

Assessing and Addressing Erectile Function Concerns in Patients Postprostatectomy

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Case Study

Mr. J, a 52-year-old African American male, returns to the clinic for routine post-surgical follow-up six weeks after a bilateral nerve-sparing radical retroperitoneal prostatectomy for prostate cancer. Mr. J's surgery was performed at a major comprehensive cancer center by an experienced urologic surgeon. As part of the informed consent process prior to surgery, Mr. J's surgeon informed him about the risk for postoperative erectile dysfunction. He received relevant cancer center statistics and general information regarding postoperative recovery of erectile function specific to the operative procedure and was told about the availability of postoperative erectile function rehabilitation. He completed the International Index of Erectile Function (IIEF) (Rosen et al., 1997) prior to surgery. On the questionnaire, Mr. J indicated that he was able to achieve and maintain an erection most of the time during sexual intercourse, found sexual intercourse highly enjoyable, had a high level of confidence in his ability to get and keep an erection, and felt moderately satisfied with his sex life.

At the six-week postoperative visit, the nurse planned to assess and address Mr. J's concerns regarding postoperative recovery of erectile function. The nurse asked Mr. J

to complete the IIEF to assess his postoperative erectile function. Mr. J verbalized his concerns that he had not noticed penile tumescence or nocturnal erections since the removal of the urinary catheter placed during his surgery. His confidence was very low that he would be able to get and keep an erection because he had largely recovered from surgery. The nurse used this opportunity to review the general information regarding postoperative recovery of erectile function specific to his operative procedure, introduce the topic of erectile function rehabilitation and recovery, institute a teaching program, and allow Mr. J to discuss his concerns.

Clinical Problem Solving

What is the incidence of erectile dysfunction in patients who undergo radical retropubic prostatectomy?

In the immediate postoperative period, virtually all patients will experience erectile dysfunction. When highly experienced surgeons in major academic centers perform bilateral nerve-sparing retropubic prostatectomies, recovery rates of erectile function range from 60%–85% within 24 months of surgery (Burnett, 2005). In patient populations in which only one nerve is spared or if community-based urologic surgeons perform

the procedure, recovery rates are more variable (30%–70%) (Burnett, 2005; Chang, Wood, Kroll, Youssef, & Babaian, 2003). Less than 5% of patients who undergo a non-nerve-sparing procedure achieve functional erectile recovery; however, patients who undergo bilateral sural nerve grafts at the time of the non-nerve-sparing procedure have a 50%–60% recovery rate of functional erections at the two-year follow-up (Chang et al.; Kim et al., 2001).

Which preoperative factors affect the recovery of erectile function?

Three preoperative factors influence the incidence of erectile dysfunction postprostatectomy. The first is the level of preoperative erectile function. Men who have diminished ability to achieve or maintain an erection and may require the use of a phosphodiesterase-type 5 (PDE5) inhibitor such as sildenafil, tadalafil, or vardenafil in the preoperative period are at increased risk for poor recovery of function postoperatively. This risk factor is believed to be related to a morphologic deterioration of the corpus cavernosa, most commonly seen with aging (Montorsi, Briganti, Salonia, Rigatti, & Burnett, 2004).

Do You Have an Interesting Clinical Experience to Share?

Clinical Challenges provides readers with a forum to discuss creative clinical solutions to challenging patient care problems. Case studies or problem descriptions may be submitted with or without discussion or solutions. References, tables, figures, and illustrations can be included. Materials or inquiries should be directed to *Oncology Nursing Forum* Associate Editor Lori A. Williams, RN, DSN, OCN®, AOCN®, at lori.williams@prodigy.net or Susan Moore, RN, MSN, ANP, AOCN®, at smoore46@yahoo.com.

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Age also is a predictor for recovery of erectile function after radical prostatectomy. An inverse correlation exists between the patient's age and recovery of erectile function. A patient undergoing radical prostatectomy at age 55 is more likely to recover function than a patient at age 67, even when the same procedure is performed by the same surgeon. Again, the higher prevalence of erectile dysfunction in older men is related to a morphologic deterioration of the corpus cavernosa with aging (Montorsi et al., 2004).

