Nursing Assessment of Sexual Function Following Permanent Prostate Brachytherapy for Patients With Early-Stage Prostate Cancer

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Erectile dysfunction (ED) affects as many as 30 million American men at any given time (National Institutes of Health [NIH] Consensus Development Panel, 1993) and frequently is associated with potentially curative local treatments for prostate cancer (Merrick, Butler, Lief, & Galbreath, 2001a). Although the majority of the prostate brachytherapy literature reports biochemical results as favorable as the most promising radical prostatectomy and external beam radiation therapy series to date, no difference has been found in overall survival between the aforementioned treatment modalities (Merrick, Butler, Lief, & Dorsey, 2001; Merrick et al., 2001b). Because of the absence of a survival advantage, quality-of-life issues have assumed increased importance for both physicians and patients.

The NIH Consensus Development Panel (1993) defined ED as “the inability to attain or maintain penile erection sufficient for satisfactory sexual performance” (p. 83). ED results in a deleterious effect on quality of life, including physical and emotional well-being, marital discord, and loss of self-esteem (Burnett, 1998; Day, Ambegaonkar, Harriot, & McDaniel, 2001; Laumann, Paik, & Rosen, 1999; NIH Consensus Development Panel). Following permanent prostate brachytherapy using either palladium-103 (i.e., Pd103) or iodine-125 (i.e., 125I) with or without external beam radiation therapy, ED has resulted in 6%–61% of cases (Incrocci, Slob, & Levendag, 2002; Merrick, Butler, Galbreath, et al., 2002; Merrick et al., 2001a). The reported wide ranges of ED may be a result of differences in patient characteristics and follow-up and potentially may be distorted by the mode of data collection. Litwin, Lubeck, Henning, and Carroll (1998) suggested that “physician ratings of patient symptoms do not correlate well with patient self-assessment of quality of life” (p. 1988). Most brachytherapy studies evaluating ED have utilized physician interviews, whereas others did not provide a definition of ED or a description of the collection methods (Merrick, Butler, Galbreath, et al.). To date, only one study has utilized patient-administered questionnaires (Merrick, Butler, Galbreath, et al.). Self-reporting should be the preferred method of quality-of-life data collection because it provides the best estimate of highly subjective phenomenon, such as potency. When patient-administered questionnaires have been utilized after radical prostatectomy, potency rates as low as 7% have been reported (Talcott, Clark, Stark, Nadir, & Ragde, 1999).

Assessment of sexual function following potentially curative local treatment for carcinoma of the prostate gland has resulted in wide ranges of potency preservation rates, which may be because of differences in the evaluated patient populations, mode of data collection, and length of patient follow-up. Quality-of-life data are most reliable when obtained by patient-administered and validated quality-of-life instruments. In the Schiffler Cancer Center’s prostate brachytherapy unit, healthcare professionals utilize the specific erectile questions of the International Index of Erectile Function to ascertain pre- and post-treatment erectile function. Documentation of sexual function following all local treatments, including prostate brachytherapy, may help to clarify the etiology of treatment-induced erectile dysfunction (ED), improve treatment for ED, and, ultimately, improve quality-of-life outcomes. Fortunately, the majority of patients with brachytherapy-induced ED respond favorably to sildenafil citrate.
Etiology of Brachytherapy-Induced Erectile Dysfunction

The etiology of ED after potentially curative local treatment for carcinoma of the prostate gland represents a multifactorial process that includes neurogenic compromise, vascular insufficiency, local trauma, and psychogenic causes (Zelefsky & Eid, 1998). A strong correlation has been found between both external beam radiation therapy and brachytherapy-induced ED and the dose of radiation delivered to the bulb of the penis (Fisch, Pickett, Weinberg, & Roach, 2001; Merrick, Wallner, Butler, Galbreath, et al., 2001); however, brachytherapy-induced ED is not correlated with the dose of radiation therapy delivered to the neurovascular bundles (Merrick, Butler, Dorsey, Lief, & Donzella, 2000). The bulb of the penis represents the most proximal aspect of the bulbous spongiosum and is attached to the inferior aspect of the urogenital diaphragm. Increasing doses of radiation therapy to the bulb of the penis decreases the number of nitric oxide-producing cells (Carrier et al., 1995). Nitric oxide is essential to obtain and maintain an erection. Sildenafil citrate enhances the effect of nitric oxide by inhibiting phosphodiesterase type 5; as such, the efficacy of sildenafil citrate in brachytherapy-induced ED may be related to its ability to enhance the effect of nitric oxide (Merrick et al., 1999).

