Prolonged Duration of Incontinence for Men Before Initial Anti-incontinence Surgery: An Opportunity for Improvement

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OBJECTIVE To evaluate the duration and severity of male incontinence symptoms before presentation for initial anti-incontinence surgery (AIS) in a large tertiary subspecialty practice. Although male stress urinary incontinence (SUI) is known to profoundly compromise quality of life, many men do not undergo AIS in a timely manner.

MATERIALS AND METHODS We retrospectively reviewed our male patients with SUI (2007-2017) and assessed time from SUI onset to initial AIS across various demographics comparing male sling and artificial urinary sphincter (AUS). Reoperative cases were excluded.

RESULTS Among 786 cases, 572 men undergoing initial AIS met the inclusion criteria (mean age 69 years), with 57.7% (330/572) undergoing AUS and 42.3% (242/572) undergoing sling. The median duration of incontinence before AIS was 32 months. AUS patients pursued surgical intervention earlier than men undergoing sling (median time 28.8 months vs 34.7 months, $P = .03$). Most patients deferred AIS for more than 2 years (69.8% of sling patients and 58.5% of AUS patients), and 32.3% demonstrated an extended delay of more than 5 years. Increasing age correlated with delays in both AUS (Spearman rho = 0.20, $P = .0001$) and sling (Spearman rho = 0.34, $P < .0001$). On multivariate analysis, age was significantly associated with duration of incontinence ($P < .0001$). Octogenarians had a notably higher median delay of 87.4 months.

CONCLUSION Although the median duration of SUI before the initial AIS is 2.7 years, one-third of men experience a delay of more than 5 years. AUS present for AIS 6 months less on average relative to sling patients. Older men demonstrate a longer duration of SUI before seeking surgical care. UROLOGY 119: 149–154, 2018. © 2018 Elsevier Inc.

Stress urinary incontinence (SUI) is common after radical prostatectomy, with rates ranging from as low as 4% to as high as 42%.[1-4] Urinary incontinence in this setting is known to significantly impair both psychosocial and health-related quality of life (QOL) for both patient and partner, thus representing one of the most common causes of postprostatectomy regret.[1,5-8] Specific subgroups of patients, including those of advanced age and lower socioeconomic status, have been identified as more likely to experience worsened urinary function and bother after radical prostatectomy.[9-12]

The artificial urinary sphincter (AUS) has long been the gold standard for moderate to severe SUI, whereas transobturator urethral sling is an option for lesser degrees of SUI.[13,14] Although improvements in both patient satisfaction and QOL measures are demonstrated after anti-incontinence surgery (AIS) at rates ranging from 73% to 90%, many men do not undergo AIS in a timely manner.[15,16] Approximately 6% of men undergoing radical prostatectomy undergo surgery for urinary incontinence during the subsequent 15-year period,[3,17] whereas roughly half do not pursue surgical treatment for postprostatectomy incontinence for more than 2 years.[3]

We examined the patient-reported duration of male SUI before pursuing initial AIS in our large tertiary male SUI referral population. We evaluated the duration of SUI in the context of surgical year, patient characteristics, and SUI treatment method. We hypothesized that despite available effective options for male SUI, significant delay from SUI onset to initial surgical intervention occurs commonly.

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MATERIALS AND METHODS

We performed an institutional review board-approved retrospective study of male patients undergoing surgical treatment for male SUI by a single surgeon at our tertiary academic referral center between 2007 and 2017. All patients had SUI, determined by patient history and confirmed on physical examination with demonstration of stress incontinence in the clinic. All men underwent primary (first-time) AIS using either AUS or transobturator male urethral sling (American Medical Systems, Minnetonka, MN). Patient characteristics and history were reviewed, including patient age, etiology of incontinence, distance to the referral center, time of SUI onset, surgical interventions, and date of initial AIS. The distance to the referral center was estimated by calculating the driving distance between the zip code of the patient's primary residence and the zip code of the referral hospital using an online driving website (maps.google.com). Patients with prior anti-incontinence procedures (reoperative cases) and predominantly neurogenic or urge incontinence on patient history, provider assessment, or urodynamic testing were excluded from the analysis.

