

The Relationship Between Incontinence and Erectile Dysfunction After Robotic Prostatectomy: Are They Mutually Exclusive?

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ABSTRACT

Background: Urinary incontinence (UI) and erectile dysfunction (ED) remain the most common long-term complications of prostatectomy, with a significant impact on sexual health and quality of life.

Aims: To determine the relation between UI and moderate to severe ED and the risk factors for UI in patients undergoing robotic-assisted laparoscopic prostatectomy.

Methods: Patients in our institutional database who underwent robotic-assisted laparoscopic prostatectomy for prostate cancer (2006–2013) and who completed the University of California–Los Angeles Prostate Cancer Index and the Sexual Health Inventory for Men (SHIM) surveys at 12 months after prostatectomy were eligible for inclusion. Men who reported use of no urinary pads per day were considered continent, whereas men who used at least one pad per day were considered incontinent. Men with moderate to severe ED based on a SHIM score no higher than 11 were considered to have ED. Patients who had preoperative moderate to severe ED and/or UI based on these definitions were excluded from further analysis.

Outcomes: A better understanding of what increases the risk for UI after a prostatectomy and how it can co-occur with ED.

Results: We analyzed 464 patients who met the inclusion criteria. After prostatectomy, 36% of patients had UI and 47% of patients had moderate to severe ED. Of all patients with ED, 45% (98 of 216) were incontinent compared with 27% (67 of 248) of patients without ED ($P < .001$). On multivariable analysis, older age at diagnosis (odds ratio [OR] = 1.05, $P = .002$) and ED (OR = 1.88, $P = .005$) were independent predictors for incontinence. The use of unilateral nerve sparing (OR = 1.03, $P = .94$) or no nerve sparing (OR = 0.53, $P = .50$) during surgery did not have an impact on postoperative incontinence.

Clinical Implications: Understanding that ED is an independent predictor of UI after robotic-assisted laparoscopic prostatectomy has important clinical implications and suggests a common anatomic pathway.

Strengths and Limitations: Our focus on different measurements of incontinence and their relation to ED and our use of validated questionnaires to define incontinence and ED were important strengths of this study. Limitations of our study include its retrospective nature and the fact that our results were drawn from a single-center database of a tertiary referral hospital.

Conclusion: Our results show that the presence of moderate to severe ED after prostatectomy is an independent risk factor for incontinence, suggesting a possible common pathway for these two complications. Further studies to investigate the anatomic and clinical bases of this relation are warranted. **Tsikis ST, Nottingham CU, Faris SF. The Relationship Between Incontinence and Erectile Dysfunction After Robotic Prostatectomy: Are They Mutually Exclusive? J Sex Med 2017;XX:XXX–XXX.**

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INTRODUCTION

Robotic-assisted laparoscopic radical prostatectomy (RALP) is currently widely used in the treatment of localized prostate cancer.¹ Although certain perioperative outcomes such as blood loss and length of hospital stay are better in patients undergoing RALP compared with open radical prostatectomy, this procedure has not consistently provided superior urinary incontinence (UI)

or erectile dysfunction (ED) rates.^{2,3} In fact, UI and ED continue to be some of the most common long-term adverse effects of prostatectomy, with a significant impact on a patient's quality of life.⁴ Unfortunately, very little is currently known about the risk factors for UI after prostatectomy; hence, our ability to counsel patients is limited.

Reported rates of post-prostatectomy incontinence range up to 20% to 30% in some series.^{3,5} This is not surprising because the operation can interfere with the urethral sphincter complex, which is crucial in maintaining continence. Hence, preservation of the external urethral sphincter and its innervation helps shorten the time needed to achieve continence after a prostatectomy.⁶ However, even if the external urethral sphincter is preserved, post-prostatectomy incontinence can be present. This illustrates that the cause of incontinence after a prostatectomy involves complex pathophysiologic mechanisms.⁷ It is well established that the periprostatic neurovascular bundle (NVB) provides autonomic innervation to the corpora cavernosa and plays an important role in erection.⁸ Preservation of the NVB during RALP is correlated with the preservation of normal sexual function. However, the role of the NVB in the neural supply of the urethral sphincter remains controversial.⁹

If the NVB or some other anatomic mechanism related to potency also plays a role in the complex physiologic mechanisms that are responsible for continence, then we would expect that men with ED would have higher rates of incontinence after a prostatectomy. We hypothesized that moderate to severe ED after RALP would be an independent risk factor for UI at 1 year after surgery.

