

SEXUAL MEDICINE REVIEWS

Surgical Factors Associated With Male and Female Sexual Dysfunction After Radical Cystectomy: What Do We Know and How Can We Improve Outcomes?

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ABSTRACT

Background: Sexual dysfunction after radical cystectomy (RC) is a frequent, though commonly overlooked symptom for both men and women. Improved oncological outcomes and the rising number of bladder cancer survivors mandate physicians to closely address and evaluate post-surgical sexual dysfunction and offer goal-directed treatment. Improvements in RC surgical techniques that promote post-operative sexual function have been proposed, alongside new quality-of-life inventories and sexual function therapeutic options; however, rigorous studies in the field are lacking.

Aim: To provide a comprehensive overview of post-RC sexual dysfunction and discuss new surgical techniques, sexual dysfunction evaluation, and novel treatment strategies.

Methods: A non-systematic narrative review of the literature was performed through PubMed about sexual dysfunction in men and women after RC.

Outcomes: We reported on the surgical anatomy of sexual function-sparing RC, the most common inventories used to investigate sexual function in post-RC patients, and current treatment options.

Results: Extensive knowledge about pelvic anatomy and nerve-sparing surgical techniques in men is well understood from studies about prostate anatomy and nerve-sparing prostatectomy. However, anatomical and surgical details of sexual-sparing RC in women needs further characterization. Several questionnaires are used to investigate sexuality after RC, but a standardized approach is still missing. Therapeutic options are available to treat sexual dysfunction, but limited studies have been conducted to specifically address the post-RC population.

Conclusion: Further work is needed to understand the best strategies to prevent and treat sexual dysfunction in patients after RC. **Pederzoli F, Campbell JD, Matsui H, et al. Surgical Factors Associated With Male and Female Sexual Dysfunction After Radical Cystectomy: What Do We Know and How Can We Improve Outcomes? *Sex Med Rev* 2018;XX:XXX–XXX.**

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INTRODUCTION

Radical cystectomy (RC) is the recommended surgical intervention for several benign and malignant conditions, including bladder cancer, severe and otherwise untreatable bladder dysfunction, and refractory hemorrhagic cystitis.^{1–3} Following the radical portion of the procedure, the extent of which varies according to

the indication, a reconstructive urinary diversion is performed to restore a mechanism for urine excretion. Urinary diversion can be classified as non-continent conduits, performed in 80% of patients undergoing RC, and continent catheterizable reservoirs or orthotopic neobladders, performed in the remaining 20%.⁴

Recently, urologists have been focusing on quality-of-life (QoL) issues arising in cancer survivors. In bladder cancer, improved oncological outcomes and an increased number of survivors has necessitated a greater awareness and interest in long-term post-operative care. Sexual dysfunction is among the most common consequences of RC and is frequent in both men and women. Unlike other urological oncology procedures, such as radical prostatectomy (RP), sexual function is often overlooked in RC patients. Several reasons may explain this tendency, including

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the burden associated with the bladder cancer diagnosis, the fear of the unpredictable outcomes, and the anxiety of facing a major surgical procedure being overwhelming.⁵ Similarly, post-operative body image changes due to a urinary stoma in patients with an ileal conduit or urinary leakage and incontinence in patients with a neobladder negatively influence sexual function.⁶

Urologists play a crucial role in patient and partner counseling before RC. The evaluation should include an assessment of pre-operative sexual function and a discussion about each patients' post-operative expectations and realistic outcomes.⁷ In this review, we will examine the current literature surrounding sexual dysfunction after RC; describe the currently available tools to investigate sex-related QoL; and discuss novel therapeutic approaches.

ANATOMICAL BASES OF SEXUAL-SPARING RC

Sexual function-sparing RC is governed by 2 conflicting principles: aggressiveness and precision. On one hand, the surgeons must provide the most complete excision possible to reach definitive oncologic control; on the other, they must pay close attention to the pelvic neurovascular structures to attempt preservation of sexual function.

