OPINION

Psychosocial perspectives on sexual recovery after prostate cancer treatment

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Abstract | Many therapies for erectile dysfunction (ED) after prostate cancer treatment improve erectile firmness, yet, most couples stop using aids within 1–2 years. Patients and partners who expect immediate and complete success with their first ED treatment can be demoralized when they experience treatment failure, which contributes to reticence to explore other ED aids. Comprehensive patient education should improve sustainability and satisfaction with ED treatments. Pre-emptive and realistic information should be provided to couples about the probability of recovering natural erections. Beginning intervention early and using a couple-based approach is ideal. Recommendations are provided about the timing of ED treatment, the order of aid introduction, and combination therapies. Renegotiation of sexual activity is an essential part of sexual adaptation. From the outset of therapy, couples should be encouraged to broaden their sexual repertoire, incorporate erection-independent sexual activities, and continue to be sexual despite ED and reduced libido.

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Introduction

Prostate cancer treatments (for example, radical prostatectomy or external beam radiation therapy) impair erectile function in the vast majority of patients.[1–3] One year after a radical prostatectomy, approximately 90% of patients report a persistent "moderate or big problem" with erectile dysfunction (ED).[3] Along with residual urinary incontinence, ED is the most persistent and debilitating patient-reported adverse effect of prostate cancer treatment.[4,5]

ED is associated with significant declines in quality of life and has negative effects on psychological and marital adjustment for both patients[2,6,7] and their partners.[2,7–12] About half of all patients will try a treatment for ED at some point after undergoing prostate cancer treatment.[13–16] Such ED treatments include phosphodiesterase type 5 inhibitors (PDE5Is), intracavernous injections (ICIs), or vacuum erection devices (VEDs). However, despite successfully achieving an erection with these treatments, a substantial proportion (up to 73%) of patients discontinue using them within the first year, even though they report increased penile rigidity.[14,16–19] One exception is the penile implant, which has high satisfaction rates (for example, 93% for penile implant versus 40.9% for ICIs and 51.6% for sildenafil), though satisfaction tends to be lower among patients who underwent radical prostatectomy in comparison with men with ED from other causes.[20]

Defining success with ED treatments remains a complex issue, and helping couples resume satisfying sex often requires more than helping the man obtain erections sufficient for penetration.[21] A variety of factors can contribute to a definition of success, including firmness of erection, size and orientation of erection, ability to use erection for penetration, a couple's satisfaction with the use of the ED treatment in their sexual practice, ease of use, and whether or not couples are able to adequately address difficulties that might arise with the ED treatment.

Patients routinely report being inadequately prepared for the severity and duration of the adverse sexual effects of prostate cancer treatments.[22–27] Furthermore, patients' expectations about the success of ED treatments are often unrealistic.[15,28,29] Patients are not always informed that not all aids will work for them, or that aids, which are initially successful in restoring some erectile function, might not produce an erection equivalent to its pretreatment quality. Indeed, even when patients are counselled before prostatectomy about the probability of recovering baseline erectile function, they underestimate how severe the problem is likely to be for them as an individual.[28]

Many patients, presumably in response to mass marketing of PDE5Is, assume that the path to recovery of erections is a straightforward one, where taking a pill will solve the problem.[30] In reality, for the majority of men their sex life will not be the same as it was before prostate cancer treatment. Treatment for prostate cancer can have a spectrum of effects on the patient, ranging from mild (such as loss of ejaculate) to severe (such as total loss of libido and intractable ED). Such adverse effects need to be handled in the context of a sexual relationship, in which each partner holds their own needs and expectations.[31–33]

Suggesting that time alone, or a single medical intervention alone, will allow the couple to 'get back to normal' can set up unrealistic expectations that lead to disappointment and failure. We have observed that with appropriate support and guidance, and persistence in the use of ED treatments, many couples do resume satisfying sexual activity. For others, novel (that is, erection-independent) ways of being sexual become an acceptable and rewarding alternative.[34–36]

This Perspectives article, written by researchers and clinicians dedicated to sexual recovery in patients with prostate cancer, presents suggestions for physicians who treat iatrogenic ED after prostate cancer treatments, which should help promote the best sexual outcome for patients and their partners. These suggestions are derived from research, where citations are provided, and from expert opinion in areas that have yet to be explored with well-designed clinical trials.

Preparing patients for success

The physician's approach to managing a patient's use of ED treatments can be guided by considering the following strategies, which prepare patients for the process of sexual recovery (Box 1).

Competing interests
The authors declare no competing interests.

Box 1 | Preparing patients for success

Foster realistic expectations
Realistic information should be provided about possible challenges in sexual recovery and about ED treatment before primary prostate cancer treatment. This information should be offered even to those who do not have their future sexual functioning at the forefront of their mind.