We analyzed the time from SUI onset to initial AIS, comparing men undergoing male sling and AUS. Continuous variables and categorical variables were compared using the Mann-Whitney *U* test and the Fisher exact test, respectively. Preoperative characteristics were analyzed in univariate analysis for the time from SUI onset to initial AIS. The relationship between patient age and time to AIS was analyzed using the Spearman rank correlation. For all statistical analyses, $P < .05$ was considered statistically significant. Analysis was performed using SPSS 21 for Mac (IBM Corp., Armonk, NY).

RESULTS

Among 786 male anti-incontinence procedures performed during the 10-year study interval, 572 men undergoing initial AIS met the inclusion criteria (57.7% [330/572] undergoing AUS and 42.3% [242/572] undergoing transobturator male sling). Men underwent initial AIS at a mean age of 69 years, with sling patients being significantly younger than those undergoing AUS (67.4 years vs 70.6 years, $P < .001$). The most common etiology of SUI was postprostatectomy incontinence (88.1% [504/572]), whereas endoscopic prostatic procedures (3.8%) and trauma (0.5%) were relatively rare. Patients undergoing male sling as the initial AIS were more likely to have postprostatectomy incontinence (95.4%, 231/242) than AUS patients (82.7%, 273/330) ($P = .04$).

A history of radiation was reported in 47.3% of AUS patients, compared with only 10.3% of the male sling cohort ($P = .0001$, Table 1). A minority of patients (4.7%, 27/572) had a history of bladder neck contracture managed endoscopically before AIS, with a median delay of 25 months. This delay is comparable with the median delay of 32 months among patients overall, suggesting that bladder neck contracture alone was not a significant factor in delay in SUI. The median distance from the primary residence to the clinic office was 42 mi (interquartile range 22-141 mi). Distance to the referral center was not significantly associated with an increased delay in SUI surgery or SUI surgery type (Spearman rho −0.02, $P = .65$).

Patients undergoing placement of urinary sphincter pursued surgical intervention earlier than men undergoing sling (median time to surgery 28.8 months vs 34.7 months, $P = .03$). Of the preoperative patient characteristics analyzed, increased patient age at the time of surgery and surgery type (male sling) were associated with longer delay from SUI onset to initial AIS (Table 2). Increasing age positively correlated with delays in both AUS (Spearman rho = 0.20, $P = .0001$) and sling (Spearman rho = 0.34, $P < .0001$; Table 2, Fig. 1). A progressive increase in the duration of incontinence before surgery was observed with each decade of life; a nearly 3-fold increase in the time to surgery was demonstrated in patients over the age of 80 (median delay of 87.4 months), compared with those younger than 80 years (median delay of 30.1 months). On multivariate analysis, age remains significantly associated

Table 1. Characteristics of male stress urinary incontinence patients undergoing primary anti-incontinence surgery

	All Patients (N = 572)	AUS (n = 330)	Sling (n = 242)	*P* Value
	Mean			
Age (y)	69.0	70.6	67.4	<.001
BMI (kg/m^2)	28.8	28.8	28.6	.99
	n (%)			
Etiology				
Postprostatectomy	504 (88.1)	273 (82.7)	231 (95.4)	.04
RALP	186 (32.5)	85 (25.8)	101 (41.7)	
RRP	300 (52.4)	176 (53.3)	124 (51.2)	
Undetermined	18 (3.1)	12 (3.6)	6 (2.5)	
TURP	22 (3.8)	18 (5.5)	4 (1.7)	.61
Trauma	3 (0.5)	3 (0.9)	0 (0)	.87
Idiopathic	43 (7.5)	36 (10.9)	7 (2.9)	.85
History of radiation	181 (31.6)	156 (47.3)	25 (10.3)	.0001

AUS, artificial urinary sphincter; BMI, body mass index; RALP, robotic-assisted laparoscopic prostatectomy; RRP, retropubic radical prostatectomy; TURP, transurethral resection of prostate.

