

Overview of the Management of Post-prostatectomy Urinary Incontinence

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Introduction

Prostate cancer is the leading cause of non-cutaneous cancer and the second leading cause of cancer-related death in men in the United States (Jemal, Thomas, Murray, & Thun, 2002). Although the incidence of occult autopsy-proved prostate cancer is the same worldwide (Reiter & deKernion, 2002), the incidence of clinically detectable prostate cancer in the U.S. has skyrocketed over the past two decades as a result of improved methods of diagnosis, routine prostate cancer screening, and heightened public awareness (Reiter & deKernion, 2002). There has also been a corresponding dramatic increase in treatment interventions for early stage prostate cancer, especially radical prostatectomy. Advances in surgical techniques pioneered by Dr. Patrick Walsh beginning in 1982 have reduced the morbidity and improved the outcome of radical prostatectomy (Han, Partin, Pound, Epstein, & Walsh, 2001). As a result, the age-adjusted rate of radical prostatectomies initially jumped six-fold between 1984-1990 (Lu Yao, McLerran, Watson, & Wennberg, 1993) and prostatectomies continues to be the most popular option for treating prostate cancer (Lu-Yao & Greenberg, 1994) (Garnick & Fair, 1998). In the year 2001, nearly 80,000 men underwent a radical prostatectomy (Greenlee, Hill-Harmon, Murray, & et al, 2001).

Radical prostatectomy arguably offers the best ten-year cure rate for prostate cancer - as high as 96% for organ-confined prostate cancer (Han et al., 2001). Nevertheless, the risk of serious side effects, most notably impotence and urinary incontinence (UI), must be taken into consideration. Although these two distressing side effects normally improve or resolve within 12-24 months following surgery, they can

become permanent. Depending upon the definition used, length of follow-up, and source of the data, the incidence of post-prostatectomy urinary incontinence (PUI) ranges from a high of 87% at one month after surgery (Jonier, Madsen, Sall, Messing, & Bruskewitz, 1996) to a low of 2% at 12 months or more following surgery (Gittes, 1991) (Sueppel, Kreder, & See, 2001), and the incidence of impotence ranges from 14% to 97.5% (Shekarriz, Upadhyay, & Wood, 2001).

Of these two potential complications, urinary incontinence is one of the most distressing side effects for patients following surgery for prostate cancer (Olsson et al., 2001). Men afflicted with UI must contend with shame, embarrassment, depression, avoidance of social activities and altered life style (Braslis, Santa-Cruz, Brickman, & Soloway, 1995) (DuBeau & Resnick, 1991) (Herr, 1994). Postoperative UI is also the single most significant barrier to regaining the preoperative state of health and social functioning (Morse & Fife, 1998) (Olsson & Goluboff, 1994). Therefore, health care practitioners need to become informed about the management of post-prostatectomy urinary incontinence and proactively share this information with their patients.

Problem Statement

In the year 2004, an estimated 230,110 men will be diagnosed with prostate cancer (American Cancer Society, 2004). Approximately 50% of men with prostate cancer elect to have their prostates surgically removed, which makes radical prostatectomy the leading treatment for prostate cancer (Lu-Yao & Greenberg, 1994) (Olsson & Goluboff, 1994). While radical prostatectomy offers the best chance for cure, it is associated with a number of significant side effects, especially urinary incontinence.

Men typically regain their continence within the first year following surgery, however at least 50% of men experience temporary moderate to severe UI following a radical prostatectomy (Maffezzini et al., 2003) (Palmer, 2000). The attendant physical, psychological, and social ramifications of UI can be devastating (Herr, 1994). Furthermore, the cost of materials, side effects of medications, and sequele of ongoing UI add to their burden (Meaglia, Joseph, Chang, & Schmidt, 1990) (Moorhouse, Robinson, Bradway, Zoltick, & Newman, 2001) (Palmer, Fogarty, Somerfield, & Powell, 2003) (Paterson, 2000) (Phillips et al., 2000). Even though patients are usually warned about the risk of developing postoperative urinary incontinence, they're not given sufficient information about how to manage UI if it occurs (Palmer et al., 2003).

Purpose Statement

The purpose of this master's degree project is to review the literature on the management of post-prostatectomy urinary incontinence, formulate a comprehensive overview of the management of post-prostatectomy urinary incontinence, and publish these data.

Design

Literature review

Limitations: males over the age of 35 treated with radical prostatectomy for prostate cancer.

Data Bases: CINHALL 1985-2003, Medline 1985-2003, reference lists

Key Words: Prostate cancer, post-prostatectomy urinary incontinence, radical prostatectomy, complications.

Main Research Variables: male urinary incontinence, management of post-prostatectomy urinary incontinence

Incidence

Urinary incontinence is technically any involuntary loss of urine. The reported incidence of UI, though, varies widely depending upon a variety of factors including the definition, length of follow-up, surgical technique, surgeon's experience, patient population, study design, collection technique, and source of data (Carlson & Nitti, 2001) (Palmer, 2000) (Foote, Yun, & Leach, 1991) (VanKampen, Weerdt, & Van Poppel, 2000).

The incidence of "significant" or bothersome urinary incontinence is reported to range between 2-44.5% (Sueppel et al., 2001) . However, if the strict definition of any involuntary loss of urine is used, the incidence is significantly higher (Palmer, 2000). Contrary to the favorable one-year postoperative urinary incontinence rates of 8% or less that have been reported by selected academic institutions (Catalona, Carvalhal, Mager, & Smith, 1999) (Walsh, Marchike, & Ricker, 2000), patient self-reported data and information gleaned from Medicare and community data bases and hospital registries report a one-year incidence as high as 69% (Carlson & Nitti, 2001). Furthermore, the prevalence of urinary incontinence is skewed since men underreport the incidence of UI, especially if it's not bothersome (Johnson, Kincade, Bernard, Busby-Whitehead, & DeFries, 2000) (Smoger, Felice, & Kloecker, 2000) (Herzog, Fultz, & Normolle, 1989).

Differences in phraseology also confound data regarding the incidence of urinary incontinence. When Mettlin *et al.* used total incontinence as the benchmark, the incidence of self-reported UI was only 2%, however the incidence jumped to 47% when

men were asked if there was any daily leakage of urine (Mettlin et al., 1997). Similarly, when Wei *et al.* defined UI as “more than one pad per day”, the reported incidence was only 13%, in contrast to a 47% incidence based on “any leaking or dripping urine”, and a 65% incidence based on “frequency of incontinence greater than once daily”(Wei & Montie, 2000).

Moreover, self-administered patient questionnaires generally reflect a higher incidence of urinary incontinence than do physician-reported data (Carlson & Nitti, 2001) (Palmer, 2000). Based on validated patient questionnaires, the range of subjective UI varies between 3-69% and overall pad use ranges between 7-47%, whereas physician assessment of subjective UI ranges from 0-8% and overall pad use varies between 5-19.9% (Carlson & Nitti, 2001). Concordance increases though when men consider their urinary incontinence to be ‘a moderate to big’ problem, and when the amount of leakage is linked to the number of pads used daily (Palmer et al., 2003) (Wei & Montie, 2000).

Age is also a factor. In most, but not all studies, older men, especially men over the age of 70, have an increased risk of developing PUI (Carlson & Nitti, 2001). Catalona *et al.* reported that the return of continence was twice as likely for each decade decrease in age when comparing men between ages 40-70 (Catalona & et al., 1994).