METHODS

A total of 4,167 consecutive patients with prostate cancer from May 2006 through October 2013 at the University of Chicago were screened for inclusion retrospectively. The patient data were acquired from a prospectively maintained institutional database that collects basic demographics, preoperative oncologic information, surgical and perioperative inpatient data, pathology, oncologic follow-up data, and responses from a quality-of-life questionnaire that is administered at each patient encounter. This questionnaire contains the Sexual Health Inventory for Men (SHIM), the International Prostate Symptom Score, and the University of California—Los Angeles Prostate Cancer Index (UCLA-PCI), which are validated tools used to determine quality of life related to urinary and sexual function.^{10–12}

The results of the questionnaire administered at the 12-month postoperative visit were used to determine the degree of UI and ED. UI was assessed through the UCLA-PCI questionnaire through five questions that ask about overall urinary control, the frequency of leaks, the use of pads for incontinence, and the effects of incontinence on daily activities. Men were defined as incontinent if they used at least one pad per day and continent if they reported no pad use, a definition that has been extensively

used in the literature.¹³ ED was measured using the SHIM score and patients were classified as having moderate to severe ED if the SHIM score was less than or equal to 11.^{11,14} Patients completing the SHIM are asked to do so in the context of using supplemental medication or devices to achieve an erection, if they are using them. The Charlson comorbidity index was calculated from the patient medical history.¹⁵

Patients in the database must have undergone RALP to be eligible for this study. Other inclusion criteria were completion of the 12-month postoperative questionnaire, complete demographic information, and patients must not have received androgen deprivation therapy or radiation within 12 months of their operation. Patients with preoperative moderate to severe ED and/or incontinence based on these definitions were excluded from further analysis. Some patients in the database met a surgeon for consultation but did not receive treatment for prostate cancer, and others were treated at our institution with modalities such as open prostatectomy, radiation therapy, and active surveillance. This database was previously approved by our institutional review board under protocols 13-0317 and 12803B.

For RALPs, our group previously described the clipless ante-grade nerve-sparing technique, in which the surgeon creates an intrafascial plane between the prostate and the NVB.¹⁶ The dissection is carried from the base of the gland to the apex, with the vascular pedicle being transected using primarily cold cutting and judicious electrocautery so that it is swept posteriorly, and the NVB is swept laterally using blunt dissection. Additional hemostasis is performed using interrupted suturing of selected bleeding vessels. This technique can be performed for the right and left sides of the prostate, and we defined nerve sparing as the performance of this technique on either side or both sides of the gland.

We used STATA 14.0 (StataCorp, College Station, TX, USA) for statistical analysis. We used the *t*-test for normally distributed continuous variables for comparisons between two groups and analysis of variance for comparisons among three groups. For categorical variables, we used the χ^2 test. The *z*-score test was used for comparisons of two population proportions. Univariate and multivariable analyses were performed to assess independent predictors of UI. We used a *P* value less than 0.05 to indicate statistical significance.

RESULTS

In total, 464 patients met the inclusion criteria and were included in this analysis. The baseline demographic characteristics are presented in Table 1, divided based on whether patients had UI according to our definition of UI as having to use at least one pad per day. The prevalence of incontinence at 12 months after RALP was 36% (165 of 464) in our sample. The mean age was older for incontinent patients compared with continent patient (59.9 vs 56.8 years, respectively; *P* < .001). The representation of different races and ethnicities was similar between

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