Third, the expertise of the surgeon is a factor in recovery of function. The nerve-sparing procedure is a technically challenging operation that evolved from the work of Walsh and Donker (1982). The surgeons discovered that surgical severance of the cavernous nerves was the primary cause of erectile dysfunction following radical prostatectomy. Subsequent modification in the surgical procedure led to the development of the nerve-sparing approach. Major academic centers have incorporated this procedure into training programs; however, it is not routinely available or offered in many community-based practices (Burnett, 2005).

Can patients' erectile function be assessed easily in the early postoperative period?

The IIEF is a brief, well-validated, self-administered questionnaire that is scored in terms of the ability to sustain an erection suitable for the completion of intercourse, with sensitivity and specificity for detecting treatment-related changes (Rosen et al., 1997) (see Figure 1). The IIEF contains a total of 15 questions, each rated on a scale of 0–5 or 1–5. The total score is determined by

- Over the past four weeks, how often were you able to get an erection during sexual activity on a scale from 0 (no sexual activity) to 5 (almost always or always)?
- Over the past four weeks, how many times have you attempted sexual intercourse on a scale from 0 (no attempts) to 5 (11+ attempts)?
- Over the past four weeks, how much have you enjoyed intercourse on a scale from 0 (no intercourse) to 5 (very highly enjoyable)?
- Over the past four weeks, how would you rate your level of sexual desire on a scale from 1 (very low or none at all) to 5 (very high)?
- Over the past four weeks, how do you rate your confidence that you could get and keep an erection on a scale from 1 (very low) to 5 (very high)?

Figure 1. Sample Questions From the International Index of Erectile Function

Note. Based on information from Rosen et al., 1997.

adding the number ratings for each question; the questionnaire has a maximum possible score of 75. The lower the score is on the IIEF, the more significant the degree of erectile dysfunction.

A subset of five questions from the IIEF, known as the Sexual Health Inventory for Men (SHIM), was developed as a staging system for erectile dysfunction (Rosen, Cappelleri, Smith, Lipsky, & Pena, 1999). The five questions ask about confidence in getting and maintaining an erection, whether erections are hard enough for penetration and can be maintained after penetration until the completion of intercourse, and whether intercourse is satisfactory to the man. Each question is rated on a scale of 0–5, and a composite score is derived by adding all of the ratings. A score of 21 or less on the SHIM is indicative of some degree of erectile dysfunction.

Urologists often use the SHIM to clinically assess erectile dysfunction following prostatectomy. However, unlike the SHIM, the IIEF assesses the desire for and frequency of sexual activity, issues that might be addressed in a more extended teaching session initiated by a nurse. Ideally, the IIEF or SHIM is incorporated into the baseline assessment prior to surgery, at the six-week postoperative visit, and at subsequent follow-up visits. By reviewing the patient's responses to the questionnaire items, the nurse can identify specific areas of concern for the patient and specific areas of patient education that need to be addressed.

How does the nurse address a topic as sensitive as erectile function during a brief postoperative clinic visit?

Acknowledging that erectile function is a concern for most patients who have undergone radical prostatectomy is the first step. The topic can be introduced with the statement that the two primary concerns patients have postoperatively are incontinence and erectile function (Butler, Downe-Wamboldt, Marsh, Bell, & Jarvi, 2001). Such an acknowledgment provides an opportunity to uncover concerns that the patient may have during a brief visit. Nurses also have the opportunity to reeducate and review with the patient the statistics associated with the recovery of erectile function, the time frame, and the recommended rehabilitation program for recovery.

Which rehabilitation measures are available for the recovery of erectile function?

Current research indicates that early rehabilitation may be beneficial for the recovery of erectile function (Burnett, 2005; Montorsi et al., 1997, 2004). Rehabilitation may consist of daily use of a vacuum erection device (Gontero & Kirby, 2004; Kim, 2002), weekly intracavernosal injections of prostaglandin E1 (Montorsi et al., 1997, 2004), intracor-

poreal injections of trimix (a combination of papaverine, phentolamine, and prostaglandin E1) (Raina et al., 2003), or an oral PDE5 inhibitor (Gontero & Kirby; Kim).

How do the phosphodiesterase-type 5 inhibitors work to correct erectile dysfunction?