Anatomy and Physiology

Urinary continence is a balance between bladder pressure and outlet resistance offered by a proximal and distal urethral sphincter mechanism. Incontinence occurs when bladder pressure exceeds the outlet resistance. The proximal urethral sphincter mechanism is comprised of the bladder neck, prostate gland, and prostatic urethra. A

matrix of elastic smooth and striated muscle tissue forms two incomplete loops around the bladder neck that reflexively contract in response to bladder (detrusor muscle) contractions. The proximal urethral sphincter is innervated by parasympathetic branches of the pelvic nerve (Myers , 1991) (Parra, Cherullo, & Cummings, 1997).

The distal urethral sphincter mechanism consists of an intrinsic and extrinsic component. The intrinsic component is comprised of three elements: (1) pliable urethral mucosal tissue, (2) fibroelastic tissue enmeshed with longitudinal smooth muscle tissue, and (3) an intrinsic periurethral rhabdosphincter, which contains slow-twitch striated muscle fibers that maintain a resting urethral tone (pressure). Slow twitch fibers have high endurance, low contraction speed and resist fatigue (Robinson, 2000).

The extrinsic component consists of surrounding levator ani muscular tissue, which is innervated by autonomic branches of pelvic nerve and somatic branches of the pudendal nerve, and a supporting network of fascial tissue. The levator ani muscles contain fast-twitch muscle fibers, which respond quickly to sudden changes in intra-abdominal pressure. Fast twitch fibers contract quickly but low endurance and fatigue easily (El Din et al, 1996) (Myers , 1991) (Parra et al, 1997) (Carlson & Nitti, 2001) (Robinson, 2000).

Since the proximal urethral mechanism is destroyed during a radical prostatectomy, the distal urethral mechanism preserves postoperative urinary continence(Wan, McGuire, Bloom, & Ritchey, 1992).

Pathophysiology of post-prostatectomy urinary incontinence

The goals of radical prostatectomy are cure of disease and preservation of urinary control and erectile function. A thorough understanding of the anatomy of the prostate and associated pelvic fascia, pelvic floor musculature, and relationship of the prostate to the bladder, urethra, penis and neurovascular structures is fundamental to the accomplishment of these three goals. Since anatomic variations in the male pelvis are commonplace, the operating surgeon must adapt the operative approach in order to perform a meticulous dissection, especially at the apex; failure to do so will increase the likelihood of positive surgical margins and the incidence of impotence and urinary incontinence (Myers, 2001).

Various surgical modifications have been proposed to improve post-prostatectomy continence and preserve potency including sparing the puboprostatic ligaments, preserving the bladder neck, and sparing the periprostatic neurovascular bundles (Poore, McCullough, & Jarow, 1998) (Noh, Kshirsager, & Mohler, 2003) (Wei, Dunn, Marcovich, Montie, & Sanda, 2000). Nevertheless the only modification that has received universal endorsement is a meticulous apical dissection (Peyromaure, Ravery, & Boccon-Gibod, 2002).

According to Myers, five factors can increase the chance for post-prostatectomy urinary incontinence: (1) insufficient membranous urethral length; (2) loss of the smooth muscle continuity between the urethra and bladder; (3) disruption of the investing urethral musculature and fascia; (4) loss elasticity at the vesicourethral junction and; (5) denervation of the bladder neck and urethra (Myers, 1991).

Patients with an intact extrinsic urethral sphincteric component can still experience urinary stress incontinence if their intrinsic urethral sphincter is damaged; that is, they can still voluntarily start and stop urination by contracting their extrinsic urethral sphincter, but still leak if their intrinsic urethral component is incapable of surpassing intra-abdominal pressure (Wan et al., 1992).

Bladder dysfunction and obstruction due to residual tissue or scar tissue can also individually or collectively contribute to urinary incontinence (Carlson & Nitti, 2001). Overflow incontinence secondary to obstruction caused by scar tissue at the vesicourethral junction or a distal urethral stricture is a rare but potentially reversible cause of post-prostatectomy urinary incontinence (Carlson & Nitti, 2001).

Detrusor instability (involuntary bladder contraction in the absence of neurologic disease) can also contribute to PUI. Unstable bladder contractions are common during the first few months following a radical prostatectomy, but they usually resolve within the first year (Abrams, 1985) (Leach, Yip, & Donovan, 1987) (Schwartz & Lepor, 1999). Abrams, *et al.* reported that 53-80% of men undergoing a radical prostatectomy had preexisting detrusor instability, however once the prostate was removed, the detrusor instability (DI) resolved in two thirds of these men within the ensuing 3-12 months (Abrams, 1985).

Although DI is a common component of post-prostatectomy urinary incontinence, it is rarely the sole cause; intrinsic sphincter deficiency is usually the prime contributing factor in most studies (Chao & Mayo, 1995) (Desautel, Kapoor, & Badlani, 1997). Chao *et al.* evaluated 74 men with PUI. The average time since surgery was 3.8 years. Sphincteric weakness was the only cause of UI in 57% of the men and a major

contributor in another 39% of the men. On the other hand, even though DI was also present in 39% of the men, it was the sole cause of PUI in only 4% of men (Chao & Mayo, 1995).

Evaluation

Establishing an accurate diagnosis is a prerequisite for proper management of post-prostatectomy urinary incontinence. The evaluation begins with a thorough history and physical examination. Significant findings can guide further investigation and treatment recommendations. The natural history of urinary incontinence also needs to be taken into consideration.

Continence typically improves first during sleeping hours, followed next by improvement early in the day when the energy level is highest (Assad, 2000). Although figures vary, only 50% or so of men are continent immediately after the catheter is removed (Maffezzini et al., 2003). Thereafter, continence steadily improves for most men: 55% of men are continent at 6 weeks, 47-71% at three months, 75-93% at six months, 82% at 9 months, 89-97% at one year, and 92% at two years (Mathewson-Chapman, 1997) (Stein, Discippio, Davia, & Taub, 1995). Even though most men are “continent” within one year after surgery, an occasional squirt of urine induced by heavy lifting or coughing, especially when the bladder is full or late in the day when muscles are tired, is a common but not bothersome occurrence (Carlson & Nitti, 2001) (Palmer, 2000) (VanKampen et al, 2000).

History

The history should begin with an accurate assessment of the patient's continence status. A continence questionnaire can serve as a good starting point (Moore & Jensen, 2000) (Stanford, Feng, & Hamilton, 2000). A three-day voiding diary can also provide detailed information about the quantity and type of urine loss and precipitating events. A voiding diary should detail the hours of sleep, oral intake, time and voided amount, incontinent episodes, associated triggering events (e.g., cough, changes in position, running water), and a quantitative estimate of leakage (damp, wet, soaked) (DuBeau & Resnick, 1991). A voiding diary serves several purposes: it serves as a baseline measurement that can be used to gauge the effectiveness of treatment interventions; provides a reasonable estimate of bladder capacity and urinary output; and gives patients insight about the nature of their incontinence.

Patients should also be asked about any pre-operative voiding symptoms, especially urinary incontinence. In a prospective randomized survey of men 60 years and older living in a community, the prevalence rate of UI within a year was 19%: 34.9% urge, 7.9% stress, 28.9% mixed urge/stress and 28.3% other categories (Diokno, Brock, Brown, & Herzog, 1986). A voiding questionnaire such as the International Prostate Symptom Score (El Din et al., 1996) can highlight any current lower urinary tract voiding symptoms that need further investigation.

The review of systems should include questions about pre-existing neurological problems, prior pelvic or urologic surgeries, history of radiation therapy, sexual and bowel function, consumption of urinary irritants such caffeine-containing foods and

beverages and alcoholic beverages, and problems with constipation or skin irritation. Medications should also be reviewed, especially those that affect urinary function.