Table 2. **(A)** Duration of male stress incontinence before surgical intervention over time (2007-2017) and relative to patient age and **(B)** proportion of patients with prolonged duration of incontinence before undergoing initial anti-incontinence surgery

A

	All Patients		AUS		Sling		
	N	Median Time to Surgery (mo)	n	Median Time to Surgery (mo)	n	Median Time to Surgery (mo)	*P* Value
Year of surgery							All >.05
≤2007	68	36.2	58	36.2	10	41.4	
2008-2009	122	36.6	42	25.1	80	47.8	
2010-2011	90	38.2	36	38.0	54	38.2	
2012-2013	99	32.6	46	30.3	53	32.6	
2014-2015	112	25.7	80	25.7	32	25.8	
≥2016	81	29.1	68	29.3	13	27.7	
Age (y)							AUS .0001, sling <.0001
<70	307	27.50	157	25.68	150	28.03	
≥70-<80	212	39.80	134	36.50	78	56.47	
≥80	53	87.38	39	48.70	14	183.92	
All patients	572	32.0	330	28.8	242	34.7	.03

B

	AUS (n = 330)		Sling (n = 242)	
	n	%	n	%
Time from SUI onset to surgery (mo)				
>24	193	58.50	169	69.83
>36	150	45.45	120	49.59
>48	115	34.85	100	41.32
>60	101	30.61	84	34.71

SUI, stress urinary incontinence.

with prolonged time from SUI onset to surgery (P <.0001). Despite the presence of a dedicated prostatic urology subspecialist at our center over the past decade, the duration of incontinence before initial AIS did not change significantly over the 10-year study period for either AUS or sling cohorts (Fig. 2).

The median duration of incontinence before AIS was 32 months (interquartile range 17.1-82.5 months). Male patients with SUI commonly waited for more than 2 years before undergoing initial surgical intervention (63.3%, 362/572, Table 2B). Male sling patients often demonstrated a delay in AIS of more than 2 years (69.8%, 169/242) compared with AUS patients (58.5%, 193/330) (P = .007). Almost half or 47.2% of the men (270/572) waited for more than 3 years, and 32.3% (185/572) demonstrated an extended delay of more than 5 years.

DISCUSSION

Although effective treatment options exist for men with SUI, delay from onset of incontinence to surgical treatment remains common. Two-thirds of men suffering from SUI deferred initial AIS for more than 2 years, whereas one-third of patients exhibited a protracted delay of more than 5 years before definitive treatment. Men with more severe incontinence (undergoing AUS) tended to pursue surgical intervention 6 months earlier than men with more mild incontinence (undergoing sling) despite a higher probability of undergoing secondary prostate cancer treatment with radiation.

Older men are increasingly likely to demonstrate a prolonged delay in AIS. Increasing age was associated with longer duration of SUI before surgery in both AUS and sling cohorts. The most striking increase in time to surgery was seen in octogenarians, in whom a 3-fold increase in time to surgery (median 7.3 years) is demonstrated compared with men younger than 80. We suspect that some elderly men experienced a gradual compromise of marginal sphincteric muscular function over time that eventually degraded to an unacceptable level.

Urinary incontinence has been repeatedly shown to have a negative impact on QOL, with 7% of prostatectomy patients reporting moderate distress as a result of urinary symptoms 1 year postoperatively.[18,19] The adverse influence of male SUI not only is limited to urinary QOL or bother but also has detrimental emotional, psychological, financial, and sexual effects.[7,20] Men experiencing urinary symptoms after prostate cancer treatment are more likely to suffer from moderate to higher anxiety and depression than men without such symptoms.[7]

Barriers to male SUI treatment are likely multifactorial. Both patient and provider factors are likely to contribute to delayed referral and intervention. Oncological outcomes are paramount for this population, and thus adjunctive cancer treatments may also interfere with progression to AIS. Undoubtedly, most oncological surgeons

