Does intraoperative difficulty at time of robotic-assisted radical prostatectomy predict urinary continence recovery?

Emad Rajih[1,2], Abdullah M. Alenizi[2,3], Mansour Alnazari[1,2] ,Walaa Borhan[2,4], Assaad El-Hakim[2]
[1]Department of General and Specialized Surgery, College of Medicine, Taibah University, Madinah, Saudi Arabia; [2]Division of Robotic Urology, Department of Surgery, Hôpital du Sacré-Cœur de Montréal, Montreal, QC, Canada; [3]Department of Urology, Security Force Hospital, Riyadh, Saudi Arabia; [4]Basic Medical Sciences, College of Medicine, Taibah University, Madinah, Saudi Arabia

Cite as: Rajih E, Alenizi AM, Alnazari M, et al. Does intraoperative difficulty at time of robotic-assisted radical prostatectomy predict urinary continence recovery? *Can Urol Assoc J* 2025 December 15; Epub ahead of print. http://dx.doi.org/10.5489/cuaj.9374

Published online December 15, 2025

Corresponding author: Dr. Assaad El-Hakim, Hôpital du Sacré-Cœur-de-Montréal Montreal, QC, Canada; assaad.el-hakim.med@ssss.gouv.qc.ca

***

ABSTRACT

Introduction: Several studies have reported the preoperative and intraoperative predictors of urinary continence after robotic-assisted laparoscopic radical prostatectomy (RARP). No studies have addressed the impact of surgeon satisfaction and perceived surgical difficulty on continence recovery after RARP.
Methods: We conducted a retrospective study of prospectively collected data for patients treated with RARP for clinically organ-confined prostate cancer. Perioperative variables were recorded and studied. Patients were followed with regular visits at one, three, six, 12, and 24 months after surgery. The primary endpoint of the study was time to continence.
Results: A total of 322 patients treated with RARP were included. At least 80% of patients had 24-month postoperative continence followup. Continence rates were 39.1, 58.2, 71.1, 80.9, and 90.7% at one, three, six, 12, and 24 months, respectively. Perceived intermediate and high difficulty cases were associated with lower hazards of continence after RARP compared to low-difficulty cases (hazard ratio [HR] intermediate vs. low: 0.63, p=0.006; HR high vs. low: 0.52, p<0.001). Similarly, increased prostate size and decreased operative time were associated with low hazard of continence after RARP. Conversely, no statistically significant differences were recorded for surgeon satisfaction and preoperative Sexual Health Inventory for Men score (all p>0.05) at multivariate analysis.
Conclusions: Overall difficulty encountered by the surgeon at time of RARP is an independent predictor of continence recovery, in addition to prostate size and preoperative International Prostate Symptoms Score. Predictive preoperative factors for difficult surgery should be dealt with by an experienced surgeon to hasten continence recovery after surgery.

INTRODUCTION

Robotic-assisted radical prostatectomy (RARP) has gained widespread acceptance among patients and urologists in treating organ confined prostate cancer [1]. This was based on comparable oncological outcomes relative to open retropubic radical prostatectomy, as well as better postoperative recovery of urinary continence and erectile function [2,3].

Several studies have reported on preoperative and intraoperative predictors of urinary continence after RARP including age, body mass index, lower urinary tract symptoms, and prostate volume [4,5]. Furthermore, recent studies highlight the growing importance of reconstructive techniques in continence recovery for instance, Rinaldi et al. demonstrated improved 5-year urinary outcomes with anterior or posterior reconstruction during RARP [6]. Similarly, MRI-based predictors (e.g., membranous urethral length) have been identified in laparoscopic cohorts as valuable tools to forecast continence recovery [7]. Broader narrative reviews underscore the evolving landscape of surgical innovations including Retzius-sparing and single-port approaches that aim to optimize early continence while balancing oncological efficacy [8]. However, no studies addressed the impact of surgeon satisfaction and surgical perceived difficulty on continence recovery after RARP.

In the current manuscript, we relied on a single surgeon experience to identify preoperative predictors of urinary continence after RARP. Additionally, we examined the impact of surgeon's perception of difficulty and satisfaction on continence recovery following RARP with long term follow-up.