Responses to a standardized quality of life questionnaire can facilitate a discussion about urinary incontinence-related psychosocial and quality of life issues (Litwin, Hays, & Fink, 1998) (Litwin, Melmed, & Nakazon, 2001). Braslis *et al.* reported an inverse relationship between urinary incontinence and perceived physical and psychological well-being (Braslis *et al.*, 1995). Therefore, helping patients identify and prioritize specific concerns about incontinence-related issues can direct psychological counseling and treatment recommendations.

Patients should also be asked about their understanding of the problem. Although unspoken, patients often harbor a fear that urinary incontinence signifies that their cancer has come back. Furthermore, there is also a normal grieving process following major surgery, especially when there is a complication. Healthcare professionals can provide solace and restore hope by providing details about the normal healing process that accompanies prostate surgery, and by discussing and providing resources about the natural history and management of post-prostatectomy urinary incontinence.

Physical Examination

A physical examination should include palpation of the lower abdomen to evaluate for bladder distension. The groin, genitalia, and perineum should be examined for signs of skin irritation. A focused neurological examination should evaluate sacral innervation by checking perineal sensation, voluntary contraction of the anal sphincter, bulbocavernosal reflex activity, and anal wink, and any lower extremity motor or sensory abnormalities. A urine specimen should be examined to rule out infection. Finally, the

patient should be asked to reproduce the urinary incontinence and the precipitating event and severity of leakage should be noted (Carlson & Nitti, 2001).

Other Diagnostic Studies

Urodynamic testing

The treatment of pure sphincteric incontinence or incontinence caused solely by bladder dysfunction is clear-cut. However, since urinary symptoms alone are often unreliable, especially for mixed causes of post-prostatectomy urinary incontinence, urodynamic testing is the most accurate method to assess the type and severity of urinary incontinence and direct treatment recommendations. Symptoms and urodynamic findings correlate better for intrinsic sphincter deficiency (ISD) than they do for bladder dysfunction (Carlson & Nitti, 2001). According to Ficazzola *et al.*, there is a 95% positive predictive value and a 100% negative predictive value of patient-reported symptoms of stress incontinence and urodynamic evidence of ISD. On the other hand, there is only a 44% positive predictive value and an 81% negative predictive value for urinary urgency incontinence (Ficazzola & Nitti, 1998).

The main goals of urodynamic testing are to assess the presence or absence of obstruction and the presence or absence of bladder or sphincteric dysfunction during the filling, storage, and emptying phases of micturition (Carlson & Nitti, 2001).

Comprehensive urodynamic testing is usually reserved for patients that have urinary

incontinence lasting beyond one year or before proceeding with invasive surgical procedures. On the other hand, measuring a urinary flow rate and post void residual is a simple, non-invasive screen for dysfunctional voiding caused by impaired bladder contractility or outlet obstruction (Carlson & Nitti, 2001).

Cystoscopy

Cystoscopy is usually reserved for men with obstructive urinary symptoms or in conjunction with minimally invasive and invasive surgical therapies for post-prostatectomy urinary incontinence (Foote et al., 1991).

Management of post-prostatectomy urinary incontinence

For reasons that are unclear, some men are immediately continent after surgery, others take months, and some men continue to indefinitely experience varying degrees of urinary incontinence. Although urinary function usually improves with time, a significant number of men never regain their baseline urinary function. In a prospective longitudinal study of 247 men that underwent radical prostatectomy, Litwin *et al.* measured general and prostate-specific self-reported health-related quality of life at baseline before surgery and postoperatively every 3 months for 1 year and then every 6 months for up to 48 months (median 30 months). The recovery of urinary function to baseline was 21% at 3, 56% at 12, and 63% at 30 months. Men that recovered baseline urinary function usually did so within 7 to 8 months after surgery; there was little additional improvement beyond 18 months. Overall, approximately 80% of men recovered to baseline urinary bother (Litwin et al., 2001).

At the first onset of urinary incontinence, men are forced by default to employ self-help practices to control leakage. The most commonly employed self-help practices include modifying behavior, changing environment, and/or using special equipment or devices (Herzog et al, 1989) (Johnson et al., 2000).

Men often equate urinary incontinence with infantile behavior, senility, dependency, and poor hygiene (Johnson et al, 2000) (Paterson, 2000) (Robinson, 2000). Therefore, men are also less likely than women to ask for help, and are more likely to delay return to work because of urinary incontinence and minimize health concerns when they do return to work for fear of losing self-esteem and status (Moorhouse et al., 2001) (Paterson, 2000). Men are also less likely than women to use pads because they consider pads to be feminine (Herzog et al., 1989). Between 10-58% of men with PUI use absorbent pads or other protective devices (McPherson, Swenson, & Kjellberg, 2001).

The aftermath of urinary incontinence, particularly if it's permanent, exacts a heavy toll. Afflicted men express varying degrees of anger, frustration, and depression that often spills over into their family and professional lives (Kornblith, Herr, Offman, Scher, & Holland, 1994). To put things in perspective, some men consider dealing with permanent urinary incontinence worse than dealing with metastatic prostate cancer (Palmer et al., 2003). Therefore, it is crucial for health care professionals to proactively address the ramifications of UI with afflicted patients and their partners. An honest assessment of their condition coupled with a comprehensive overview of treatment options can allay fears, dispel myths, improve coping skills, and restore a sense of dignity and hope.

Ultimately, treatment for post-prostatectomy urinary incontinence depends upon the etiology, severity, duration, impact on quality of life, and patient's expectations of treatment. Urinary incontinence, especially if it's mild, is not bothersome to some men (Donnellan, Duncan, & MacGregor, 1997) (Litwin, Hays, Fink, & et al., 1995) (Jonier et al., 1996).

As a rule, conservative measures should be tried first. If these measures fail, and the incontinence is bothersome and persists beyond one year, minimally invasive therapies are tried next. Invasive therapies are usually reserved as a last resort (Carlson & Nitti, 2001). Less than 5% of men with post-prostatectomy urinary incontinence require surgical intervention (Peyromaure et al., 2002).

Behavioral Treatments

Behavioral therapies include supportive care, lifestyle and dietary modifications, pelvic floor exercises, urge and stress inhibition training, medications, psychosocial support, and patient education (Moorhouse et al., 2001) (Chang & Joseph, 1993) (Joseph & Chang, 2000) (Robinson, 2000). Behavioral treatments can improve post-prostatectomy urinary incontinence caused by bladder dysfunction and urethral sphincter deficiency.

Supportive care

Commonsense measures can improve urinary continence, minimize embarrassment, and prevent incontinence-related side effects. For instance, proper use of absorbent products can contain urinary leakage, prevent skin maceration, and avoid embarrassing and costly soiling of clothes and upholstery. Although men may have initial reservations about using absorbent products, endorsement from their healthcare

provider coupled with practical advice about the size, style, absorbency, relative cost, local availability, and strategies for discrete storage and disposal can usually overcome this reluctance and restore a sense of security (Johnson et al., 2000) (Moorhouse et al., 2001). Light pads are designed to contain 6-10 oz. of fluid; guards contain moderate amounts of fluid (10-14 oz.); undergarments contain moderate to heavy amounts of fluid (14-17 oz), and briefs contain heavy amounts of fluid (> 17 ounces) (Newman & Dzurinko, 1999) (Moorhouse et al., 2001).