The physiologic mechanism of penile erection involves the release of nitric oxide into the corpus cavernosa during sexual stimulation. PDE5 inhibitors enhance the effects of nitric oxide by preventing the degradation of cyclic guanosine monophosphate (cGMP) in the smooth muscle cells of the corpus cavernosa. Nitric oxide acts trans-synaptically to activate an enzyme cascade by stimulation of intracellular guanylate cyclase. The subsequent increase in cGMP produces a change in the intracellular calcium release, resulting in the relaxation of corpus cavernosal and vascular smooth muscle (Carson, Kirby, & Goldstein, 1999). Because sexual stimulation is required to initiate the local release of nitric oxide, the PDE5 inhibitors have no effect in the absence of sexual stimulation (Carson et al.).

What information is important for patients to hear at the six-week postoperative visit regarding the recovery of erectile function?

Patients must understand that virtually all men will experience some degree of erectile dysfunction immediately following radical prostatectomy. Time is an essential component in the recovery process. All patients undergoing unilateral or bilateral nerve-sparing procedures should be informed that recovery may take as many as two years and the mean period of maximum recovery is 18 months (Burnett, 2005). Although specific program recommendations for penile rehabilitation still are under investigation, published research supports the need to initiate some type of therapy intervention as a means of preventing the corporal fibrotic changes that may develop in the absence of postoperative erections (Montorsi et al., 1997, 2004).

In the patient population that does not undergo a nerve-sparing procedure, the options for achieving an erection suitable for intercourse postoperatively currently are limited to autologous bilateral sural nerve grafting at the time of surgery (Burnett, 2003), pharmacologic interventions such as intracavernosal injections of trimix or intra-urethral suppositories (Burnett, 2005), or surgical implantation of a penile prosthesis (Mulcahy, 2000).

What new research is being conducted on the preservation of erectile function following radical prostatectomy?

The use of neuromodulatory therapy is being investigated. Phase II clinical trials are under way to examine the effectiveness of various neuroprotective and neurotropic

Clinical Highlights: Assessing and Addressing Erectile Function Concerns in Patients Postprostatectomy

Definition: Erectile dysfunction is the consistent or recurrent inability to achieve or maintain a penile erection suitable for completion of intercourse.

Incidence: Some degree of erectile dysfunction will occur in virtually all patients undergoing radical prostatectomy. Recovery is based on the following operative factors: the type of procedure performed, the expertise of the surgeon, and the complexity of the procedure. In patients who undergo bilateral nerve-sparing retropubic prostatectomy, 60%–85% will recover erectile function within 24 months of surgery. Those who undergo unilateral nerve-sparing radical prostatectomy have a 50%–70% likelihood of recovering erectile function within 24 months of surgery (Burnett, 2005).

Risk factors: Increasing age, medical comorbidities (e.g., cardiovascular disease, diabetes mellitus), medications (e.g., antihypertensives, antidepressants), and lifestyle factors (e.g., obesity, physical inactivity, cigarette smoking) are risk factors for preoperative erectile dysfunction and optimal recovery of erectile function

in the postoperative period (Burnett, 2005). The risk factors affect baseline penile hemodynamics, which directly impact the ability to achieve and sustain a functional erection (Montorsi, Briganti, Salonia, Rigatti, & Burnett, 2004). The circulatory and structural changes that are associated with hypertension, diabetes, smoking, and aging reduce the function of the nerves and endothelium and result in erectile dysfunction (Andersson, 2003).

Pathophysiology: Postoperative erectile dysfunction following radical prostatectomy most commonly is considered the result of intraoperative damage to the cavernous nerve bundles. Damage to the cavernous nerves is believed to cause the development of neuropraxia, resulting in an absence of the return of early postoperative erections. The early postoperative absence of erections is believed to occur because of corporeal fibrotic changes in the penis, leading to veno-occlusive dysfunction (Montorsi et al., 2004).

Current research: Current research in erectile dysfunction includes clinical trials to assess the effectiveness of rehabilitation in the early postoperative period (Montorsi

et al., 2004), novel compounds directed at neuroprotection and neuroregeneration (Burnett, 2005), autologous sural nerve grafting at the time of radical prostatectomy (Burnett, 2003), and early postoperative pharmacologic intervention with phosphodiesterase-type 5 inhibitors (e.g., sildenafil, tadalafil, vardenafil) (Burnett, 2005).

Andersson, K.E. (2003). Erectile physiological and pathophysiological pathways involved in erectile dysfunction. *Journal of Urology*, 170(2, Pt. 2), S6–S14.

