/10 with rest and pain medications. Her incision was healing, and she had good tissue approximation without signs of infection. Mrs. R reported increased UI and constipation since her surgery. She stated that the incontinence occurred when trying to complete her exercises, as well as with urgency when trying to get to the bathroom in time. She reported drinking 32 oz of water daily. Mrs. R voided 10 times per day and 4 times per night (nocturia) whereas normal void patterns five to seven daytime voids, one to two nocturia.

Informed consent was obtained verbally and in writing to perform an internal pelvic floor

Causes of functional incontinence include a slow gait, difficulty with sit-to-stand transfers, inability to remove clothing quickly because of mobility impairments, specific muscle weakness, general deconditioning, and being in an environment that is not conducive to reaching the toilet easily or quickly.

examination to test muscle strength and soft tissue quality by a physical therapist who specializes in pelvic floor dysfunctions and is certified. On external examination, the patient had a positive anal wink test, a present muscle contraction of the pelvic floor muscles when cued, an absent involuntary contraction of the pelvic floor muscles when asked to cough (increase in intra-abdominal pressure), and perineal descent in a resting position as well as with bearing down. The patient had hypertonicites in the right superficial genital muscles. *Hypertonicity* is defined as pelvic muscle tension creating a myalgia (Irion & Irion, 2010). On internal muscle testing to the levator ani muscles using Laycock's PERFECT Scale, Mrs. R had 3/5 strength, endurance of 5 seconds, at five repetitions; was able to complete four quick contractions in 10 seconds; present for elevation; present for co-contraction of the transverse abdominis; and absent for timing of an involuntary contraction. However, she displays poor relaxation in between contractions. She is able to bear down easily when cued. See Table 1 for the Laycock PERFECT grading scale of muscle contraction. Mrs. R displayed symptoms of mixed UI and functional incontinence.

Intervention

Mrs. R was advised to increase her fluid intake to 64 oz of water. The patient was educated to avoid bladder irritants, as listed in Table 2. She received PT 3 times per week. Two visits per week to focus on functional strengthening and mobility and one visit per week for pelvic floor strengthening and training. She was advised on urge suppression techniques, including abdominal breathing and pelvic floor contractions with increased urgency. She also performed pelvic floor contractions with electromyography biofeedback for 5 seconds hold for 10 repetitions, quick flicks of pelvic floor contractions 2 seconds hold for 20 repetitions, as well as roll ins and roll outs (Hulme, 2008) for 10 seconds hold for 10 repetitions each. The duration of contraction of the Kegel exercise and number of repetitions was increased to a 10 seconds hold for 12 repetitions as the patient progressed with treatment. All exercises were performed lying on her back with her knees bent, using a vaginal sensor and surface abdominal sensor for EMG biofeedback. She received treatment for 4 weeks

Table 2. Possible Irritants to the Bladder

Alcoholic beverages	Cranberries
Apples	Grapes
Apple juice	Guava
Artificial sweeteners	Peaches
Caffeine	Pineapple
Cantaloupe	Plums
Carbonated beverages (soda)	Strawberries
Chili/Spicy foods	Tea
Chocolate	Tomatoes
Citrus fruits (lemons, limes, oranges, etc.)	Vitamin B complex
Coffee	Vinegar

at 3 visits per week for a total of 12 visits. The nursing intervention was to manage her medications and monitor her fluid intake and diet and to reinforce the home exercise program of pelvic floor contractions during ADLs with this patient.

Outcomes for Mrs. R

After the 4 weeks of PT for LE strengthening to improve ADLs as well as pelvic floor training, Mrs. R had a pelvic floor muscle contraction strength of 4 and was able to hold a pelvic floor muscle contraction for 10 seconds. In addition, she was able to complete seven quick flicks in 10 seconds, and has normal voiding between 2 to 4 hours daily. After PT, she reported nighttime voids of once per night and resolution of constipation to daily bowel movements. Her functional strength improved to right LE 4-/5 grossly and left LE 4+/5, and she was ambulating community distances less than 500 ft with a single point cane. This gain in functional strength and walking distance allowed Mrs. R to get to the bathroom before any leakage occurred. Pain medication frequency has decreased to only being taken before PT sessions and home exercises. She reported 4/10 with ADLs at worst, and 0/10 with use of the pain medications, which are being decreased.

Discussion

On discharge from PT, Mrs. R had a significant resolution of symptoms related to her UI because of the treatment implementation setup by the PT plan of care. She had functional incontinence because of her LE weakness after a THA limiting her ability to get to the bathroom in time. She had significant constipation from use of her pain medications, which can be a contributing factor to UI. She also had weakness and poor muscle coordination of the pelvic floor muscles all leading to UI. After completing the PT interventions, she had normal voiding patterns of every 2 to 4 hours, no UI, and increased LE strength allowing her to get to the bathroom in time. She also went from using a sometimes difficult assistive device to navigate in a small house, the four-wheeled walker, to using a single point cane, which is also much more functional for household and community ambulation. Using the biofeedback to teach coordination and control and to strengthen the pelvic floor muscles was an effective tool to decreasing Mrs. R's UI. Strengthening of the LEs and pelvic girdle to improve her ambulation also decreased her episodes of UI. Strengthening the pelvic floor muscles was essential to controlling the UI, despite her mobility improvements. Had the pelvic floor not been addressed, she would have gotten to the bathroom faster, but would have continued to leak urine on her way there due to her mixed incontinence. ☗

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