Intervene early
Although there is no consensus about the specific timing of intervention, recommendations favour starting ED intervention and resuming sexual activities as early as possible. Men are likely to tolerate ED for as long as it is perceived to be a part of the acute recovery from surgery. If erections have not partially recovered by 6 weeks after surgery ED intervention is appropriate.

Consider prehabilitation
Although not appropriate for everyone, pre-emptive administration of ED treatments or implementation of sexual rehabilitative counselling before prostate cancer treatment might help patients anticipate and plan how to cope with ED.

Include partners as much as possible
When possible, the 'identified patient' should be 'the couple'. Treating the couple rather than the patient alone discourages secretive use of ED treatments, which can undermine confidence and trust among partners. This approach also enables the couple to take shared ownership of the treatment and provides the potential for eroticization of the treatment itself. These developments can circumvent performance anxiety or fear of embarrassment, as well as assist in developing positive, but realistic, sexual expectancy.

Abbreviation: ED, erectile dysfunction.

Foster realistic expectations

Patients are often overly optimistic about both the extent and timeline for recovery of erectile function after prostatectomy.[37,38] Patients further assume that ED treatments will restore erections with minimal effort;[38] however, recovery of erectile function following prostate cancer treatment is often a prolonged and effortful process. Misassumptions might result from the patients being provided with inaccurate or inadequate information.[37–41] Popular notions in the media in our modern "Viagra Culture"[30,42] perpetuate the misconception that ED is an easily treatable condition. Such misconceptions and popular notions do not accurately convey the complexity of treating ED in men after prostate cancer treatment.

As an issue of informed consent, realistic (but conservative) estimates of potential erectile recovery times and reliable estimates of ED rates (taking into consideration treatment outcome, previous erectile function, age and comorbidities)[37] should be provided to patients before treatment.[39] Patients should also be advised that ED treatments can be started either pre-emptively or as soon as possible after completing prostate cancer treatment,[43–47] but that finding the right ED treatment for them might require some persistence.[48]

Waiting for natural recovery of erections is difficult for patients and their partners, as recovery times are highly individual.[5] For example, for patients who undergo radical prostatectomy, even partial recovery of erectile function can take up to 4 years, owing to nerve recovery,[49] though the majority of function returns within the first 24 months.[39] Salonia *et al.*[50] stipulate that patients should be told that recovery typically takes 6–36 months, but that the level of recovery at 6 months is predictive of long-term, overall recovery, as discussed by Vickers *et al.*[39] To maintain sexual intimacy during that recovery period, patients and their partners should be encouraged to explore not just erectile assistance but also alternative sexual practices that are not erection-dependent.

Couples (or patients alone) should be encouraged to consider a variety of methods for sexual stimulation. Strategies might or might not involve the use of ED treatments. Couples could benefit from being openly encouraged to try nonpenetrative sexual practices (for example, genital caressing, oral sex, or use of sex toys), which might not have been part of their previous sexual practices. Patients might find that these new activities can enrich their sexual lives, whether or not recovery of erections adequate enough for penetration occurs in the future.

Patients who have undergone external beam radiation therapy (EBRT) show declines from baseline erectile function for up to 3 years after treatment, secondary to progressive nerve and vascular involvement.[51] Patients should be encouraged to maintain a variety of sexual activities during EBRT and as soon as is safe after brachytherapy. Therefore, the medical follow-up period should extend beyond the 3 year mark in patients undergoing ED treatment. Pre-emptive education about ED treatment options—and alternative ways of maintaining sexual intimacy—is advisable for patients undergoing radiation therapy.

Furthermore, it may take several attempts before an adequate erection can be achieved with an ED treatment, and that success with their use will take persistence.[48,52] Pre-emptive ED education should allow for problems to be anticipated and addressed before they occur.[53] In addition, realistic information about the effort required to produce an acceptable erection can provide a buffer against a patient's personal sense of failure when ED treatments are ineffective. A sense of failure—once established—is hard to reverse.[54]

Intervene early

While recovering from prostate cancer treatment, many couples set their sexual lives aside, assuming they will resume sexual activity at a later date. Unfortunately, if penile stimulation is lacking for an extended period of time, when ready to resume sex, men might find that ED is persistent and refractory, owing to irreversible changes to the cavernosal tissue.[19,37,55–57] Urologists are well aware of the hypothesized benefits of early penile rehabilitation—with the goal of penile tumescence to provide oxygenation and/or to improve blood flow and enzymatic pathways in the penile tissues—to optimize future sexual functioning.[55,56,58–60] However, Fode *et al.*[61] caution readers: "One must be careful not to repeat the statement that penile rehabilitation improves erectile function after RP [radical prostatectomy] so many times that it becomes a truth even without the proper scientific backing."[61] Although the data are robust in animal models, studies in humans have failed to show the same results. Still, despite conflicting data,[62,63] use of PDE5Is early after treatment (or in some cases even prophylactic)[64] is generally recommended by experts.[37,44,50,52,65]