METHODS

Study population

The ethical approval for the current research was obtained with the number (2014-991; BQ-991). We conducted a retrospective study of prospectively collected data for patients treated with RARP for clinically organ confined prostate cancer. No patient received a previous pelvic radiation, neo-adjuvant therapy, or endoscopic prostate treatment. In addition, none of the patients required salvage prostatectomy or adjuvant external beam radiotherapy (EBRT) after surgery. Patients with missing pathological and operative characteristics, as well as postoperative follow-up were excluded from the study. At a single institution (Hôpital du Sacré Cœur de Montréal), we included patients treated with RARP between 2008 and 2016. All cases (n=322) were performed by a single surgeon (AEH) beyond his learning curve.

Covariates

Perioperative variables were collected at the time of surgery using a standardized data sheet (Figure 1). Age at surgery, prostate specific antigen (PSA), and prostate volume (measured by transrectal ultrasound at the time of prostate biopsy) were coded as continuous variables. Pathological stage was categorized into 4 sub-groups: T2a-b, T2c, T3a, and T3b-T4, using TNM 7^{th} edition classification system. Pathological Gleason grade was categorized into 4 strata: ≤6, 3+4, 4+3, and 8-10. Body mass index (BMI), Charlson comorbidity index (CCI), year of surgery, and operative time were also included. Preoperative international prostate symptoms score (IPSS) was stratified into 3 categories: mild (<8), moderate (8-19), severe (20-35). Similarly, preoperative sexual health inventory for male (SHIM) symptoms score was also categorized: no erectile dysfunction, mild (17-21), mild- moderate (12-16), moderate (8-11) and severe (1-7). Finally, surgeon's satisfaction and overall surgical difficulty were measured prospectively with a

Lykert scales. Surgeon's satisfaction of was categorized into three strata: please, mixed and dissatisfied. Similarly, overall difficulty was also divided into three levels: easy, intermediate and difficult. All scales were filled after surgery by the same surgeon (AEH) throughout the study period.

Outcomes

Patients were followed with regular visit at 1, 3, 6, 12, and 24 months after surgery. During each visit a self-administered questionnaire were filled, as well as number of pads usage were documented. The primary endpoint of the study was time to continence. The latter was defined as the use of less than one security liner or pads per day (24 hr).

Statistical analysis

Descriptive statistics focused on frequencies and proportions for categorical variables. Means, medians and interquartile ranges were reported for continuous variables. The Mann-Whitney test and chi-square test were used to compare statistical significance of differences in medians and proportions, respectively.

Univariable and multivariate Cox regression analyses were fitted to predict the effect of preoperative IPSS and SHIM, as well as surgical difficulty and surgeon satisfaction on continence recovery after RARP. In multivariable analyses, adjustment was made for age, BMI, PSA level, prostate size, pathological stage, Gleason score and operative time.

All statistical tests were performed using R software environment for statistical computing and graphics (Vienna, Austria, version 3.0.1). All tests were 2-sided with a significance level set at $p<0.05$.

RESULTS

Overall, 322 patients treated with RARP were included. At least 80% of patients had 24-months postoperative continence follow-up. Baseline clinical and pathological characteristics are summarized in table 1. The median age at surgery, PSA level, and prostate volume were 61 years, 5.7 ng/dl and 47g; respectively. Most patients had a high comorbidity index (CCI≥ 3: 61.5%), were overweight [BMI (>25- 30 Kg/m^2): 41.6%], and harbored low pathological stage disease (T2a-c: 75.2%), and low Gleason score (G<3+4: 77.9%).

Preoperative mild, moderate, and severe IPSS rates were 61, 33, and 6%; respectively. Preoperative mild, mild to moderate, moderate, and severe SHIM erectile dysfunction rates were 29, 11, 4, and 13%; respectively. Subjective surgical difficulty was low, intermediate, and high in 40, 27, and 32% of cases, respectively. Additionally, the surgeon was satisfied in 95% of cases.

Continence rates were 39.1, 58.2, 71.1, 80.9, and 90.7% at 1, 3, 6, 12, and 24 months, respectively (table 2). Patient with mild IPSS score had statistically better continence rates at 1, 3, 6, 12 and, 24 months (mild IPSS continent vs. incontinent: 71.4 vs. 54.1%; 68.4 vs. 50.7%; 66.2 vs. 47.8; 64.7% vs. 44.6%; 62.7 vs. 54.2% for 1; 3; 6; 12; 24 months, respectively; all P<0.05). Similarly, surgical difficulty perception rates were statistically variable between continent and incontinent patients (low overall difficulty continent vs. incontinent: 54 vs. 31.1%; 48.7 vs. 27.6%; 47.7 vs. 21.1; 45.8% vs. 19.6%; 45.5 vs. 12.5% for 1; 3; 6; 12; 24 months, respectively; all P<0.05). Conversely, no statistically significant differences were recorded for surgeon satisfaction and preoperative SHIM score (all p>0.05).