Routinely changing damp pads, cleansing after incontinent episodes, and applying a moisturizer, emollient, or protective skin barrier can help prevent skin irritation and minimize unpleasant urine odors. Using deodorizing sprays, tablets, and liquid drops, and cleansing incontinent devices with appliance cleansers can also neutralize urine odor (Verdell, 2001). Additionally, men can equip themselves with a pocket-size emergency 'spill kit', which contains disposable skin wipes, a spare pad, and a zip-lock plastic bag for disposal. A spare kit can be tucked in a coat or pants pocket and discretely stowed elsewhere for ready access.

Other practical measures include wearing dark washable fabrics and using a plastic mattress pad on bedding and a waterproof pad on car and household upholstery. Finally, hiding a sealed container under the front seat of the car can serve as a makeshift urinal in the case of an emergency.

Judicious use of a penile clamp also makes it easier to resume social activities, however certain precautions must be observed. Patients should be properly fitted for a penile clamp by their healthcare provider and then taught how to use the device. Based upon their fluid intake and bladder capacity, the clamp should be released to permit

voiding at least every few hours. In addition, the clamp should be cleansed regularly and it should not be worn continuously, particularly during sleeping hours, or used if there is a urinary tract infection. Finally, it should not be applied too tightly otherwise it can cause urethral trauma and skin breakdown (Moorhouse et al., 2001). Patients should be advised to discontinue usage and contact their healthcare professional if the clamp causes penile pain or if there is any evidence of skin breakdown, blood in the urine, or pain with urination.

Dietary and Lifestyle Modifications

Avoiding urinary irritants such as tobacco products, acidic and hot and spicy foods, and alcoholic and caffeinated beverages can improve urinary urgency incontinence (Bottomley, 2000) (Moorhouse et al., 2001) (Robinson, 2000). Adequate fluid intake is also important. Men with post-prostatectomy urinary incontinence often compensate by restricting their fluid intake. However, fluid restriction can be counterproductive. Dehydration causes constipation and produces acidic malodorous urine, both of which aggravate bladder symptoms. Therefore, men with PUI should drink at least 1200-1500 ml of fluid daily to prevent dehydration. In addition to drinking sufficient water, constipation can be prevented by consuming 25-30 grams of fiber daily, including at least 5 daily servings of fruits and vegetables, deep breathing, and regular exercise (Bottomley, 2000) (Robinson, 2000).

Pelvic Floor Exercises

The long-term benefit of pelvic floor exercises (PMEs) to improve urinary incontinence in women is supported by numerous scientific studies (Hahn, Milsom, & Ekuland, 1993) (Mouritsen, Frimoft-Moller, & Moller, 1991). On the other hand, the

value of using PMEs for men with post-prostatectomy urinary incontinence is controversial, particularly for men with severe urinary incontinence and urinary incontinence that lasts beyond 12 months (Bales et al., 2000) (Carson & Nitti, 2001).

The goal of PMEs is to increase the strength and endurance of the pubococcygeus and puborectalis muscles that surround the urethra. Contraction of these two muscles with simultaneous relaxation of abdominal musculature improves urinary stress incontinence by increasing urethral resistance and lowering intra-abdominal pressure. Furthermore, PMEs can interrupt detrusor contractions caused by detrusor instability via a feedback inhibition mechanism that is mediated by the pelvic nerve (Bump, Hurt, Fantl, & Wyman, 1991) (VanKampen et al., 2000).

Although the long-term benefit is uncertain, some studies imply that PMEs using biofeedback training with or without electrical stimulation may improve urinary symptoms and facilitate an earlier return of urinary continence (Burgio, Stutzman, & Engel, 1989) (Chang, Tsai, & Huang, 1998) (Jackson, Emerson, & Johnston, 1996) (Mathewson-Chapman, 1997) (Sueppel et al., 2001) (VanKampen et al., 2000) (Moore, Griffiths, & Hughton, 1999).

The most encouraging results of PMEs using biofeedback training were reported by VanKampen *et al.* (VanKampen et al., 2000). One hundred two men were randomized to a placebo group that received sham electrotherapy and a treatment group that received PMEs and biofeedback. Patients that were unable to generate sufficient PMEs received electrical stimulation with an anal probe to teach them how to contract their pelvic muscles. Both groups were treated by the same therapist for up to a year or until they became continent. At three months, 88% of the treatment group was continent versus

56% in the placebo group. At one year, 95% of the treatment group was continent versus 81% of the treatment group. A visual analog scale and a 24-hour pad test measured continence, with continence being defined as a urine loss of 2 grams or less in 24 hours. The treatment group also improved in the degree of incontinence (VanKampen et al., 2000).

In contrast, another randomized prospective study did not demonstrate any benefit of PME's for treating post-prostatectomy urinary incontinence. Bales *et al.* randomized 100 men to two groups. The treatment group was taught how to perform PME's using biofeedback 2 to 4 weeks prior to radical prostatectomy. Surface electrodes were used to access muscle strength and contractions. Men were instructed to perform 10 to 15 contractions lasting from 5 to 10 seconds, four times daily before surgery and again once their foley catheter was removed. Men in the verbal instruction group received written and brief verbal instructions on how to perform PME's and were told to follow the same routine as the treatment group. Monthly assessments were made during the first 4 months and then again at 6 months after surgery. There was no statistical difference in overall continence or rate of return between the two groups (94% [44 of 47] in the biofeedback group and 96% [48 of 50] in the control group)(Bales et al., 2000) (Diokno, 1998).

Opinions also vary about the optimal time to initiate PME's (Assad, 2000) (Diokno, 1998) (Peyromaure et al., 2002) (Sueppel et al., 2001) and the best way to teach pelvic muscle exercises. Two studies in women and one study in men with post-prostatectomy urinary incontinence demonstrated superior results with biofeedback versus verbal instructions (Burgio, Robinson, & Engel, 1986) (Shepard & Montgomery,

1983) (Sueppel et al., 2001), whereas several studies in men with post prostatectomy urinary incontinence did not show a statistically significant difference between the two teaching methods (Bales et al., 2000; Moore et al., 1999). Moore *et al.* studied 63 men that were divided into three treatment groups. The first group received brief written and verbal instructions. The second group received instruction from a physiotherapist for 30 minutes two times weekly for 12 weeks. The third group received the same protocol as the second group plus biofeedback training. While all three groups showed marked improvement – 24-hour pad use went from 463 to 115 Gm - there was no statistical difference between the three groups (Moore et al., 1999).

Although pelvic floor exercises don't cure post-prostatectomy urinary incontinence, they are a reasonable intervention for motivated patients, especially for men with urinary urgency incontinence and milder forms of urinary stress incontinence (Moorhouse et al., 2001) (Peyromaure et al., 2002) (Sueppel et al., 2001).

Urge and stress inhibition techniques

Voiding 'by the clock' and using pelvic floor exercises can improve urinary urgency and stress incontinence (Moorhouse et al., 2001) (Bottomley, 2000) (Palmer, 1994). At the first sensation of an impending bladder contraction, men should immediately stop what they are doing and quickly perform three quick PME's lasting 3-6 seconds each. Once the contraction dissipates, they should proceed to the nearest bathroom and empty their bladder. Once urge inhibition has been mastered, men with urgency incontinence can be taught how to gradually increase the interval between voiding (Moorhouse et al., 2001). A voiding diary provides information about timing intervals and guides the target volume. The aim is to gradually increase the interval

between voiding until an acceptable bladder volume and voiding frequency is achieved. Urgency training, judicious fluid intake, and selective medications can help reach this goal. Even so, if voiding is delayed too long, urgency incontinence can still occur.

Anticipating events that provoke urinary stress incontinence can also improve continence. A voiding diary can help identify common triggers. For instance, if urinary incontinence is induced by sudden changes in position, men can prevent urinary leakage by taking corrective measures beforehand. Before changing position, men should perform three quick PME's and then hold the last contraction once they start to move.