The merits of daily use of a PDE5I, versus on-demand use, remain controversial—at least in terms of facilitating the speed of recovering penile rigidity adequate for penetrative intercourse. However, there is an understanding that daily use might help prevent long-term and irreversible adverse changes in penile physiology.[61] Higher compliance has been documented with daily tadalafil than on-demand tadalafil[66]

or on-demand sildenafil.[67] In two randomized controlled trials, sexual self-confidence and perceived spontaneity were higher with daily-use or on-demand tadalafil than on-demand sildenafil.[68,69] Despite these possible advantages, prescribing daily use of PDE5I drugs needs to be weighed on a case-by-case basis against the fact that for many patients daily use of these drugs constitutes considerable financial burden and contributes to treatment discontinuance.[18]

Another possible penile rehabilitation strategy is to recommend masturbation, as blood flow is stimulated even if the penis remains flaccid. Because masturbation is not usually viewed as a medical intervention, urologists might wish to present this concept in a manner that avoids judgement and promotes acceptance of masturbation as a legitimate penile rehabilitation strategy.

Certainly, some patients opt to use a VED as an ED treatment option.[59,70] One small study ($n = 20$) showed evidence that the use of a VED improves penile oxygen saturation.[71] Two randomized controlled trials[72,73] suggest VEDs as a viable penile rehabilitation strategy. However, further supporting evidence is needed: erections using the VED were rarely sufficient (17%) and partner satisfaction rates were moderate (55%).[72]

ICIs early after nerve-sparing prostatectomy might increase the recovery rate of spontaneous erections,[43,74,75] although further studies are needed to confirm this effect. Patients who start using ICIs earlier (<3 months) after radical prostatectomy report firmer erections and better compliance compared with those who wait.[43] Thus, patients should be encouraged to begin ED treatment and/or to resume partnered or solo (that is, masturbation) sexual activities as soon as possible after radical prostatectomy.[44,50,65,76] Follow-up consultations with patients on a penile rehabilitation programme will be necessary, as compliance is typically poor.[77,78] Pairing ED treatments, such as ICIs and PDE5Is, with sexual counselling increases treatment compliance.[79] In our clinical opinion, patients who choose to wait to address erectile function probably lack an understanding of the benefit of engaging in early penile rehabilitation. We have observed clinically that the longer the period of sexual stagnation the harder it is for patients and partners to navigate re-entry into sexual activities. Research suggests that couples do not fully appreciate how difficult it can be to adapt to sexual changes;[48,80] avoiding or reducing the period of stagnation is likely to assist with sexual adaptation.

Despite the limited evidence supporting penile rehabilitation, the general expert consensus supports early intervention.[18,52,76] Furthermore, early return to sexual activity after prostate cancer treatment has the benefit of keeping the couple intimately connected, thus buffering against the development of relationship difficulties.[81] It is our clinical observation that the maintenance of sexual activity in any capacity can help couples maintain interest in sex, promote the physiological and psychological benefits of sexual activity, and strengthen a couple's bond despite impaired erectile function.

Consider prehabilitation

A growing concept in supportive care for cancer patients is the idea of prehabilitation, that is, pre-emptive intervention before an anticipated decline in function.[82] Consistent with this notion, sexual rehabilitative counselling could be offered to couples before ED manifests, as counselling couples about coping before complications arise improves their ability to deal with problems when they develop.[32,83]

This pre-emptive approach is suggested, as effective sex therapy and couples counselling is difficult to implement after couples have developed sexual problems—in particular, when patients and partners have discordant views about the precise problem, possible solutions, and ways of coping.[84–88] We acknowledge that, in many cases, sexual rehabilitative counselling is offered privately at direct cost to patients, which reduces accessibility for many patients. If a couple can afford such a resource, or in institutions where an erectile rehabilitation programme is offered as a free service, the concept of prehabilitative counselling might prove helpful.

Upon diagnosis of prostate cancer, patients (and partners) facing the stressful task of choosing a prostate cancer treatment, can be strongly bonded by mutual concerns for each other. After diagnosis, but before definitive cancer treatment is initiated, might be an opportune time to introduce patients and partners to the breadth of strategies for restoring erections, and also sexual practices that are not dependent on erections. Encouraging exploration of novel sexual practices can be beneficial to the couple's intimate bond overall, even if the practices do not become a part of routine sexual activity.