In multivariable Cox regression analyses (Table 3) after adjustment for potential confounders, preoperative moderate IPSS score was associated with lower hazard of continence recovery compared to mild IPSS score (HR for moderate vs. mild IPSS: 0.74; p=0.04). However, no statistically significant difference was recorded for severe vs. mild IPSS (HR: 0.57; p=0.06). Regarding surgical difficulty perception, intermediate and high difficulty cases were associated with lower hazards of continence after RARP compared to low difficulty cases (HR intermediate vs. low: 0.63; p=0.006; HR high vs. low: 0.52; p<0.001). Similarly, increased prostate size and decreased operative time as associated with low hazard of continence after RARP. Conversely, no statistically significant differences were recorded for surgeon satisfaction and preoperative SHIM score (all p>0.05) at multivariate analysis.

DISCUSSION

In the current study, we hypothesized that surgeon reflection and satisfaction about the procedure could have an impact on continence recovery following RARP. Our analysis showed that surgeon-perceived intraoperative difficulty was a strong and independent predictor of continence recovery at all time points during the first 2 years (p<0.05). By contrast, surgeon satisfaction regarding the perceived perfection of the surgery and the anastomotic quality did not affect continence recovery in multivariable analysis, as no significant associations were detected (all p>0.05). This observation is consistent with the limited available evidence, where studies have focused on technical modifications to the anastomosis (e.g., posterior or anterior reconstruction) rather than subjective surgeon-reported satisfaction, and these have shown mixed effects on continence recovery [9,10]. To the best of our knowledge, such reflection on perceived difficulty has never been studied before. We believe this measure could help in patient counseling after RARP, particularly in identifying individuals who may benefit from early rehabilitation strategies.

Preoperative IPSS was an independent predictor of continence recovery in our cohort. Patients with lower preoperative IPSS had significantly better continence outcomes throughout follow-up. This is consistent with previous studies, such as Lavigueur-Blouin et al., who reported that age and preoperative IPSS predicted early continence at 1 month [14], and Lee et al., who found higher IPSS scores were associated with delayed continence recovery at 6 weeks [9]. Similarly, Wang et al. showed improvements in IPSS and continence over time after RARP [15]. Together, these findings highlight that preoperative LUTS severity is an important determinant of continence recovery.

Preoperative SHIM was studied not as a measure of erectile function recovery but as a surrogate of vascular and neurogenic status. In our study, preoperative SHIM predicted continence recovery only at 24 months, not earlier. This delayed effect may be explained by the role of microvascular disease, which is known to affect both erectile function and bladder recovery [16,17]. Kim et al. reported that higher baseline SHIM scores predicted continence recovery within 3 months [10], while Shikanov et al. found baseline SHIM correlated with continence at 1 year [18]. Ko et al. also described associations between severe erectile dysfunction and worse incontinence outcomes at 3 months [19]. Our findings suggest that SHIM may capture microvascular compromise that influences long-term rather than early continence recovery as reported in our study previously [20].

Prostate size was another significant factor. Larger prostates were associated with delayed recovery, consistent with prior evidence that larger glands increase dissection complexity and reduce urethral length, thereby impairing sphincter preservation [4,5].

Operative time was not significant in univariate analysis but became significant in multivariable modeling. This discrepancy can be explained by confounding: operative time correlates with prostate size, BMI, and perceived difficulty. In univariate analysis, these interrelationships may obscure the independent effect of operative time. After adjustment, longer operative time emerged as an independent predictor of delayed continence recovery. This underscores the importance of multivariable modeling to disentangle complex associations.

Perceived intraoperative difficulty proved to be one of the strongest predictors of continence recovery. This subjective measure integrates several unrecorded complexity factors such as adhesions, prostate anatomy, and technical challenges into a single assessment. Although no standardized scoring system exists, we used a Likert scale consistently applied by the same surgeon, minimizing interobserver variability. Our results indicate that surgeon-perceived difficulty is a vital parameter influencing functional recovery.