Post void dribbling of urine that is pooled in the bulbous urethra is another complaint that can respond to conservative measures. Gently massaging the bulbous urethra beneath the scrotum with the tips of the index and middle fingers and then 'milking' the urethra forward to the tip of the penis can expel the last few drops of urine (Meaglia et al., 1990). Pooling of urine in the bulbous urethra can be prevented by lowering pants to mid thigh before voiding since urine can become trapped when the bulbous urethral is compressed against the pants 'fly'.

Medications

The physiology of voiding is complex and involves input from the central nervous system and the peripheral autonomic and somatic nervous systems. During bladder storage, input from the central nervous system inhibits bladder contractions. In addition, input from the sympathetic nervous system causes relaxation of the bladder and contraction of the striated musculature of the urethra. Sacral parasympathetic nerves that discharge acetylcholine to muscarinic receptors in the bladder and urethra facilitate bladder contractions and urethral relaxation (Wein, 1991).

The mainstay of treating of detrusor instability is antimuscarinic medication. Anticholinergic medications such as oxybutynin chloride (Ditropan) and tolterodine (Detrol) can increase bladder capacity and decrease urinary urgency by blocking muscarinic receptors in bladder musculature. Common side effects include dry mouth, visual disturbances, drowsiness and constipation (Wein, 1991). Once-a-day dosing and time-release preparations decrease the incidence of side effects. Smooth muscle relaxants such as flavoxate hydrochloride (Urispas) also inhibit detrusor muscle overactivity and exhibit similar side effects as other anticholinergic medications (Wein, 1991). For best effect, medications should be integrated with a program of timed voiding, urge and stress inhibition, and pelvic floor exercises.

Other novel therapies are also under investigation for intractable detrusor instability. Injecting botulinum toxin directly into the detrusor muscle via a needle passed through a cystoscope shows promise. Installation of an analog of capsaicin called resiniferatoxin, can prevent DI by gradually depolarizing dorsal root ganglion neurons (Chancellor, 2003).

Urinary incontinence due to sphincteric injury can theoretically be improved by prescribing sympathomimetic medications such as ephedrine that increase urethral pressure by potentiating alpha-adrenergic receptor activity. Unfortunately, this class of medications is rarely helpful for post-prostatectomy urinary incontinence, and their use is limited by significant side effects (Parra et al., 1997).

Finally, if patients are taking diuretic medications, timing of the medication should be adjusted to facilitate access to toilet facilities.

Psychosocial support

According to some reports, men with urinary incontinence do not experience a significant difference in overall quality of life when compared to men without prostate cancer (Litwin et al., 1995) (Yarbro & Ferrans, 1998). Furthermore, abnormalities in sexual function and urinary and bowel domains are often seen in age-comparable men that have not been diagnosed or treated for prostate cancer (Litwin et al., 1995). In addition, experiencing more urinary symptoms does not necessarily correlate with a poorer quality of life (Shrader-Bogen, Kjelberg, McPherson, & Murray, 1997).

In contradistinction, other researchers report that urinary incontinence can shatter body image and sense of manhood (Braslis et al., 1995). Furthermore UI can evoke feelings of anger, confusion, and depression (Braslis et al., 1995) (Palmer et al., 2003) (Phillips et al., 2000). These negative emotional responses are provoked by a sense of loss of control (Heyman & Rosner, 1996) (Rondorf-Klym & Colling, 2003). In addition, men with prostate cancer typically suppress anger and minimize the effects of disease (Rondorf-Klym & Colling, 2003). Moreover, men that are afflicted with urinary incontinence may even assume a dual identity: a public identity that is indistinguishable from a continent man since the experience of UI is held within, and a private identity that silently harbors feelings of shame and humiliation. If continence is not fully restored, men may begin a process of renegotiating a new sense of self that is accepting of their leaking body (Paterson, 2000).

As a consequence of urinary incontinence, men are apt to alter their social activities and avoid sexual activity (Braslis et al., 1995) (Butler, Downe-Wamboldt, Marsh, Bell, & Jarvi, 2000) (Perez & Webster, 1992) (Yarbro & Ferrans, 1998). Herr

reported that 26% of men limited physical activities because of urinary incontinence and more than half of the men expressed moderate to severe emotional distress (Herr, 1994).

Despite serious consequences following radical prostatectomy, the majority of men with PUI do not regret their decision and would opt for the same treatment again (Herr, 1994) (Stanford, Feng, & Hamilton, 2000). Nevertheless, duration of incontinence and racial differences must be taken into consideration. Although 83% of men with incontinence lasting 1 to 3 years would opt for surgery again, only 47% of men polled at five years following surgery would make the same choice again (Herr, 1994). Similarly, black and Hispanic males are less inclined to select surgery again than are white males. In a survey of 1291 black, white, and Hispanic men ages 39-79 that were 18 months or more following surgery, 75.5% of the men overall said they were satisfied or pleased with their treatment and 71.5% would choose surgery again. The breakdown, though varied according to race: 76.1% whites, but only 61.4% Hispanic and 56.4% black males would undergo a radical prostatectomy again (Stanford, Feng, & Hamilton, 2000).

A baseline preoperative quality of life questionnaire and a follow-up questionnaire at post-operative follow-up visits can highlight issues that should be explored. The RAND 36-Item Health Survey and the UCLA Prostate Cancer Index are two validated questionnaires that provide general and prostate cancer-specific quality of life information (Litwin et al., 1998) (McHorney, Kosinski, & Ware, 1994) (Ware & Shervourne, 1992). The patient's spouse or partner should also be part of the discussion since they may actually suffer more distress than does their afflicted male partner (Kornblith et al., 1994). When health care professionals include both partners in the discussion, it provides a safe forum for honest communication (Butler et al, 2000). If

issues remain unresolved, timely referral for psychological counseling should be considered.

Education

The most significant element affecting postoperative recovery and adjustment to urinary incontinence is lack of knowledge (Herzog et al., 1989) (Moore & Estey, 1999). According to Rondorf-Klym and Colling (2003), patients deserve the following four items from their healthcare providers: (1) a thorough assessment of the patient's QOL preferences before proceeding with an intervention; (2) evidence-based data regarding potential side effects of treatments; (3) clear and concise information that address the concerns of patients and their partners, and; (4) focused counseling that address patient-specific problems (Rondorf-Klym & Colling, 2003). Without such knowledge, healthcare professionals may focus on long-term goals without adequately addressing short-term consequences of therapy (Moore & Estey, 1999). Factors that challenge a health care professional's ability to effectively communication with prostate cancer patients include poor timing of information, inability to retain or understand medical information, and a perceived or actual lack of support (Moore & Estey, 1999).

The groundwork for managing UI should begin with the preoperative discussion about radical prostatectomy. Specifically, men that elect to undergo a radical prostatectomy should receive a candid overview of the cause, incidence, natural history, and management of urinary incontinence along with a list of reliable recourses. An informative handout can serve as a handy reference (see figure 1). Pertinent pointers from the handout can be reviewed prior to discharge from the hospital and at every follow-up visit until continence is regained. Repetition is important since men are preoccupied with

the immediate threat of death during the initial discussion about the diagnosis and treatment of prostate cancer. Therefore, they often fail to process or gloss over information about the incidence and management of treatment-related side effects (Heyman & Rosner, 1996) (Moore & Estey, 1999) (Palmer et al., 2003).