Patients and partners who are prepared pre-emptively for coping with ED might be better able to deal with it once it occurs.[83] More specifically, couples are likely to benefit from being encouraged to openly discuss their options before experiencing iatrogenic ED. Willingness to consider and discuss new sexual practices ahead of time should increase the willingness of the patient and partner to actively explore options when ED emerges. Pre-emptive, open discussion fosters sexual communication, an important component of sexual adaptation. Furthermore, as part of dyadic coping (that is, conferring as a couple on the precise problem they are facing and together implementing a strategy for dealing with it), discussions about novel sexual practices can help build intimacy at that moment, regardless of whether these practices are ultimately implemented.

As mentioned above, starting ED 'treatment' prophylactically,[64] before prostate cancer treatment, is possible but clinical guidelines for this approach have yet to be developed. An accurate assessment of baseline sexual function assists in identifying patients who are already experiencing some difficulty in achieving erections at the time of prostate cancer diagnosis. Giving these men and their partners an opportunity to try out ED treatments (for example, ICIs, PDE5Is, or a VED) before they develop severe ED can boost their confidence at being able to successfully manage subsequent iatrogenic ED.

Include partners

Many patients see ED as their personal problem and want to deal with it on their own; therefore, they might attend their medical appointments without their partner. These patients might not initially see the benefit of including their partner in their medical consultation. However, the physician can help these patients to appreciate that sexual dysfunction occurs in the context of an intimate partnership; therefore, the partner's needs, values, and difficulties are relevant to the sexual recovery process.[33,89,90] In this context, 'the identified patient' should be perceived as 'the couple'. In fact, sexual rehabilitation is most successful if both partners participate in a recovery plan that responds to both partners' needs.[91–93] For example, continuance rates with PDE5Is are higher when they are prescribed to the patient with his partner's knowledge than when the partner was not involved in the treatment.[79]

A challenge in implementing a 'couple's perspective' to ED treatment is that some patients attempt to keep their use of ED

Box 2 | Sustaining success

Prepare patients to manage failures
Begin with a more effective treatment (e.g. ICIs) rather than the least invasive treatment (e.g. PDE5Is). This strategy should increase the likelihood of immediate success and reduce the chance of demoralization from failed ED treatments. As part of realistic preparation, patients should understand that failures are an expected part of the trial and error process.

Normalize the grieving process
Few patients can expect to return to baseline erectile function. Grieving this loss, and appreciating that their sex life might be irrevocably changed, can open the way for renegotiating sexual practices.

Endorse sexual activity despite low libido
Sexual activity does not have to be preceded by spontaneous sexual desire or urge. Encourage couples to engage in sexual play with the reassurance that arousal and desire can follow sexual stimulation.

Promote flexibility in sexual practices
Encourage a broad outlook on sexual activities, beyond those that are erection-dependent. Couples need to understand that men are capable of arousal and orgasm without an erection and that satisfying sexual activity even without an erection is possible.

Manage erections of reduced quality
Striving for a return to baseline erectile capability might be unrealistic and might even be counterproductive, as erections are likely to be suboptimal. Combination of ED treatments is possible if only a partial erection is achieved using one assistive aid. Patients should be advised about potential limitations of ED treatments. Couples should be encouraged to broaden their sexual repertoire to discover new ways of having enjoyable sex that are not erection-dependent.

Persist in addressing challenges
If patients and partners understand that their physicians are motivated to persist in problem-solving (should unforeseen challenges arise) they will be encouraged to also persevere.

Abbreviations: ED, erectile dysfunction; ICI, intracavernous injections; PDE5I, phosphodiesterase type 5 inhibitor.

treatments a secret, because they feel emasculated by their loss of penile function.[94–97] Even men who achieve good erections (Erectile Function Domain ≥24) following prostate cancer treatment express shame and embarrassment because of changes compared to their baseline erectile function.[40] Patients with prostate cancer report that loss of sexual capacity makes them feel unmanly, invisible, and worthless,[97–100] and that it impedes social and mental health functioning.[95,101,102] Furthermore, if the patient worries about experiencing failure when using an aid to overcome ED (that is, performance anxiety) he might find it difficult to retain erotic interest or focus on pleasurable sensations during a sexual encounter. As a result, he will have difficulty becoming aroused and enjoying sex. Cultivating the shared experience of the patient and his partner in managing ED might help circumvent psychological burdens faced by the patient, such as shame and/or performance anxiety.[90,103]