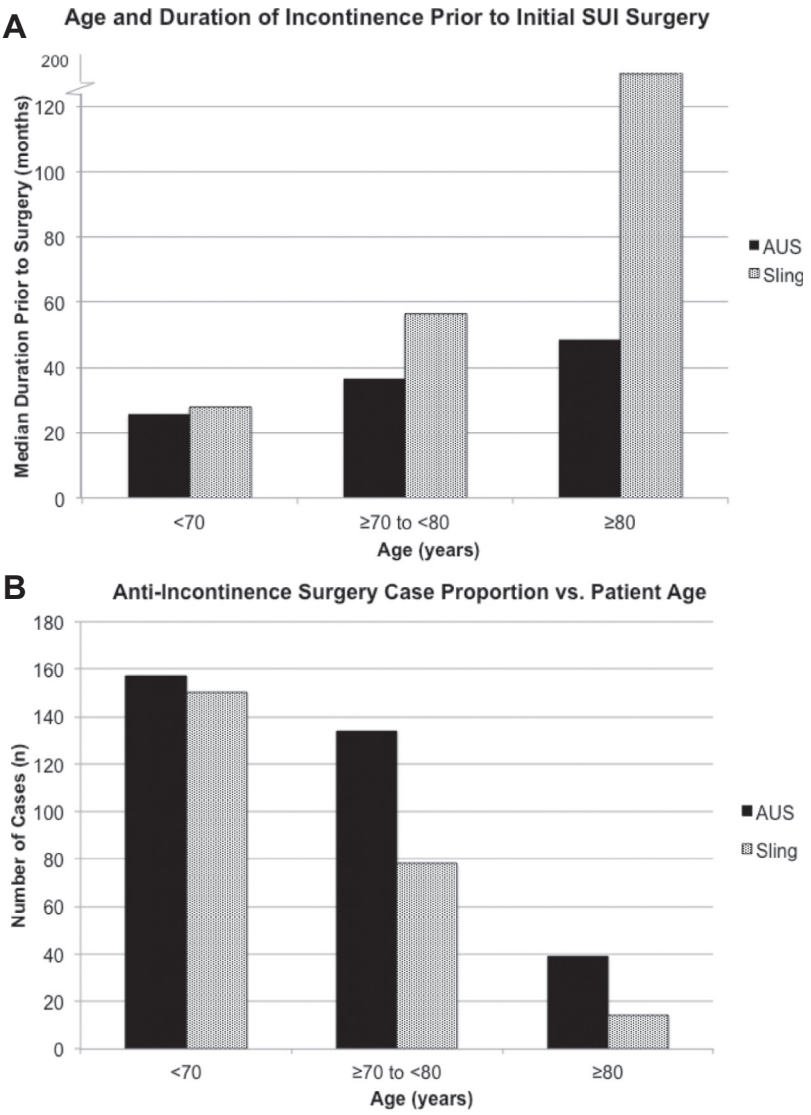

Figure 1. **(A)** Increasing age is associated with more extended time before undergoing surgical intervention ($P < .0001$). **(B)** Patients of increasing age are progressively more likely to undergo AUS than male sling. AUS, artificial urinary sphincter; SUI, stress urinary incontinence.

want to allow as much natural continence recovery as possible after prostatectomy before referral. Although projected urinary control recovery has been shown to peak within 30 months after prostatectomy, the majority of continence is recovered within the first 12 months.[4,19] We suspect that delay in provider diagnosis of male SUI or reluctance to accurately address incontinence outcomes may contribute to SUI treatment deferment.