Burnett, A.L. (2003). Neuroprotection and nerve grafts in the treatment of neurogenic erectile dysfunction. *Journal of Urology*, 170(2, Pt. 2), S31–S34.

Burnett, A.L. (2005). Erectile dysfunction following radical prostatectomy. *JAMA*, 293, 2648–2653.

Montorsi, F., Briganti, A., Salonia, A., Rigatti, P., & Burnett, A.L. (2004). Current and future strategies for preventing and managing erectile dysfunction following radical prostatectomy. *European Urology*, 45, 123–133.

interventions. Neuroprotective agents (e.g., immunophilin ligands, vascular endothelial growth factor, growth hormone, sonic hedgehog protein) administered at the time of surgery and in the early postoperative period are under investigation (Burnett, 2005).

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References

- Burnett, A.L. (2003). Neuroprotection and nerve grafts in the treatment of neurogenic erectile dysfunction. *Journal of Urology*, 170(2, Pt. 2), S31–S34.
- Burnett, A.L. (2005). Erectile dysfunction following radical prostatectomy. *JAMA*, 293, 2648–2653.
- Butler, L., Downe-Wamboldt, B., Marsh, S., Bell, D., & Jarvi, K. (2001). Quality of life post radical prostatectomy: A male perspective. *Urologic Nursing*, 21, 283–288.
- Carson, C.C., III, Kirby, R.S., & Goldstein, I. (Eds.). (1999). *Textbook of erectile dysfunction*. Oxford, UK: Isis Medical Media.

- Chang, D.W., Wood, C.G., Kroll, S.S., Youssef, A.A., & Babaian, R.J. (2003). Cavernous nerve reconstruction to preserve erectile function following non-nerve-sparing radical retropubic prostatectomy: A prospective study. *Plastic and Reconstructive Surgery*, 111, 1174–1181.
- Gontero, P., & Kirby, R. (2004). Proerectile pharmacological prophylaxis following nerve-sparing radical prostatectomy (NSRP). *Prostate Cancer and Prostatic Diseases*, 7, 223–226.
- Kim, E.D. (2002). Strategies for preventing erectile dysfunction induced by radical prostatectomy. *Contemporary Urology*, 14(11), 12–23.
- Kim, E.D., Nath, R., Slawin, K.M., Kadmon, D., Miles, B.J., & Scardino, P.T. (2001). Bilateral nerve grafting during radical retropubic prostatectomy: Extended follow-up. *Urology*, 58, 983–987.
- Montorsi, F., Briganti, A., Salonia, A., Rigatti, P., & Burnett, A.L. (2004). Current and future strategies for preventing and managing erectile dysfunction following radical prostatectomy. *European Urology*, 45, 123–133.
- Montorsi, F., Guazzoni, G., Strambi, L.F., Da Pozzo, L.F., Nava, L., Barbieri, L., et al. (1997). Recovery of spontaneous erectile function after nerve-sparing radical retropubic prostatectomy with and without early intracavernous injections of

- alprostadil: Results of a prospective, randomized trial. *Journal of Urology*, 158, 1408–1410.
- Mulcahy, J.J. (2000). Erectile function after radical prostatectomy. *Seminars in Urologic Oncology*, 18, 71–75.
- Raina, R., Lakin, M.M., Thukral, M., Agarwal, A., Ausmundson, S., Montague, D.K., et al. (2003). Long-term efficacy and compliance of intracorporeal (IC) injection for erectile dysfunction following radical prostatectomy: SHIM (IIEF-5) analysis. *International Journal of Impotence Research*, 15, 318–322.
- Rosen, R.C., Cappelleri, J.C., Smith, M.D., Lipsky, J., & Pena, B.M. (1999). Development and evaluation of an abridged, 5-item version of the International Index of Erectile Function (IIEF-5) as a diagnostic tool for erectile dysfunction. *International Journal of Impotence Research*, 11, 319–326.
- Rosen, R.C., Riley, A., Wagner, G., Osterloh, I.H., Kirkpatrick, J., & Mishra, A. (1997). The International Index of Erectile Dysfunction (IIEF): A multidimensional scale for assessment of erectile dysfunction. *Urology*, 49, 822–830.
- Walsh, P.C., & Donker, P.J. (1982). Impotence following radical prostatectomy: Insight into etiology and prevention. *Journal of Urology*, 128, 492–497.

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