Nevertheless, many men, demoralized by ED and their need for ED treatments, choose to manage their ED secretly and elect to implement ED treatments in private. They might attempt to use an ICI or a VED privately before coming to the bedroom. One strategy to help these men become more comfortable with the use of ED treatments is to encourage their partners to be actively involved in administering the treatment. For couples who are open to the concept of eroticizing erectile aids, such a practice should help to build positive expectations that promote effective use.[104] For example, a partner could show their acceptance of PDE5I use and interest in initiating sexual activity by setting the prescription package out on the bathroom counter, or putting a pill on the nightstand with a glass of water. Over time, the pill itself can engender erotic feelings, as it becomes associated with the sexual pleasure provided by the partner; the pill itself becomes a sexual 'turn-on'. The same is true for the use of a VED or an ICI—a partner's involvement in the use of these treatments can increase their association with pleasure and arousal, thereby reducing their association with sexual dysfunction. Along with Fisher and colleagues,[90] Kukula *et al.*[104] and others, we encourage partners to be actively involved in the implementation of ED treatment in order to promote success in their use.

Involvement of the partner in the ED treatment process enables the clinician to assess the partner's attitude toward particular treatments. Some partners are dissatisfied with the use of erectile aids in general, crediting the ED treatment for the erectile response and discounting desire for, or interest in them. Such a perception by a partner can lead to discord in the couple and undermine treatment effectiveness. For other partners, their own sexual dysfunction, or loss of libido secondary to menopause, can present a barrier to maintaining sexual activity. Involving the partner in the ED treatment process from the outset opens the way to assessing other barriers to recovery, including intervening in sexual difficulties pertaining to the partner.

Sustaining success

The process of sexual recovery can be long and arduous and, thus, requires sustained motivation and persistence. Physicians can help their patients sustain success by promoting a broader approach to sexual recovery than one that emphasizes ED treatments and by supporting them as they encounter challenges (Box 2).

Prepare patients to manage failures

Beginning ED therapy with a more effective, rather than the least invasive, ED treatment might improve motivation and reduce future ED treatment abandonment. First-attempt ED treatment success affects subsequent ED outcomes and continuation of treatment is associated with that early success.[105]

The effectiveness of PDE5Is as a first-line treatment is dependent on the extent of nerve damage.[50] Better results have been found in men who have bilateral nerve-sparing surgical procedures.[76] However, even with nerve-sparing procedures, nerves can be traumatized and require time to recover before men can expect PDE5Is to be effective. Salonia *et al.*[50] state "regardless of the surgical technique, the removal of the prostate may result in an almost obligatory period of dormancy of the nerves that govern the functional aspects of erection." Our clinical experience demonstrates that, unless men are able to achieve a partial erection on their own, PDE5Is will not produce an erection sufficient for penetration. Effectiveness of PDE5Is can improve over time with satisfaction rates peaking at 60% between 18 months and 24 months after prostatectomy.[106] For patients who have not undergone a nerve-sparing procedure, response rates to PDE5Is are low;[50] therefore, alternatives to PDE5Is, such as ICIs, should be offered early after prostatectomy. In this setting, ICIs are more effective than PDE5Is because their efficacy is independent of nerve preservation.[13,19]

Beginning therapy with ED treatments that have a high probability of failure sets couples up to become discouraged when the treatment is ineffective. Once discouraged, patients and partners become reticent to try other—more effective—treatments.[48] Thus, ICIs should be introduced as a treatment option as soon as possible after radical prostatectomy, and could even be considered before implementing PDE5Is. Changing the order in which ED treatments are introduced might be an appropriate strategy for promoting optimism, confidence, and ED treatment success without exacerbating fear of failure. Certainly, some patients will be reluctant to begin treatment with injection therapy and might prefer to start with less invasive treatments than ICIs. Patients undergoing prostatectomy should be informed that recovery of baseline erectile function with PDE5Is alone is only possible after a nerve-sparing procedure. Of note, patient knowledge of whether they have received nerve-sparing surgery is often poor.[107]

It might be necessary to try several different drugs and dosing schemes to achieve erectile recovery adequate for penetration. In these cases, persistence is paramount. Patients should be counselled regarding nonpenetrative sexual strategies along with ED treatments, so that sexual intimacy is still promoted despite functional challenges (Figure 1). Furthermore, patients might need to adjust their expectations such that the goal of using erectile aids is to achieve erections adequate enough to have successful intercourse rather than recovering erectile function as it was before prostate cancer.[50] More often than not, erections will be less firm than they were before prostate cancer treatment, and those erections are likely to be achieved only with some kind of assistance. We acknowledge that such realism could demoralize some men and, therefore, a small number of men might decide to choose a cancer treatment protocol that avoids ED, such as active surveillance. However, appropriate patient education is an essential aspect of informed consent.