Men

The preservation of the neurovascular bundles (NVB) responsible for sexual function is a critical consideration during pelvic surgery. In both male and female pelvic anatomy, the NVB contains parasympathetic and sympathetic neurons that supply the urogenital tract with efferent and afferent nerve fibers. Sympathetic innervation arises from T10–L2, whereas the parasympathetic fibers originate from S2–S4 and join the pelvic splanchnic nerves. The NVB is of particular interest in male sexual function since it harbors the neuronal control for initiating the erectile response, seminal vesicle (SV) emission of semen, and antegrade ejaculation.⁸ The studies by Walsh and colleagues⁹ and others^{10,11} describe a precise understanding of male NVB anatomy and surgical techniques required to preserve these structures. The NVB is formed by vessels that supply the outer prostate, and nerve fibers that innervate the prostate, urethra, and corpora cavernosa. The NVBs are symmetrically located posterolaterally to the prostate in a space defined by the levator, prostatic, and Denonvilliers' fasciae. Costello et al¹² identified 3 functional components of the NVB in the male pelvis. The first section comprises the posterior NVB and runs within Denonvilliers' fascia and the pararectal fascia to innervate the rectum. A second component within the lateral NVB supplies the levator ani. Finally, the cavernous nerves and prostatic neurovascular supply lie along the posterolateral surface.¹³ Recent studies have used nerve topographical quantification using computerized planimetry software to further delineate this complex anatomy.^{12–14}

Four main approaches for sexual function-preserving RC have been described.² However, no consensus has been accepted for a

technique that preserves functional outcomes, and concerns persist regarding the oncological appropriateness of these approaches.

The first technique for sexual function preservation is the prostate-sparing RC, which is performed by leaving the prostate, SV, and vasa in situ. This technique was first described in 2002 and consists of an open RC with a Z-shaped ileal pouch anastomosed to the prostatic capsule.¹⁵ In the first report, 82% of men with satisfactory pre-operative sexual activity recovered sexual function post-operatively. Only 3 patients had a diagnosis of prostate cancer at 5-year follow-up and 2 patients had a urothelial recurrence in the prostatic fossa. Subsequent studies reported similar oncological and functional outcomes.^{16–18} Performing a concurrent transurethral resection of the prostate to further rule out prostate cancer and prevent obstructive complications has been considered and proposed as a variation of this surgery. The prostate-sparing RC has been performed laparoscopically in an attempt to decrease surgical invasiveness.^{17,19} Despite the encouraging results, this technique is rarely performed due to the oncological concerns and the lack of clear, long-term follow-up data.

Similarly, the capsule-sparing RC has been performed, which, as its name implies, leaves only the prostatic capsule rather than the whole gland. The 2 main approaches used for prostate removal are the adenectomy, according to Millin's technique, or a transverse excision through the proximal prostate with preservation of the posterior prostate. As with the prostate-sparing RC, careful patient selection is critical to not affect the oncological outcomes. Reported potency preservation rates after capsule-sparing RC are studied to be around 80–100%.^{20–22}

Seminal-sparing RC is described as preserving the SVs, the vas deferens, and the NVB. Compared to the 2 previous approaches, seminal-sparing RC minimizes the oncological risk, since the prostate is removed in its entirety, but at the same time offers a similar probability to spare the autonomic innervation responsible for sexual function.^{23–26} A reported 95% of patients who have undergone this procedure had preservation of erectile function and continence, with only a 10–30% rate of urethral anastomosis stricture. This procedure appears feasible in a carefully selected patient population interested in preserving sexual function, but the oncologic appropriateness is not yet clear.²⁵

Lastly, in a nerve-sparing RC only the NVB is left in place, and the prostate, SVs, and vas deferens are excised.^{10,27} Several studies showed satisfactory post-operative functional outcomes, without compromising tumor control, and the procedure has been described as open, laparoscopic, and robot-assisted approaches.^{28–33} Early studies demonstrate a statistical improvement in the Erection Hardness Score for men who have had NVB preservation compared to the control group.³⁰

A recent systematic review identified 12 studies comparing the different sexual-preserving techniques.³⁴ Oncological outcomes, including local and metastatic recurrences, disease-free survival,

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