Moore et al surveyed 63 men 8 weeks following radical prostatectomy. At the initial visit, a single urologist discussed treatment options and associated risk and benefits with all the same men. They were also encouraged to view a video about prostate cancer, visit a radiation oncologist, and make a follow-up appointment to discuss any remaining questions. Nevertheless, two months following surgery, only a few men recalled that the urologist had mentioned the possibility of urinary incontinence and erectile dysfunction, and none could remember details of the preoperative discussion.

Even when men recall being told that urinary incontinence was a possibility, the actual event usually comes as a shock (Moore & Estey, 1999) (O'Rourke, 2000). Men and their spouses/partners feel ill prepared to deal with such practical matters as catheter care and strategies to contain urinary leakage (Butler et al., 2000) (Chang & Joseph, 1993) (Moore & Estey, 1999) (Palmer et al., 2003). In a non-randomized survey of 114 men that were less than two years (n=36), 2-5 years (n=40), and five plus years (n=37) since radical prostatectomy, 80% of the men recalled being told that urinary incontinence was a possibility (Palmer et al., 2003). Even so, 39% of the men overall and 59% of men in the 5 years plus group reported that they were not adequately prepared to manage urinary incontinence. They wanted honest information about the incidence and natural history of urinary incontinence, explicit instructions on how to perform Kegel exercises, and access to appropriate literature about incontinence (Palmer et al., 2003). Fitch et al

also reported that only 37% of men had received adequate information about post-prostatectomy urinary incontinence (Fitch, Gray, Fransseo, & Johnson, 2000).

How men perceive the results of their cancer surgery can also influence their quality of life and postoperative recovery. Persistent or recurrent cancer has an adverse effect (Phillips et al., 2000). It is also important to include partners in the discussion about quality of life issues since men often defer health decisions to their partners (Moorhouse et al., 2001) (Palmer et al., 2003).

Information needs also vary according to the time frame. Although prostate cancer care is addressed in stages, it is lived as a continuum (Heyman & Rosner, 1996). According to Heyman et al, there is an early and late phase of prostate cancer care. Diagnosis and treatment take center stage during the 'early phase'. Facing death, selecting a treatment, and contending with loss of control are three key issues in this phase. Coping skills include searching for information, linking with others, and seeking professionals who show that they care. In the second or 'late phase', living with cancer assumes greater importance and issues revolve around side effects, the fear of cancer recurrence, and treatment. Coping strategies include maintaining a positive outlook, redefining intimacy, and expanding knowledge. The issue of control and death are constant companions throughout the cancer journey, however the prospect of death experienced in the early phase is later viewed as a lurking menace, and an earlier attempt to control events that threaten survival is replaced by an effort to control everyday routines and reestablish a normal life (Heyman & Rosner, 1996).

Similarly, it is helpful to frame the return to continence as a step-wise process. Chang et al propose that irrespective of the time frame, return to continence is preceded

by four stages (Chang & Joseph, 1993). The first stage is *awareness* of when wetness occurs. Passive leakage into absorbent pads or the use of urinary containment devices over the long haul can negate the need to relearn normal voiding. The second stage is *appreciation* of the mechanics of normal voiding and a renewed attempt to control urination. The third stage is *exploration*. Men are willing to take risks, even in social situations, and discard incontinence devices. The final stage is *mastery*.

A timely phone call from their doctor's office, especially in the early postoperative recovery period, can answer questions and allay fears. Providing patients with appropriate information can improve coping skills, restore a sense of control, and improve quality of life. Helpful resources include informative videos, reliable web sites with evidence-based data and treatment recommendations, and written literature from organizations such as the American Cancer Society and National Association for Continence (Butler et al., 2000) (Maliski, Heilemann, & McCorkle, 2001) (Rondorf-Klym & Colling, 2003). Men may also find it helpful to speak with men that have had radical prostate surgery, or to attend a prostate cancer support group.

Surgical interventions

When conservative measures fail to restore an acceptable level of urinary continence, minimally invasive surgical procedures are usually tried first, especially for men with mild to moderate urinary leakage. Invasive surgical procedures are usually reserved for men with severe urinary incontinence that has not responded to other measures.

Transurethral surgery. In the rare situation when post-prostatectomy urinary incontinence is due to overflow incontinence caused by residual adenoma, bladder neck

contracture, or urethral stricture, transurethral resection or incision of the obstructing scar tissue can be curative (Foote et al., 1991). Incising rather than resecting the bladder neck is usually preferable, though, since an incision lessens the chance of damaging adjacent normal urethral tissue and the distal urethral sphincter mechanism.

Transurethral injection of “bulking” material beneath the urethral mucosa is a first-line treatment for persistent post-prostatectomy urinary incontinence. The urethra has four distinct layers proceeding from inside out: mucosa, lamina propria, muscularis, and adventitia (Elsargany & Ghoniem, 1998). Over the past 50 years, a variety of materials have been injected into the space between the urethral mucosa and lamina propria in an attempt to create an extrinsic “bulk” that will physically increase urethral resistance (Kylmälä, Tainio, Raitnen, & Tammela, 2003). Although the concept is attractive – it’s quick, causes few side effects, and can be performed under local anesthesia in an outpatient setting – the long-term success rate is only 20% or less (Comiter, Sullivan, & Yalla, 1997).

The success rate is influenced by technical factors, which include the choice of materials, patient’s anatomy, surgeon’s experience, length of follow-up, and variations in study design and terminology. Factors that negatively impact success rates include previous transurethral surgery, radiation therapy, severe urinary incontinence, and scarring of the urethral mucosa (Carlson & Nitti, 2001)(Elsargany & Ghoniem, 1998). If the mucosa is tightly adherent to the underlying lamina propria, it is difficult to develop a submucosal wheal of bulking material. In addition, some degree of external urethral sphincter function is necessary for a successful implant since bulking agents are only a

support and not a substitute for external urethral sphincter function (Colombo, Augustin, Breinl, Schips, & Hubmer, 1997).

Beginning in the 1970s, Teflon became the first commercially available injectable agent for post-prostatectomy urinary incontinence (Politano, 1992). Although the initial reports were encouraging, Teflon injection therapy fell into disfavor because of poor long-term success rates ranging between 17-35%, and its tendency to migrate elsewhere in the body (Kylmäälä et al., 2003) (Malizia et al., 1984). Autologous fat has also been tried, but rapid absorption compromises long-term benefit (Kylmäälä et al., 2003).

Attention shifted to bovine cross-linked collagen in 1993 when it was approved as an injectable agent for urinary incontinence. Unfortunately, collagen is also rapidly absorbed, requires multiple injections, and seldom provides a durable cure. Furthermore, collagen can cause a delayed hypersensitivity reaction (Kylmäälä et al., 2003) (Yalla, 1998). Carlson summarized the success rate of collagen injections reported in 8 studies dating from 1994 to 1999 (Carlson & Nitti, 2001). The mean number of treatment sessions ranged from 1.0 to 4.4 with a mean follow-up of 8.5 to 28 months. Although the 'success' rate ranged between 36-69%, the 'cure' rate (total dryness) was only 4-20%.

Collagen is also expensive. Brown et al reported that the projected per treatment cost of collagen injection therapy in a Mayo Clinic population would average between \$4300 for Medicare and \$5625 for non-Medicare patients (assuming 3 syringes of collagen per treatment session). The cost escalated to \$17,200 and \$22,500 respectively if four treatment sessions were required. In comparison, the cost of a GU sphincter averaged \$15,400 and \$20,300 for a similar population of men. An estimated 22% re-operation rate increased the cost to \$18,850 and \$24,847 respectively. Alternatively, the

cost of using the 5 of the least expensive pads (\$0.52 each) daily would amount to \$9497 over ten years (Brown, Elliott, & Barrett, 1998).