Indeed, ineffectiveness is the most commonly stated reason for discontinuing ED treatments.[13,50,108] Physicians should be attentive to the fact that with each experience that is viewed as a failure by a patient or partner expectation for failure will increase. Overcoming the fear of failure is difficult once instilled.[48]

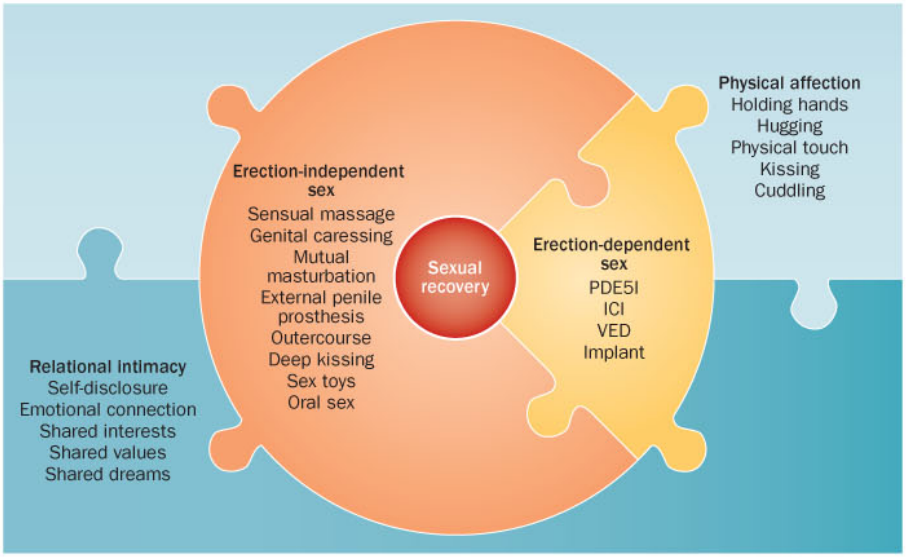

Figure 1 | Pieces of sexual recovery after prostate cancer treatment. If sexual rehabilitation only focuses on restoring erections and not also on the sexual relationship as a whole, couples might abandon physical affection altogether when ED treatments are found to be unreliable, ineffective, or unappealing. Furthermore, fear of erectile failure hampers sexual intimacy. Together, such losses impair relational intimacy. A broader focus circumvents this problem and increases the chance of successful sexual recovery. Couples should be encouraged to strengthen relational intimacy and physical affection to enhance the recovery process. Sexual intimacy can be maintained through a variety of activities that are independent of erections. Abbreviations: ED, erectile dysfunction; ICI, intracavernous injection; PDE5I, phosphodiesterase type 5 inhibitor; VED, vacuum erection device.

Encourage sex despite low libido

Many patients seem to be unaware that, although ED treatments can help to restore erections, they do not directly affect libido.[109] Declines in libido frequently follow prostate cancer treatment.[29,110] This effect can even be observed in patients on active surveillance;[111] however, it is most notable with androgen deprivation therapy.[29] With reduced libido, sexual activity will be more difficult. Thus, physiological arousal is likely to require physical stimulation and/or mental fantasy before a man becomes aroused. Despite a lack of an initial strong desire, a person might make a conscious choice to engage in sexual activity, even without the usual kinaesthetic and visual cues that an erection provides. For both men and women, sexual arousal can emerge when starting in a sexually neutral, unaroused state.[112] Sexual activity is then driven by the perceived benefits of the sexual experience (for example, to be close and connected) rather than by spontaneous sexual desire. Of course, an erection can be autoerotic for the patient and also arousing for the partner. In this setting, VEDs and ICIs have an advantage over PDE5Is, as they are more likely to create a partial or full erection even in the context of reduced libido. By contrast, erections achieved through the use of PDE5Is must follow from sexual stimulation and arousal.

Promote flexibility

Sexual renegotiation is well documented as a pathway to sexual recovery after prostate cancer treatment.[36,48,113–115] This renegotiation is likely to include a variety of forms of sex that are not dependent on an erection, rather than limiting activities to penile penetration. Exploring such activities should be encouraged as a complement to ED therapies and as a pathway to sexual recovery when adequate erectile function cannot be restored (Figure 1).[34,48,53,114,116]

Even if a patient finds an ED treatment that is effective for him it might not always be reliable. Anticipating erectile failures as an inevitable part of the recovery process will reduce the chance of patients abandoning ED treatments and sexual activity altogether. At the same time, talking in an open and nonjudgemental fashion with patients, along with their partners, about sexual activities that are not erection-dependent (for example, sensual massage, mutual masturbation, genital caressing, oral sex, use of sex toys or an external penile prosthesis) can help encourage them to explore such options. With the

right encouragement, these options can give patients and partners a way to recover rewarding sex without erections. Becoming free of a single focus on erectile function can help patients avoid a mounting sense of failure as they progress through first-line and second-line ED treatments.