Variability in the detection of SUI both in practice and in the literature is reflected in the wide range of published postprostatectomy incontinence rates.[21] Discrepancies have been identified between provider assessment of clinically significant incontinence and patient perception of bother related to incontinence. Population-based studies and those including patient-reported outcomes using validated questionnaires suggest that the true incidence of incontinence is consistently under-reported.[22,23]

In 2017, the American Urological Association-Society of Urodynamics, Female Pelvic Medicine & Urogenital Reconstruction female SUI guidelines specified the importance of physical demonstration of stress-induced incontinence as a key indication for progression to AIS; on the other hand, physical examination in determining the presence and the severity of male SUI is underemphasized.[24,25] We propose the use of the standing cough test (SCT) as a noninvasive, objective clinical tool that is simple to incorporate into routine genitourinary physical examination in both general provider and urology practices.[26] Objective demonstration of SUI severity using the SCT, quantified by the Male Stress Incontinence Grading Scale (MSIGS), has been shown to be a significant predictor of success after sling placement[27] and commonly uncovers more severe incontinence than subjective patient-reported pads per day would imply. The SCT

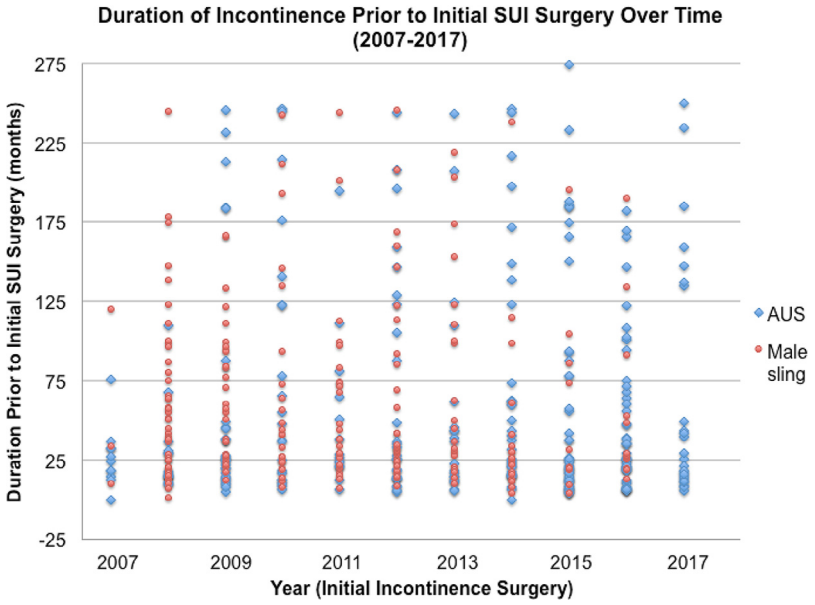

Figure 2. Duration of male stress incontinence before initial surgical intervention over the past decade. Scatter plot of patients undergoing primary AUS (blue diamond) or male sling (red circle), with unchanged delay time to surgery. AUS, artificial urinary sphincter; SUI, stress urinary incontinence. (Color version available online.)

represents an adjunctive measure that facilitates prompt objective detection of male SUI in the postprostatectomy population without added expense or time.

Unrealistic postoperative expectations regarding continence and poor patient education regarding SUI treatment options may act as further barriers to SUI treatment. Other barriers to timely SUI surgery may include limited access to subspecialist prosthetic urologic care, ongoing prostate cancer treatments, perceived relative contraindications for treatment (such as radiation history, obesity and comorbid conditions, and advanced age). Other patient factors may also include activity level, geographic access, educational constraints, race, and patient reluctance to undergo further surgery.

The identification of prolonged SUI duration in men before initial AIS in this large clinical series highlights an opportunity for improvement in prostate cancer survivorship care. The routine incorporation of male sexual health and continence teams is needed, along with post-treatment monitoring for QOL needs. The American Cancer Society Prostate Cancer Survivorship Care Guidelines recommend screening for long-term functional effects after prostate cancer treatment, including discussion of urinary incontinence with all survivors and referral of men with persistent, bothersome leakage for further evaluation.[28] The American Cancer Society guidelines, also endorsed by the American Society for Clinical Oncology, further highlight the need for coordination of care for prostate cancer survivors to optimize patient QOL and to promote economic health-care utilization.[28]

Going forward, postprostatectomy care will likely increasingly involve integration of physician assistants and nurse practitioners to interface with primary care providers.[29] We advocate a urologist-directed care plan, including key nononcological components focusing on both patient education and clinician diagnosis of postprostatectomy incontinence, for at least 1 year at a minimum. The SCT is a promising clinical tool that may encourage prompt referral with an emphasis on patient QOL goals.