Similarly, in a series that compared the cost of collagen injections with an artificial GU sphincter insertion, the lifetime cost of collagen injections amounted to \$31,900 compared to \$14,100 for a GU sphincter. The success rates were also discordant. Ten men that were matched for age, prior radiation therapy, degree of incontinence, time since surgery, and working status were compared. In the collagen-treated group, one man was cured, 3 were improved and 6 men were no better. In contrast, 8 out of 10 men that received a GU sphincter were dry and the remaining two men were improved (Strothers, Chopra, & Raz, 1995).

Macroplastique is another promising bulking agent. Macroplastique is composed of vulcanized silicone rubber macroparticles measuring 188 μ m each. Following injection, a foreign body reaction encases the particles and prevents them from migrating elsewhere. Unlike collagen, Macroplastique does not elicit an allergic reaction. Kylmälä et al treated 50 men with Macroplastique, 46 of whom had undergone a radical prostatectomy. The mean 1-hour pad test loss was 48.3 cc (range 3-260cc). After the first injection, 6 men were completely dry and 28 were improved. Among 40 men that underwent a second injection, 10 more men became dry and 5 were significantly improved. Twenty-three men were treated a third time and 9 more men became completely dry. Eight men received a fourth injection; 5 became dry and 1 man improved. Overall, 30 men became totally dry, 12 improved, and 8 did not benefit. Significantly, at 5 years of follow-up, there were no long-term relapses (Kylmälä et al., 2003). Colombo also reports encouraging results (Colombo et al., 1997). Six men with

severe PUI requiring at least 5 pads per day were treated with Macroplastique. The mean time since surgery was 28 months (range 12-55 months) and the mean age was 61 years. At a mean follow-up of 15.5 months, five patients were dry and one patient was significantly improved but still required 2 pads/day. Three patients required a second injection.

Artificial GU sphincter. The artificial GU sphincter has the best long-term success rate for treating severe post-prostatectomy urinary incontinence. Over 40,000 units have been implanted since its introduction in 1972 (Petrou, Elliott, & Barrett, 2000). The original design has undergone multiple refinements to improve function and reduce the risk of mechanical failure (Montague, 1989). The current version (American Medical Systems 800 model), which was first introduced in 1983, consists of a control assembly pump, a urethral cuff available in 12 different sizes, and a pressure-controlling balloon reservoir available in 5 pressure ranges. The cuff is implanted circumferentially around the bulbous urethra. The pump is positioned in the scrotum and the reservoir is placed in the perivesical space. Fluid is transferred from the cuff to the reservoir during voiding and back again once urination is completed.

Factors that increase the likelihood of a successful implant include healthy tissue in the pelvis and urethra, normal bladder compliance, absence of detrusor instability, sterile urine, good manual dexterity and mental faculties, and realistic postoperative expectations (Petrou et al., 2000).

With a follow-up ranging between 18-44 months, the overall success rate (2 pads daily or less) in 5 studies ranged between 59-90% (Schaeffer, 2002). Although 'total' continence only ranges between 36-63%, social continence (2 pads/day or less) and

patient satisfaction is consistently greater than 90% (Petrou et al., 2000). Contemporary series using the AMS 800 model artificial GU sphincter report a 7.6% revision rate due to mechanical failure and a 9% revision rate due to non-mechanical failure. The infection rate ranges from 1.8-10% and the urethral erosion rate ranges from 0-8.1% (Petrou et al., 2000).

Suburethral sling. Kaufman first reported external compression of the bulbous urethra using a sling of synthetic material in 1970, however due to poor long term success rates the Kaufman prosthesis never gained widespread acceptance (Comiter, 2002) (Kaufman, 1970). Schaeffer and Stamey resurrected the concept in 1998 by using bolsters made of vascular graft. They reported a promising 56% cure rate and 8% improvement rate in 64 men at a mean 22.4 months of follow-up. The bolsters were passed beneath the bulbous urethra and secured to the anterior rectus fascia. Retightening of the sutures was required in 27% of the men to achieve the goal of a leak point of 150 cm water pressure. Leak point pressure is the amount of abdominal pressure required to produce urinary leakage. The authors also reported a 3% infection rate and 6% urethral erosion rate (Schaeffer, Clemens, & Ferrari, 1998).

Jacoby modified the technique by using bone anchors to attach the suburethral sling to the adjacent pelvic bone. Furthermore, the sling tension was adjusted intraoperatively to achieve an abdominal leak point pressure of 50 cm of water pressure. Fourteen men with urinary stress incontinence were treated, including 8 men with post-prostatectomy urinary incontinence. The mean age of the men was 67 years (range 56-74 years) with a mean time since surgery of 2.5 years (range 1.5-5 years) There were no complications at a mean follow-up of 12.2 months (range 4-20 months). Overall, 12 of 14

men were cured (no leakage) and 2 were improved (50% fewer pads) (Madjar et al., 2001).

Comiter *et al.* reported similar successful results in a group of 21 men that were treated with a bone-anchored suburethral polypropylene mesh sling. Sling tension was adjusted to achieve a closure pressure of 60 cm of water. At a mean follow-up of 12 months (range 5-21 months), 16 men (76%) were cured (no pads), 3 (14%) were substantially improved (1 pad or less daily), 1 patient (5%) was somewhat improved (2 pads daily), and 1 patient (5%) was unchanged. Of the 18 men that had post-prostatectomy urinary incontinence, 13 were cured. There were no significant side effects or late-term failures up to 21 months (Comiter et al., 1997).

In comparison with a GU sphincter, a suburethral sling is less likely to cause urethral erosion since it only compresses the ventral urethra and thus doesn't interfere with the urethral blood flow, unlike a GU sphincter, which encompasses the bulbous urethra. A suburethral sling is also less expensive than a GU sphincter. In a University of Arizona study, the cost of suburethral sling materials amounted to \$1,156 versus \$5115 for a GU sphincter (Comiter et al., 1997). Nevertheless, the use of bone anchors increases the risk of osteomyelitis and synthetic sling material increases the risk for infection (Comiter et al., 1997).

Other surgical therapies. For challenging cases of post-prostatectomy urinary incontinence caused by ISD, the gracilis muscle can be mobilized with an intact neurovascular supply and wrapped around the urethra to form a neosphincter (Parra et al., 1997).

Post-prostatectomy urinary incontinence caused by intractable detrusor instability may be amenable to neuromodulation using sacral nerve stimulation (Carlson & Nitti, 2001). In the rare situation where detrusor instability is unresponsive to all other measures, augmentation cystoplasty is a consideration (Parra et al., 1997). Finally, refractory cases of debilitating cases of post-prostatectomy urinary incontinence may ultimately require urinary diversion (Carlson & Nitti, 2001).

Implications for Nursing

Urinary incontinence is a common sequale following radical prostatectomy. At least 50% of men experience temporary urinary incontinence for months following radical prostatectomy. Additionally, a significant number of men continue to experience at least occasional incontinence beyond one year following surgery (Palmer, 2000). Although individual tolerance to urinary incontinence varies, persistent urinary incontinence can dramatically diminish the quality of life of men and their partners (Braslis et al., 1995) (Herr, 1994) (Heyman & Rosner, 1996) (Kornblith et al., 1994) (Palmer et al., 2003) (Rondorf-Klym & Colling, 2003). Therefore, an accurate nursing assessment of the physical, physiological, and psychosocial aspect of urinary incontinence is essential (Chang & Joseph, 1993).