One case study offers another option for sexual renegotiation.[117] A patient on androgen deprivation therapy with complete ED used an external penile prosthesis, positioned right above his penis, in a pelvic harness. This enabled him to have penetrative coital sex with his partner and with ostensibly normal body alignment, contact, and pelvic movements. The partner concurrently held the patient's flaccid penis in her lubricated hand during prosthesis–vaginal intercourse. His pelvic thrusting, combined with a tactilely stimulated penis, replicated the sensations that occur during normal penile-vaginal intercourse, and both patient and partner reported achieving orgasm. In a follow-up account, the patient described the sexual act with the external prosthesis as feeling completely natural—to his own astonishment.[34]

From the detailed published description, intercourse with the prosthesis appears to produce a version of the rubber hand illusion, built upon multisensory integration.[118] The neurobiology behind multisensory integration has been well validated over the last decade (>50 papers listed in PubMed)[118] and can include full body illusions,[119] adding to the credibility of the patient's claim. Currently, few ED clinics bring this option to the attention of patients, either because they singularly focus on ED or are unfamiliar with the knowledge that, with enough multisensory integration, the rubber hand illusion can apply equally well to a rubber penis. Clearly, using an external penile prosthesis can provide a flexible, noninvasive, inexpensive pathway to sexual recovery for some patients who find ED treatments either ineffective or undesirable. The effectiveness of this approach relies not just on the patient, but also his partner, and their joint willingness to explore novel strategies for sexual recovery.

Normalize the grieving process

Some patients and/or their partners report an overwhelming sense of grief over the changes to their relationship because of ED. Couples seeking to restore practices identical to those they had before prostate cancer treatment are prone to disappointment. Each attempt to return to 'the ways things were before' can further demoralize the man and both patient and partner are continually confronted with the loss of the type of sexual practices they had before prostate cancer treatment. Finding sexual activities that truly satisfy is difficult without first grieving the loss of the ways things were.[116,120] Such grieving is typical, allowable, and even encouraged. Couples should be advised that those who are able to successfully renegotiate sexual practices tend to be the ones who openly talk to one another about such issues.[114,121] When possible, referral for counselling to address grief and/or couple's communication is recommended.[38,50,91]

Manage erections of reduced quality

Some ED treatments, although helpful in restoring penile tumescence, are likely to present more challenges than others with regard to their ability to enable the patient to achieve penetration or intercourse. A good example is an erection produced with a VED. With use of a VED the penile shaft can become elongated, larger and firmer, but the crural roots of the penis will not be engorged. Therefore, tumescence achieved with a VED occurs only in the shaft, leaving the penis not truly erect (that is, not oriented upward). VED-induced erections have a hinge effect, where the penile shaft can pivot on the body wall. Vaginal insertion can be achieved with manual assistance, but maintaining penetration with thrusting in the male superior position becomes more difficult.

Patients need to be advised about the mechanical limitations of erections achieved with a VED, in addition to providing them with strategies for accommodating limitations. For example, the use of a constriction ring, such as a leather or neoprene band, that is wider than the ones usually provided with these devices can better support the angle of the erection at the base of the penis and help reduce the hinge effect. Further, a ring that surrounds both the shaft of the penis and the scrotum can help push the testicles forward and, in turn, lift the penis to stabilize the engorged shaft in a more vertical position. For penile–vaginal intercourse, the female superior sexual position might help the female partner retain more control of the direction of penetration.

If the quality of erection is still insufficient for penetration with the use of a single ED treatment, combining different modalities might be beneficial. Combination of a medicinal treatment for ED (for example, PDE5Is or ICIs) with a mechanical aid (for example, a VED) is usually safe.[52] The VED can improve tumescence for men with soft glans syndrome, which can be seen with ICIs or surgical penile prosthesis; a firmer glans should aid in sensory stimulation. Furthermore, combining drug therapy with the use of a VED might help alleviate the hinge effect by providing some rigidity in the root of the penis.

As PDE5Is work indirectly through the NO–cGMP pathway via sexual arousal, and ICIs through direct smooth muscle relaxation in the corpora cavernosa, it is not surprising that early combination therapy with a PDE5I enables the use of lower doses of ICIs than if PDE5Is were not used.[122] Multiple ICI agents can be combined to increase their effectiveness.[75] It should be noted that the additive effect of combining two or more erectogenic medicinal agents is usually reserved for severe ED. Physicians who are not familiar with this treatment protocol should refer to a urologist or sexual medicine expert to decrease the risk of priapism for the patient.