Assessment of Erectile Function

Sexual quality of life following definitive therapeutic intervention for carcinoma of the prostate gland has not been sufficiently elucidated. The NIH Consensus Development Panel (1993) recommended the development of reliable methods for assessing the symptoms of ED and evaluating treatment outcomes. The International Index of Erectile Function (IIEF) consists of 15 questions in five domains (i.e., erectile function, orgasmic function, sexual desire, intercourse, satisfaction, and overall satisfaction), is psychometrically sound, has been linguistically validated in 10 languages, and also has been validated as a sensitive and specific tool for the evaluation of male sexual function, requiring patients to quantify erectile performance (Blander, Sanchez-Ortiz, & Broderick, 1999; Rosen et al., 1997). All five domains have revealed a high degree of sensitivity and specificity to the effects of treatment. The questionnaire is self-administered and detects treatment-related changes in patients with ED.

In the Schiffler Cancer Center at Wheeling Hospital in West Virginia, healthcare professionals have utilized the specific erectile questions of the IIEF with possible scores ranging from 1–25 (see Figure 1) and potency defined as a score greater than or equal to 11 (Merrick, Butler, Galbreath, et al., 2002; Merrick, Wallner, Butler, Lief, & Sutlief, 2001). At the time of the initial consultation, a prostate brachytherapy nurse reviews patients’ past medical and surgical history, obtains all current medications, and instructs patients to complete urinary, bowel, and sexual quality-of-life instruments. Specifically, the brachytherapy nurse instructs patients to complete the sexual quality-of-life instrument by considering his erectile function over the past month without any mechanical or pharmacologic aids. The nurse and physician then review the quality-of-life instruments, and these values serve as baselines for assessing changes following therapeutic intervention. The nurse assesses erectile function every three months for the next two years and every six months thereafter.

Potency Results Following Prostate Brachytherapy

At Schiffler Cancer Center, a six-year potency preservation rate of 39% has been reported for all patients undergoing prostate brachytherapy (with or without supplemental external beam radiation therapy) using the specific erectile questions of the IIEF.
and patient self-administration (Merrick, Butler, Galbreath, et al., 2002). Previously, five- and six-year reports of 47% (Zelesfsky et al., 1999) and 59% (Stock, Kao, & Stone, 2001) have been reported for patients undergoing brachytherapy without supplemental external beam radiation therapy. The six-year rate of potency preservation in the brachytherapy patients at Schiffer Cancer Center who did not receive external beam radiation therapy was 53%, which is comparable to prior reports (Merrick, Butler, Galbreath, et al.).

Because physician ratings of symptoms and patient self-assessment are not highly correlated, patient self-reporting should be the preferred method of quality-of-life data collection. Litwin et al. (1998), via data from the Cancer of the Prostate Strategic Urologic Research Endeavor, noted that although urologists reported that 90% of their patients were potent, patients reported a 50% potency preservation rate. When reporting potency preservation rates, the length of patient follow-up is essential for meaningful interpretation of the data as erectile function deteriorates with the normal aging process (Feldman, Goldstein, Hatzichristou, Krane, & McKinlay, 1994). According to the Massachusetts Male Aging Study, the frequency of ED increases at a rate of approximately 1% per year beyond the age of 40 (Feldman et al.).