Our study has several limitations, including its retrospective design and dependence on patient recall of duration of incontinence before AIS. Our findings reflect the experience of a single surgeon at a tertiary referral academic center, limiting the generalizability to other types of practices. This large series reflects a conglomeration of self-referred patients and those referred from various local and regional centers. We were not able to determine each patient's individual reasons for excessive duration of symptoms before surgical treatment. In future studies, incorporation of patient questionnaires may more clearly delineate patient-driven factors contributing to a delay in treatment in a prospective manner. Management of related prostate cancer treatment sequelae, such as vesicourethral anastomotic stricture, detrusor overactivity, or patient priority for treatment of refractory erectile dysfunction with penile prosthesis, may have also contributed to delay in SUI surgery.[30] We did not assess the influence of patient race, educational level, prostatectomy location, changes in severity of incontinence, or history of pelvic floor rehabilitation in delayed AIS.

Despite these limitations, the present study demonstrates a consistently prolonged duration of male SUI, with its attendant adverse influence on QOL, and highlights an important potential opportunity to better serve our patients. The duration of SUI before seeking surgical intervention did not change over a decade despite the addition

of a focused prosthetic practitioner at our center. As our practice has evolved during this time period, we have developed a more refined, targeted procedure selection process, which may lead to improved SUI outcomes and thus promote earlier referrals.

CONCLUSION

Although the median duration of SUI before the initial AIS is 2.7 years, one-third of men have lingered for more than 5 years. Men with more severe incontinence (AUS) show less delay from SUI onset to surgery relative to sling patients. Older men demonstrate a longer duration of SUI before seeking surgical care, with octogenarians experiencing an interval 3 times as great before ultimately undergoing AIS.