Surgeon satisfaction Surgeon satisfaction regarding anastomotic quality did not predict continence recovery in our multivariable analysis. Although subjective satisfaction may reflect perceived technical precision, continence recovery is more likely influenced by baseline functional status, tissue healing, and anatomical preservation. This is consistent with the limited available evidence, where studies evaluating technical modifications to the anastomosis (e.g., posterior or anterior reconstruction) have shown mixed effects on continence recovery. [9,10]

Although this is the first study to correlate subjective intraoperative difficulty with functional outcomes, several limitations merit acknowledgment. First, the lack of standardized definitions for intraoperative difficulty is an inherent limitation; however, our use of a consistent Likert scale mitigates this. Second, despite prospective data collection, the retrospective design carries inherent biases. Third, we acknowledge that additional variables such as prior prostate biopsies, previous abdominal surgeries, peri-prostatic adhesions, presence of a median lobe, and estimated blood loss were not systematically collected in our dataset. These factors may contribute to intraoperative complexity. Nevertheless, our findings demonstrate that the surgeon's overall perceived difficulty, regardless of the specific contributing factor, independently predicts continence recovery. Future studies should further explore the factors underlying surgeon-perceived intraoperative difficulty, as this may guide strategies to optimize surgical technique and improve functional outcomes. From an oncological perspective, although our cohort included some men with advanced pathological stage and higher Gleason grade disease, the majority had PSA ≤10 ng/mL, with fewer than 10 cases above this threshold. This distribution reflects the natural case mix of our consecutively included cohort, with no intentional exclusions apart from patients with prior radiotherapy. In a prior analysis of this prospective database, we demonstrated that PSA, stage, and Gleason grade did not significantly affect continence recovery long term. Still, the predominance of lower PSA values may limit generalizability, and future studies should explore the impact of adverse oncological features on intraoperative difficulty and functional outcomes.

This study provides surgeons with additional insight into postoperative continence recovery and quality of life. In particular, perceived surgical difficulty and preoperative IPSS remain the strongest independent subjective prognostic factors. These parameters could be incorporated into patient counseling and guide postoperative rehabilitation. As robotic surgeons,

efforts should be directed toward refining techniques that mitigate intraoperative difficulty and thereby enhance recovery.

CONCLUSIONS

Overall difficulty encountered by surgeon at time of RARP is an independent predictor of continence recovery in addition to prostate size and preoperative IPSS. To our knowledge, this is the first time a subjective intraoperative parameter has been correlated with functional outcome post RARP. These results need to be validated by others. Predictive preoperative factors for difficult surgery should be dealt with expert surgeon to hasten continence recovery after surgery.