Persist in addressing challenges

Patient-specific challenges associated with ED treatments are bound to occur and both patient and partners need to feel comfortable and confident in voicing dissatisfaction with specific ED treatment options to each other and to their physician. Similarly, they need to feel reassured that their physician is eager to collaborate with them to find ways to recover erections as well as ways to have rewarding sexual activity that is not erection-dependent. Goff *et al.*[123] noted that improvements in physician–patient communication about concerns with ED treatments helped improve patient acceptance and adherence to treatment. We would extend this statement to say that the best method to achieve long-term compliance with effective ED treatments is a collaborative approach between the health care provider and both the patient and his partner.

We have some suggestions on how to overcome specific challenges. First, when counselling patients about nonpenetrative sexual options, they should be warned that a partially erect penis is more difficult to stimulate than one that is fully erect. The use of personal lubricants to prevent abrasion during prolonged sexual stimulation is imperative. In addition, lubricants are also necessary for female partners who

might have vaginal dryness and/or atrophy if they have not been engaging in sexual activity for an extended period of time or are experiencing menopausal symptoms. Couples will struggle more to adapt if the partner of the patient is also experiencing sexual dysfunction;[124] therefore, appropriate referrals for the partner might also need to be arranged or encouraged.

Second, urinary leakage can be distressing, especially when patients or partners are unprepared for it. In regard to incontinence in general, and climacturia specifically (that is, urine loss during arousal, sexual activity, or orgasm), couples can be reminded that contact with urine usually poses no health risks. Couples can also be advised to urinate before initiating sexual activity, lay a towel on the bed, and to have a warm washcloth readily available. Other suggestions include moving sexual activities to the shower and the use of a constriction ring around the base of the penis.

Third, dysorgasmia (that is, painful orgasm) occurs in about 12% of patients after radical prostatectomy.[125] Patients can be counselled that the frequency of dysorgasmia tends to decline up to 2 years after radical prostatectomy.[125] Furthermore, medical management can be helpful,[126] although there is a clear need for more research regarding treatment options.

Fourth, painful erections after the use of an ICI, owing to nerve hypersensitivity, are relatively common and documented most for prostaglandin E_1.[127] This adverse effect can be managed by avoiding prostaglandin E_1 with a bimixture of phentolamine and papaverine, or by reducing the dose and combining prostaglandin E_1 with phentolamine and papaverine in a trimixture. Given that pain has been reported to be higher in patients starting ICIs at 1 month compared with 3 months after radical prostatectomy, patients should be counselled that pain typically lessens with time.[50,127,128] Caution should be taken to ensure that the experience of pain does not discourage the patient from trying an ICI again in the future, as it is likely that pain will diminish.

Conclusions

The vast majority of men recovering from treatment for prostate cancer will experience considerable ED. Around half of these men will elect to try ED treatments. Patients can choose from several ED treatment options, including VEDs, ICIs, and PDE5Is; however, even if successful in achieving an erection, more than half of the patients who employ these strategies discontinue use within 1 year.[14,16–18]

Physicians can encourage sexual recovery by promoting realistic expectations about ED before patients undergo potentially curative prostate cancer treatment. Counselling patients and partners that the sexual recovery process can take a considerable amount of time and requires persistence is likely to reduce anger and frustration during the process. Both patients and their partners need to appreciate that their previous sex life will be changed. Discussing the challenges associated with ED treatments with patients early—before primary prostate cancer treatment—should promote resilience in the presence of erectile failure and circumvent demoralization because of repeated ED treatments that are not fully restorative.

Encouraging the inclusion of partners from the outset of counselling in the implementation and administration of ED treatments is likely to improve long-term compliance. Realistic, pre-emptive discussion between physicians and patients (and their partners) helps to avoid discordant views of how ED can be effectively addressed. It also helps to prepare patients and their partners to be receptive to the idea of exploring sexual activities beyond those that are erection-dependent.[35,36,113,117]

Resuming masturbation or partnered sexual activities as soon as is medically safe should be encouraged. Using an effective therapy to achieve erections early, even if it is not the least invasive, should reduce the chances of discouragement. Combining aids for ED treatment can further increase their effectiveness. These suggestions should help to sustain the use of ED treatments, particularly in patients who have experienced early and repeated failure with their use. Lastly, encouraging patients and partners to explore sexual practices that are not erection-dependent, concurrent with exploring ED treatments, should open the way for patients and partners to maintain sexual intimacy should ED treatments be unsatisfactory.

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