References

1. 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;62:405-417.
2. Kao TC, Cruess DF, Garner D, et al. Multicenter patient self-reporting questionnaire on impotence, incontinence and stricture after radical prostatectomy. *J Urol.* 2000;163:858-864.
3. Kim PH, Pinheiro LC, Atoria CL, et al. Trends in the use of incontinence procedures after radical prostatectomy: a population based analysis. *J Urol.* 2013;189:602-608.
4. Penson DF, McLerran D, Feng Z, et al. 5-year urinary and sexual outcomes after radical prostatectomy: results from the prostate cancer outcomes study. *J Urol.* 2005;173:1701-1705.
5. Coyne K, Zhou Z, Thompson C, Versi E. The impact on health-related quality of life of stress, urge and mixed urinary incontinence. *BJU Int.* 2003;92:731-735.
6. Herr HW. Quality of life of incontinent men after radical prostatectomy. *J Urol.* 1994;151:652-654.
7. Namiki S, Saito S, Rochigi T, et al. Psychological distress in Japanese men with localized prostate cancer. *Int J Urol.* 2007;14:924-929.
8. Zhang AY, Strauss GJ, Siminoff LA. Intervention of urinary incontinence and quality of life outcome in prostate cancer patients. *J Psychosoc Oncol.* 2006;24:17-30.
9. Wright J, Lin DW, Cowan JE, et al. Quality of life in young men after radical prostatectomy. *Prostate Cancer Prostatic Dis.* 2008;11:67-73.
10. Sadetsky N, Lubeck DP, Pasta DJ, et al. Insurance and quality of life in men with prostate cancer: data from the Cancer of the Prostate Strategic Urological Research Endeavor. *BJU Int.* 2008;101:691-697.
11. Penson DF, Stoddard ML, Pasta DJ, et al. The association between socioeconomic status, health insurance coverage, and quality of life in men with prostate cancer. *J Clin Epidemiol.* 2001;54:350-358.
12. Ficarra V, Novara G, Galfano A, et al. Twelve-month self-reported quality of life after retropubic radical prostatectomy: a prospective study with Rand 36-Item Health Survey (Short Form-36). *BJU Int.* 2006;97:274-278.
13. Herschorn S, Bruschini H, Comiter C, et al. Surgical treatment of stress incontinence in men. *Neurourol Urodyn.* 2010;29:179-190.
14. Rehder P, Haab F, Cornu JN, et al. Treatment of postprostatectomy male urinary incontinence with the transobturator retroluminal repositioning sling suspension: 3-year follow-up. *Eur Urol.* 2012;62:140-145.
15. Montague DK, Angermeier KW, Paolone DR. Long-term continence and patient satisfaction after artificial sphincter implantation for urinary incontinence after prostatectomy. *J Urol.* 2001;166:547-549.
16. Wingate JT, Erickson BA, Murphy G, et al. Multicenter analysis of patient reported outcomes following artificial urinary sphincter placement for male stress urinary incontinence. *J Urol.* 2017;doi:10.1016/j.juro.2017.09.089. Epub ahead of print.
17. Nam RK, Herschorn S, Loblaw DA, et al. Population based study of long-term rates of surgery for urinary incontinence after radical prostatectomy for prostate cancer. *J Urol.* 2012;188:502-506.
18. Sanda MG, Dunn RL, Michalski J, et al. Quality of life and satisfaction with outcome among prostate-cancer survivors. *N Engl J Med.* 2008;358:1250-1261.
19. Gore JL, Kwan L, Lee SP, et al. Survivorship beyond convalescence: 48-month quality-of-life outcomes after treatment for localized prostate cancer. *J Natl Cancer Inst.* 2009;101:888-892.
20. Brown JA, Elliott DS, Barrett DM. Postprostatectomy urinary incontinence: a comparison of the cost of conservative versus surgical management. *Urology.* 1998;51:715-720.
21. Ficarra V, Novara G, Artibani W, et al. Retropubic, laparoscopic, and robot-assisted radical prostatectomy: a systematic review and cumulative analysis of comparative studies. *Eur Urol.* 2009;55:1037-1063.
22. Stanford JL, Feng Z, Hamilton AS, et al. Urinary and sexual function after radical prostatectomy for clinically localized prostate cancer: the Prostate Cancer Outcomes Study. *JAMA.* 2000;283:354-360.
23. Peterson AC, Chen Y. Patient reported incontinence after radical prostatectomy is more common than expected and not associated with the nerve sparing technique: results from the Center for Prostate Disease Research (CPDR) database. *Neurourol Urodyn.* 2012;31:60-63.
24. Kobashi KC, Albo ME, Dmochowski RR, et al. Surgical treatment of female stress urinary incontinence: AUA/SUFU guideline. *J Urol.* 2017;198:875-883.
25. Lucas MG, Bosch RK, Burkhard FC, et al. EAU guidelines on surgical treatment of urinary incontinence. *Eur Urol.* 2012;62:1118-1129.
26. Morey AF, Singla N, Carmel M, et al. Standing cough test for evaluation of post-prostatectomy incontinence: a pilot study. *Can J Urol.* 2017;24:8664-8669.
27. Viers BR, VanDyke ME, Pagliara TJ, et al. Improving male sling selectivity and outcomes—a potential role for physical demonstration of stress urinary incontinence severity? *Urol Pract.* 2017;doi:10.1016/j.urpr.2017.10.002. Epub ahead of print.
28. Skolarus TA, Wolf AM, Erb NL, et al. American Cancer Society prostate cancer survivorship care guidelines. *CA Cancer J Clin.* 2014;64:225-249.
29. Bourke L, Boorjian SA, Briganti A, et al. Survivorship and improving quality of life in men with prostate cancer. *Eur Urol.* 2015;68:374-383.
30. Biardeau X, Aharony S, Campeau L, Corcos J. Artificial urinary sphincter: report of the 2015 consensus conference. *Neurourol Urodyn.* 2016;35:S8-S24.