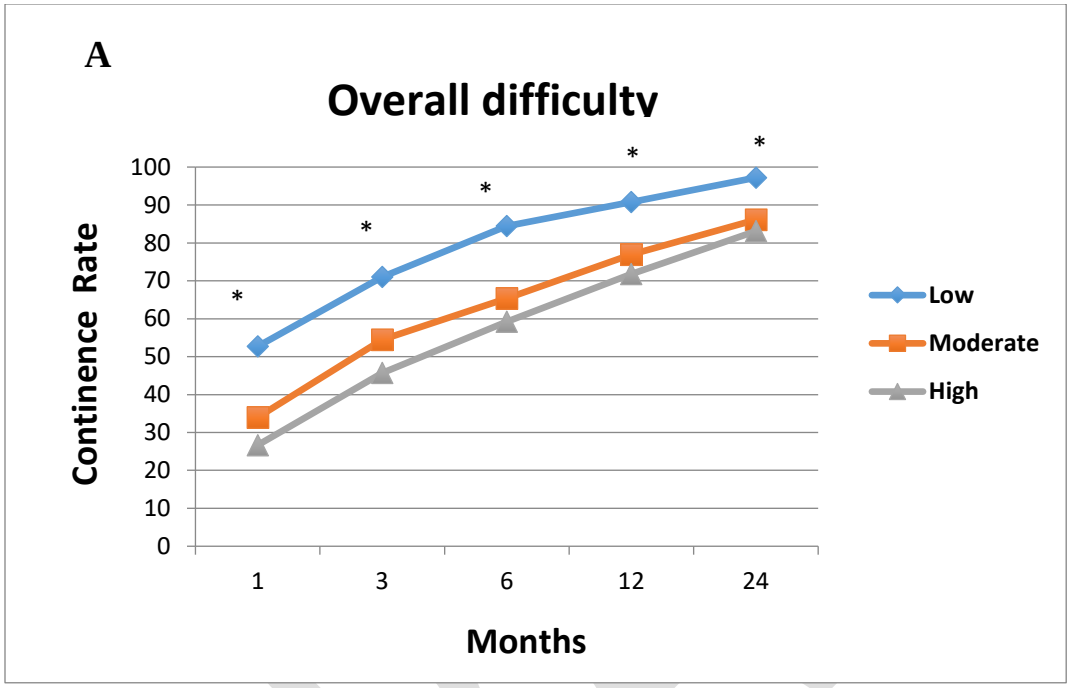
REFERENCES

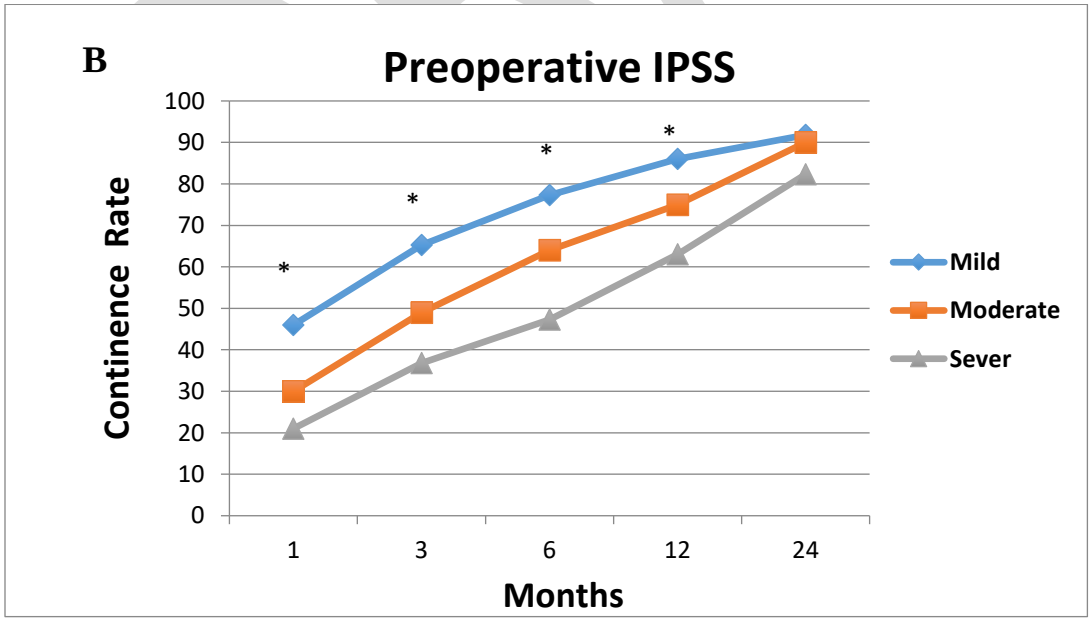
1. Wexner SD, Bergamaschi R, Lacy A, et al. The current status of robotic pelvic surgery: results of a multinational interdisciplinary consensus conference. *Surg Endosc* 2009;23:438-43. https://doi.org/10.1007/s00464-008-0202-8
2. Menon M, Shrivastava A, Tewari A, et al. Laparoscopic and robotic-assisted radical prostatectomy: establishment of a structured program and preliminary analysis of outcomes. *J Urol* 2002;168:945-9.https://doi.org/10.1016/S0022-5347(05)64548-X
3. Ahlering TE, Skarecky D, Lee D, et al. Successful transfer of open surgical skills to a laparoscopic environment using a robotic interface: initial experience with laparoscopic radical prostatectomy. *J Urol* 2003;170:1738-41. https://doi.org/10.1097/01.ju.0000092881.24608.5e
4. Ficarra V, Novara G, Rosen RC, et al. Systematic review and meta-analysis of studies reporting urinary continence recovery after robot-assisted radical prostatectomy. *Eur Urol* 2012;62:405-17. https://doi.org/10.1016/j.eururo.2012.05.045
5. Novara G, Ficarra V, Rosen RC, et al. Systematic review and meta-analysis of perioperative outcomes and complications after robot-assisted radical prostatectomy. *Eur Urol* 2012;62:405-17. https://doi.org/10.1016/j.eururo.2012.05.045
6. Rinaldi M, Porreca A, Di Lena S, et al. A matched-analysis on short-term and long-term (up to 5 years of follow-up) urinary incontinence outcomes after robot-assisted radical prostatectomy with and without anterior and posterior reconstruction: data on 1358 patients. *Int Urol Nephrol* 2024;56:121-7. https://doi.org/10.1007/s11255-023-03766-z
7. Liu L, Zhou S, Song D, et al. The predictors of short- and long-term urinary continence recovery after laparoscopic radical prostatectomy: a single cancer center report in China. *World J Surg Oncol* 2024;22:150. https://doi.org/10.1186/s12957-024-03425-2
8. Palma-Zamora I, Abdollah F, Rogers C, et al. Recent advances in radical prostatectomy: a narrative review of surgical innovations and outcomes. *Cancers (Basel)* 2025;17(5):902. https://doi.org/10.3390/cancers17050902
9. Lee DJ, Cheetham P, Badani KK, et al. Predictors of early urinary continence after robotic prostatectomy. *Can J Urol* 2010;17:5200-5.
10. Kim JJ, Ha YS, Kim JH, et al. Independent predictors of recovery of continence 3 months after robot-assisted laparoscopic radical prostatectomy. *J Endourol* 2012;26:1290-5. https://doi.org/10.1089/end.2012.0117
11. Good DW, Delaney H, Laird A, et al. Consultation audio-recording reduces long-term decision regret after prostate cancer treatment: A non-randomised comparative cohort study. *Surgeon* 2015;14:308-14. https://doi.org/10.1016/j.surge.2014.10.006
12. Guillonneau B, Vallancien G. Laparoscopic radical prostatectomy: The montsouris experience. *J Urol* 2000;163:418-22. https://doi.org/10.1016/S0022-5347(05)67890-1
13. Kinoshita H, Nakagawa K, Usui T, et al. High definition resolution three-dimensional imaging systems in laparoscopic radical prostatectomy: randomized comparative study with high-definition resolution two-dimensional systems. *Surg Endosc* 2015;29:2203-9. https://doi.org/10.1007/s00464-014-3925-8
14. Lavigueur-Blouin H, Noriega AC, Valdivieso R, et al. Predictors of early continence following robot-assisted radical prostatectomy. *Can Urol Assoc J* 2015;9:93-7. https://doi.org/10.5489/cuaj.2086