Merrick, Butler, Galbreath, et al. (2002) and Stock et al. (2001) have reported that pretreatment erectile function is the strongest predictor of the development of brachytherapy-induced ED. Of the three studies that have evaluated the role of patient age in predicting post-treatment ED (Merrick, Butler, Galbreath, et al.; Potters, Torre, Fearn, Leibel, & Kattan, 2001; Stock et al.), only Potters et al. reported that patient age was statistically significant in multivariate analysis. Potters et al. also found that the use of neoadjuvant hormonal manipulation was predictive for the development of post-treatment ED, whereas the studies by Merrick, Butler, Galbreath, et al. and Stock et al. have failed to reveal a relationship between the two events. A history of diabetes mellitus also has been implicated in the development of brachytherapy-induced ED (Merrick, Butler, Galbreath, et al.).

### Sildenafil Citrate

The vast majority of patients with brachytherapy-induced ED respond favorably to sildenafil citrate (Merrick et al., 1999). When postbrachytherapy patients who maintained potency were grouped with patients experiencing brachytherapy-induced ED who used sildenafil citrate, 92% of patients maintained erections sufficient for vaginal penetration (Merrick, Butler, Galbreath, et al., 2002). In those men who were potent before brachytherapy but impotent afterward, 95% responded favorably to sildenafil citrate. However, patients who were functional with suboptimal preimplant erections responded in 75% of cases (Merrick, Butler, Galbreath, et al.). Following therapeutic intervention for prostate cancer, patients with therapy-induced ED who have used erectile aids have improvement in erectile function scores and overall quality of life (Perez et al., 1997). During patients’ predetermined follow-up schedule, the nurse assesses erectile function by utilizing a quality-of-life instrument. For those patients with deteriorating erectile function, the nurse reviews their past medical and surgical history, along with all current medications. If the patients’ medications do not include a nitrate, the nurse will counsel them regarding the possible utility of sildenafil citrate. All possible side effects, including flushing, headaches, nausea, vomiting, blue-tinted vision, nitrate-induced hypotension, and risk of death, are discussed in great detail. Sildenafil citrate then is initiated at a dose of 50 mg, which is taken approximately one hour prior to sexual activity. If sildenafil citrate is not effective for any of the first three doses and patients have not experienced any undue side effects, the dose is increased to 100 mg for another three attempts. If, after six attempts, sildenafil citrate has not resulted in any improvement in erectile function, the drug is discontinued and patients are counseled regarding other erectile aids (e.g., vacuum device, injectable therapy, penile prostheses). For all aspects of prostate brachytherapy care, every attempt is made to provide patients with verbal and written information.

### Implications for Practice

At Schiffer Cancer Center, the utilization of the specific erectile function questions of the IIEF has significantly improved the ability of the physicians and nurse clinicians to evaluate erectile function prior to treatment and serially after treatment. This validated quality-of-life instrument also has improved the healthcare professionals’ ability to counsel patients and their partners and, in those patients with post-treatment ED, to assess the effectiveness of therapeutic intervention, including pharmacologic and mechanical aids. The IIEF can be used in other practice settings where prostate brachytherapy is administered to assess ED.

Quality of life has become increasingly important to both patients and physicians in choosing a course of therapy for carcinoma of the prostate gland. Quality-of-life data are most reliable when obtained by patient-administered and validated quality-of-life instruments. Preimplant erectile function, the use of supplemental external beam radiation therapy in conjunction with brachytherapy, diabetes mellitus, and possibly patient age and neoadjuvant hormonal therapy are important in predicting postbrachytherapy erectile function. Fortunately, the majority of patients with brachytherapy-induced ED respond favorably to sildenafil citrate. The continued documentation and elucidation of the etiology of ED following all local treatments ultimately may result in improved treatments for ED and improved quality-of-life outcomes.

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### References


Litwin, M.S., Lubeck, D.P., Henning, J.M., & Carroll, P.R. (1998). Differences in urologist...


For more information on this topic, visit the following Web sites:

**American Society for Therapeutic Radiology and Oncology**

www.astro.org

**American Brachytherapy Society**

www.americanbrachytherapy.org

**Cancerline UK: Sexual Function and the Prostate Cancer Patient**

www.cancerlineuk.net

These Web sites are provided for information only. The hosts are responsible for their own content and availability. Links can be found using ONS Online at www.ons.org.