Nurses can help patients and their loved ones allay anxiety by reframing urinary incontinence as part of the healing process rather than as a dysfunction. By so doing,

nurses can help couples regain a sense of mastery over life's circumstances and strengthen intimacy (Maliski et al., 2001). Furthermore, since the definition of a successful endpoint varies, nurses can help patients define and achieve realistic continence goals (Chang & Joseph, 1993).

At every step of the way, nurses can facilitate the recovery process and promote mastery by providing information, helping interpret medical information, dispelling misinformation, facilitating self-care skills, confirming progress, and providing emotional support (Maliski et al., 2001).

Conclusion

Once prostate cancer is diagnosed and treated, a man's life is permanently altered. Although the goal of radical prostatectomy is to add years to life, associated side effects can offset gains in longevity (Litwin et al., 1995). Even minor degrees of urinary incontinence come as a shock to most men. Persistent urinary incontinence, especially if it is severe, can even be more terrifying than the threat of cancer for some men. On the other hand, when patients and their partners /spouses are properly informed about the natural course of post-prostatectomy urinary incontinence and are provided with reliable information about treatment options, self-help skills, and reliable resources, they become more resilient, enjoy a better quality of life and are less likely to succumb to hopelessness and despair.

Figure 1

Practical tips for managing urinary leakage after prostate surgery

Urinary leakage also called urinary incontinence (abbreviated *UI*) is defined as the accidental loss of urine caused by coughing, straining or not being able to get to the bathroom in time when there is a sudden urge to urinate. More than half of men experience some degree of urinary leakage after the prostate is removed for prostate cancer. Fortunately, urinary control usually gets better with time: about half to three quarters of men are dry within three months, more than three quarters are dry by six months, and most men are dry by one year. Although it is common to lose a few drops of urine with straining or coughing, especially later in the day when muscles are weaker, significant *UI* beyond one year is unusual. In the meantime, the steps listed below can help effectively manage urinary incontinence.

Step 1: Before surgery:

(1) Learn how to perform *pelvic floor exercises* (abbreviated *PMEs*) by contracting (squeezing) the muscles that are used to start and stop urine flow. These exercises can help prevent urinary leakage. Be sure not to contract facial, abdominal, or buttock muscles or lift your shoulders at the same time. Begin by contracting the pelvic muscles in “quick flicks” lasting 3-6 seconds at a time. Next, practice contracting pelvic muscles for longer periods of time until you can squeeze the muscles continuously for 10 seconds. Rest 10 seconds between each of the longer contractions. Gradually increase the number

of 10-second contractions in a lying, sitting, and standing position. Try to perform 10 to 20 sets of the longer contractions three times daily in each position. (2) If you smoke, quit.

Step 2: Before going home from the hospital:

(1) Make sure you understand how to take care of your catheter (the tube that drains urine from your bladder). The catheter should be comfortably attached to your leg with a small piece of tape or an elastic strap. You can take a shower with your catheter and the attached drainage bag. Ask the nurse to teach you how to drain the bag where urine collects. Leaking around the catheter occurs when forceful bladder spasms try to push the catheter out of the bladder. However a balloon on the tip of the catheter prevents the catheter from falling out, so urine leaks around the catheter to the outside instead.

Bladder spasms can also make it feel like you have to urinate or have a bowel movement. These sensations will go away once the catheter is removed. If you develop bladder spasms, make sure that the catheter isn't kinked and urine is flowing into the tubing. If the problem continues, the catheter stops draining, or you develop a high fever contact your healthcare provider. A small amount of blood in the urine or around the tip of the penis where the catheter comes out is nothing to worry about. However, if the penis becomes, apply a small dab of antibiotic ointment around the opening several times daily.

The catheter slips out easily once fluid is removed from the balloon through a syringe that is plugged into a side arm of the catheter. (3) Review the suggestions listed in this handout with your nurse and healthcare provider before going home.

Step 3: Self-care practices after you get home:

(1) Bring an absorbent pad when you come to the office to have your catheter removed. Insert the absorbent side up into your underwear before getting off the exam table (2) Record a three-day *voiding diary*. Make a list of 7 columns on a piece of lined paper. At the top of each column, list the time of day, type and amount of fluid intake, type and amount of food intake, amount voided in ounces, amount of leakage (small, medium, or large), activity when leakage occurred, and presence or absence of urgency. Record the appropriate information in each column for a total of three days. (3) Avoid foods and beverages that are acidic or contain caffeine since they can irritate the bladder. Also drink at least a quart of water daily. Dehydration causes constipation and produces acid urine that irritates the bladder and increases urine odor. (4) Refer to the bladder diary and identify things that cause urinary leakage and avoid them if possible. Also, try urinating “by the clock” at regular intervals *before* the onset of urgent urination. For example, if you leak when you wait more than 2 hours to urinate, set your watch and urinate every hour and a half. If you continue to experience urgent urination, ask your healthcare provider about prescribing anti-spasm medication. (5) Practice freezing and then squeezing three quick *PMEs* (*quick flicks*) when a sudden urge to urinate strikes. Once the urgency sensation passes, proceed directly to a restroom and urinate. Before changing position or coughing, practice three quick flicks of *PMEs* and hold the last contraction while changing position. (5) If you drip urine after you’ve just gone to the bathroom, try massaging the urethra (tube that carries urine to the outside) beneath the scrotal sac with the tips of your index and middle fingers. “Milk” the last few drops to the outside before stepping away from the toilet. Also, lower your pants to mid thigh

before urinating to prevent urine from becoming trapped in the urethra where it's pressed against the pants 'fly'. (6) Use a moist wipe after urinary leakage to cleanse the skin, and apply a protective moisturizing skin cream or a film-like material if the leakage is severe or skin becomes irritated. Deodorizing sprays and liquids and tablets can help contain urine odor. A variety of disposable and reusable absorbent products are available for mild, moderate, and severe urine loss. Other devices to control urinary leakage are also available if necessary. Detailed information about products and where to buy them is available from the National Association for Continence 1-800-252-3337, www.nafc.org (7) Assemble a "spill kit" with protective skin wipes, a zip-lock plastic bag for disposal, and a spare absorbent pad. Keep a spare kit in a pants or coat pocket, in the car, and at work. (8) Wearing dark pants and using protective pads on upholstery and bedding can provide added security.

Step 4: Spiritual Care: It is normal to experience mood swings following major surgery, especially if there is a complication or concern about cancer recurrence. Share your concerns with your partner, health care provider, and spiritual counselor. Honest communication can dispel unspoken fears and make it easier to handle things.

Step 5: Treatment: If urinary leakage lasts more than one year and it is severe enough to bother you, other tests can be performed to determine the cause of the UI and guide treatment. Fortunately, only five percent of men with UI require surgery to correct urinary leakage. A variety of options are available depending upon the nature and severity of the urinary leakage. A liquid rubber-like material can be injected through a

special instrument into the lining beneath the urethra where it joins the bladder. The injected material creates two blebs that narrow the urinary passage and block urinary leakage. This procedure is performed in the operating room, but you can go home the same day. Another type of operation places a smooth silicone cuff around the urethra. Tubing connects the cuff to a pump located in the scrotal sac and a small golf ball-size reservoir in the pelvis next to the bladder. Squeezing the pump transfers fluid from the cuff to the reservoir to allow urination. Fluid flows back to the cuff after urination is completed. Another type of operation involves placing an inch-wide strip of soft material beneath the base of the urethra. Each end of the 'sling' is anchored to the pelvic bone. The sling compresses the urethra and prevents urinary leakage.

Step 6: Don't give up hope.

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