15. Wang L, Chung SF, Yip SK, et al. The natural history of voiding function after robot-assisted laparoscopic radical prostatectomy. *Urol Oncol* 2011;29:177-82. https://doi.org/10.1016/j.urolonc.2009.01.030
16. Jackson G, Rosen RC, Kloner RA, et al. The second Princeton consensus on sexual dysfunction and cardiac risk: New guidelines for sexual medicine. *J Sex Med* 2006;3:28-36. https://doi.org/10.1111/j.1743-6109.2005.00196.x
17. Yabe M, Haga N, Ogawa S, et al. Atherosclerosis as a predictor of delayed recovery from lower urinary tract dysfunction after robot-assisted laparoscopic radical prostatectomy. *Neurourol Urodyn* 2015;35:920-5. https://doi.org/10.1002/nau.22824
18. Shikanov S, Desai V, Razmaria A, et al. Robotic radical prostatectomy for elderly patients: probability of achieving continence and potency 1 year after surgery. *J Urol* 2010;183:1803-7. https://doi.org/10.1016/j.juro.2010.01.016
19. Ko YH, Coelho RF, Chauhan S, et al. Factors affecting return of continence 3 months after robot-assisted radical prostatectomy: analysis from a large, prospective data by a single surgeon. *J Urol* 2012;187:190-4. https://doi.org/10.1016/j.juro.2011.09.037
20. Alenizi AM, Bienz M, Rajih E, et al. Uroflow stop test and potency recovery: A surrogate for pelvic floor integrity post robotic-assisted radical prostatectomy? *Urology* 2015;86:766-71. https://doi.org/10.1016/j.urology.2015.05.041

FIGURES AND TABLES

Figure 1. Marked lines graphs show the continence rate in comparison with (A) intraoperative overall difficulty; (B) preoperative International Prostate Symptom Score (IPSS); (C) preoperative Sexual Health Inventory for Men (SHIM). ED: erectile dysfunction.





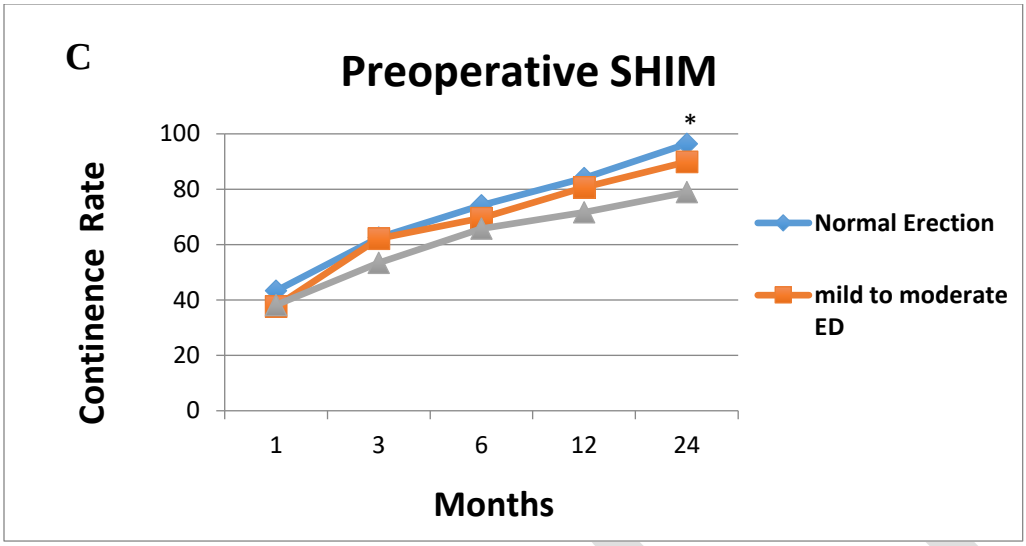


Table 1. Patient characteristics	
Variables	**Mean (IQR or % of patients)**
Age (year)	60.8 (56–66)
CCI	
0–2	124 (38.5%)
≥3	198 (61.5%)
BMI (kg/m^2)	
≤25	62 (19.3%)
>25–30	134 (41.6%)
>30	70 (21.7%)
Unknown	56 (17.4%)
Year of surgery	
2006–2010	140 (43.5%)
2011–2015	182 (56.5%)
PSA (ng/ml)	6.8 (4.58–7.65)
Prostate volume (g)	49.6 (38–57)
Pathological stage	
T2a–T2b	73 (22.7%)
T2c	169 (52.5%)
T3a	61 (18.9%)
T3b–T4	19 (5.9%)
Pathological Gleason score	
6	50 (15.5%)
3+4	201 (62.4%)
4+3	28 (8.7%)
≥8	43 (13.4%)

BMI: body mass index; CCI: Charlson Comorbidity Index; IQR: interquartile range; PSA: prostate-specific antigen.

Table 2. IPSS, SHIM, and overall difficulty during surgery and continence recovery rate at 1, 3, 6, 12, and 24 months following surgery						
A. Preoperative IPSS and continence recovery rate						
Continence status	**Preoperative IPSS**	**1 month* n=322**	**3 months* N=321**	**6 months* n=312**	**12 months* n=294**	**24 months n=257**
Continent	Mild	90 (71.4%)	128 (68.4%)	147 (66.2%)	154 (64.7%)	146 (62.7%)
	Moderate	32 (25.4%)	52 (27.8%)	66 (29.7%)	72 (30.3%)	73 (31.3%)
	Severe	4 (3.2%)	7 (3.7%)	9 (4.1%)	12 (5%)	14 (6%)
Incontinent	Mild	106 (54.1%)	68 (50.7%)	43 (47.8%)	25 (44.6%)	13 (54.2%)
	Moderate	75 (38.8%)	54 (40.3%)	37 (41.1%)	24 (42.9%)	8 (33.3%)
	Severe	15 (7.7%)	12 (9%)	10 (11.1%)	7 (12.5%)	3 (12.5%)
(B) Preoperative SHIM and continence recovery rate						
Continence status	**Preoperative SHIM**	**1 month**	**3 months**	**6 months**	**12 months**	**24 months***
Continent	Severe	13 (10.3%)	23 (12.3%)	27 (12.2%)	28 (11.8%)	30 (12.9%)
	Moderate	6 (4.8%)	6 (3.2%)	7 (3.2%)	10 (4.2%)	8 (3.4%)
	Mild-moderate	12 (9.5%)	21 (11.2%)	24 (10.8%)	26 (10.9%)	29 (12.4%)
	Mild	36 (28.6%)	52 (27.8%)	66 (29.7%)	69 (29%)	61 (26.2%)
	No ED	59 (46.8%)	85 (45.5%)	98 (44.1%)	105 (44.1%)	105 (45.1%)
Incontinent	Severe	30 (15.3%)	20 (14.9%)	14 (15.6%)	11 (19.6%)	8 (33.3%)
	Moderate	7 (3.6%)	7 (5.2%)	6 (6.7%)	3 (5.4%)	3 (12.5%)
	Mild-moderate	24 (12.2%)	15 (11.2%)	10 (11.1%)	8 (14.3%)	3 (12.5%)
	Mild	58 (29.6%)	41 (30.6%)	26 (28.9%)	14 (25%)	5 (20.8%)
	No ED	77 (39.3%)	51 (38.1%)	34 (37.8%)	20 (35.7%)	5 (20.8%)
(C) Overall difficulty encountered during surgery and continence recovery rate						
Continence status	**Overall difficulty**	**1 month***	**3 months***	**6 months***	**12 months***	**24 months***
Continent	Easy	68 (54%)	91 (48.7%)	106 (47.7%)	109 (45.8%)	106 (45.5%)

	Mixed	30 (23.8%)	48 (25.7%)	55 (24.8%)	60 (25.2%)	58 (24.9%)
	Difficult	28 (22.2%)	48 (25.7%)	61 (27.5%)	69 (29%)	69 (29.6%)
Incontinent	Easy	61 (31.1%)	37 (27.6%)	19 (21.1%)	11 (19.6%)	3 (12.5%)
	Mixed	58 (29.6%)	40 (29.9%)	29 (32.2%)	18 (32.1%)	7 (29.2%)
	Difficult	77 (39.3%)	57 (42.5%)	42 (46.7%)	27 (48.2%)	14 (58.3%

*Statistically significant ($p<0.05$). IPSS: International Prostate Symptoms Score; SHIM: Sexual Health Inventory for Men.

Table 3. Univariate and multivariate analysis, Cox regression analysis, of various factors in relation to postoperative early continence recovery

	Univariate		**Multivariate**	
	HR (95% CI)	**p**	**HR (95% CI)**	**p**
Age	0.98 (0.96–1)	0.06	0.98 (0.96–1.01)	0.28
CCI				
0–2	Reference	0.5	Reference	0.20
≥3	0.92 (0.72–1.17)		1.26 (0.88–1.79)	
BMI				
≤25	Reference		Reference	
>25–30	0.95 (0.68–1.32)	0.8	1.02 (0.72–1.43)	0.9
>30	0.88 (0.61–1.27)	0.5	1.01 (0.68–1.51)	1
Unknown	0.76 (0.51–1.13)	0.2	0.79 (0.52–1.21)	0.3
PSA	0.99 (0.96–1.02)	0.6	0.99 (0.96–1.02)	0.5
Prostate size	0.99 (0.98–0.99)	0.002*	0.99 (0.98–0.99)	0.05*
Pathologic stage				
T2a–b	Reference		Reference	
T2c	1.05 (0.78– 1.41)	0.7	0.99 (0.73–1.35)	1
T3a	0.84 (0.58–1.24)	0.4	0.87 (0.57–1.33)	0.5
T3b–T4	1.3 (0.76–2.23)	0.3	1.41 (0.59–2.22)	0.7
Gleason score				
6	Reference		Reference	
3+4	0.81 (0.58–1.13)	0.2	0.81 (0.57–1.16)	0.3
4+3	0.9 (0.55–1.49)	0.7	0.96 (0.55–1.68)	0.9
≥8	0.93 (0.6–1.44)	0.7	0.91 (0.52–1.59)	0.8
Operative time	1 (1–1.01)	0.2	1.001 (1.001–1.01)	0.02*
IPSS				
Mild	Reference		Reference	
Moderate	0.72 (0.56–0.94)	0.01*	0.74 (0.56–0.98)	0.04*

Severe	0.57 (0.34-0.97)	0.04*	0.57 (0.32–1.02)	0.06
SHIM				
No ED	Reference		Reference	
Mild	0.87 (0.65–1.16)	0.3	1 (0.74–1.36)	1
Mild-Moderate	0.85 (0.57–1.25)		1.16 (0.75–1.79)	0.5
Moderate	0.79 (0.42–1.46)	0.4	0.84 (0.43–1.66)	0.6
Severe	0.64 (0.43–0.95)	0.03*	0.78 (0.51–1.18)	0.2
Overall difficulty				
Easy	Reference		Reference	
Mixed	0.62 (0.46–0.84)	0.002*	0.63 (0.45–0.87)	0.006*
Difficult	0.51 (0.39–0.68)	<0.001*	0.52 (0.37–0.73)	<0.001*
Overall satisfaction				
Pleased	Reference		Reference	
Mixed	0.97 (0.5–1.88)	0.9	1.74 (0.82–3.7)	0.1
Dissatisfied	1.79 (0.74–4.33)	0.2	2.34 (0.89–6.16)	0.09

*Statistically significant ($p<0.05$). BMI: body mass index; CCI: Charlson Comorbidity Index; CI: confidence interval; ED: erectile dysfunction; HR: hazard ratio; IPSS: International Prostate Symptoms Index; PSA: prostate-specific antigen; SHIM: Sexual Health Inventory for Men.