Restoration of Continence after Prostatectomy is Associated With Weight Loss: A Pilot Study

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OBJECTIVES To examine association between post-prostatectomy incontinence (PPI) severity and weight changes before and after restoration of continence via artificial urinary sphincter (AUS).

METHODS Single surgeon, retrospective review of urologic prosthetic surgery (UPS) after radical prostatectomy (RP). A cohort of post-RP inflatable penile prosthesis (IPP) patients served as a surgical control. Body Mass Index (BMI) and total body weight were assessed pre and post-UPS. Multivariable linear regression was utilized to assess BMI changes post-UPS.

RESULTS 187 AUS and 63 IPP patients met selection criteria. Greater PPI severity was associated with faster BMI gain after RP (coeff. 0.14 kg/m2, P = 0.03, per pad used) and magnitude of incontinence improvement (mean reduction in daily pad use) after AUS insertion was associated with greater BMI reduction at 12 months post-UPS (coeff. - 0.13 kg/m2, P = 0.04). On multivariable regression, AUS insertion was associated with a decrease in BMI by - 2.83 kg/m2 12 months post-UPS (P = 0.02). Twelve months post-UPS, men with AUS exhibited a mean BMI reduction of -1.0 kg/m^2 compared to a mean BMI increase in the IPP cohort of 0.4 kg/m^2 (P < 0.01). Compared to IPP, AUS patients experienced absolute body weight reduction by 6 kg [Median (IQR): 90.4 (80.3−100.1) vs 96.4 (87.1−108.8) kg, P = 0.03], with nearly one-third having clinically significant weight loss (>5% body weight) at 12 months post-UPS (31.8% vs 8.3%, P < 0.01).

CONCLUSION Severe PPI appears to be associated with weight gain and correction of PPI via AUS insertion with weight loss. UROLOGY 158: 162−168, 2021. © 2021 Elsevier Inc.

Bothersome stress urinary incontinence (SUI) that persists for more than one year after surgery afflicts a substantial number of men who undergo radical prostatectomy (RP).[1−3] Such post-prostatectomy incontinence (PPI) is associated with lower health related quality of life outcomes.[4,5] Preliminary research has demonstrated an association between PPI severity and physical activity limitations within three months of RP.[6] Inactivity and weight gain have been repeatedly shown to be associated with visceral obesity, diabetes mellitus (DM), cardiovascular disease, multiple types of cancer, and premature death.[7−9] Several studies have also shown that irritative lower urinary tract symptoms (LUTS) are associated with significant physical activity impairment.[10,11]

We observed that many men referred to our practice for anti-incontinence surgery (AIS) complained of physical activity compromise related to social embarrassment and that obesity is common among this population. To our knowledge, no prior research has studied the impact of PPI on weight gain following RP. Herein we present our evaluation of PPI severity and body mass index (BMI) changes between RP and artificial urinary sphincter (AUS) implantation as well as within the first year after AUS insertion. We hypothesized that worsening PPI severity would be associated with weight gain after RP, and that correction of PPI with AUS insertion would be associated with weight loss.

MATERIALS AND METHODS

Patient Selection

We performed a retrospective review of all urologic prosthetic surgery (UPS; i.e. AUS or inflatable penile prosthesis {IPP} insertion) performed by a single surgeon at a tertiary medical center between 2009 and 2020 (IRB STU − 2020 − 1187). IPP

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insertion was chosen as a control group as these patients had minimal to no incontinence and to adjust for any effect of additional post-prostatectomy surgical procedure on BMI and weight change. The Supplementary Figure shows our selection strategy. All men included in analysis had history of prostate cancer and underwent RP. Major exclusion criteria included lack of BMI and weight data at time of prostatectomy, histories of prior UPS, or concurrent AUS and IPP insertion. Other relevant exclusion criteria included initiation of systemic chemotherapy at any time after RP, history of mobility-impairing conditions such as paraplegia, stroke, mobility impairment, and complications requiring repeat operation within 12 months of UPS. To ensure that our selection strategy did not result in large discrepancies in our control, demographics were compared between included vs excluded patients within the IPP control group.

Variables of Interest

Data collected included patient demographics, prostate cancer disease status, and receipt of androgen deprivation therapy (ADT) and/or radiation therapy (RT). PPI severity was assessed using patient reported pads per day (PPD) use at initial consultation. Post-UPS SUI severity was assessed using patient reported PPD at 6 and 12 months. We collected weight in kilograms (kg) and BMI data from the time points of RP, UPS, and 6 and 12 months post-UPS. BMI and weight data was collected if patient presented for their routine urologic follow up postoperatively after UPS or if BMI data was reported in the electronic medical record at 6 or 12 months for visit with another medical provider.

We attempted to measure BMI and weight in all patients who presented to our medical center at 6 and 12 months after UPS without exclusion. However, due to the tertiary nature of our referral center, not all patients followed up in our clinic after initial post-operative visit for device activation and instead would follow up with their referring urologist, and thus serial measurements in BMI and weight could not be obtained for all patients. Due to incomplete data at all time points, mean BMI and weight was calculated using all available patients at each specific time point, and change in BMI or weight was derived when there was patient BMI and weight data available over two distinct time points.

Outcomes of Interest

Our primary outcomes of interest were change in BMI from RP to UPS and change in BMI from UPS to 12 months post-UPS, as well as the proportion of patients who achieved clinically significant weight loss (CWL) at 12 months post-UPS. CWL was defined as greater than 5% loss of total body weight.[13,14] We also sought to assess the relationship between PPI severity (measured by reported PPD) and BMI change between RP and UPS among the twocohorts. Secondary outcome of interest included whether the magnitude of incontinence improvement after AUS insertion was associated with BMI change at 6 and 12 months post-UPS and to assess whether receipt of AUS was independently associated with BMI decrease 12 months post-UPS using a multivariable model.

Statistical Analysis

Statistical analyses was performed using Stata, version 13.0 (StataCorp., College Station, TX, USA). Fisher Exact, Chi Squared, and Wilcoxon Rank Sum tests were performed to compare continuous and categorical variables between the AUS and IPP groups. We performed two separate linear regression analysis: to examine the association between PPI severity and change in BMI from RP to UPS and to assess the relationship between the magnitude of incontinence improvement following UPS and the BMI change between UPS and 6 months and 12 months post-UPS. Multivariable linear regression analysis was used to assess the effect of PPI severity on BMI at time of UPS and to assess whether receipt of AUS affected BMI 1-year post-UPS. All included variables in both multivariable analyses required tolerance scores > 0.1 indicating no significant multicollinearity (Supplementary Table 2). Variables were initially selected for multivariable analysis for likely clinical relevancy on BMI including comorbid conditions, and ADT usage; backwards selection was then used to determine best fit.

RESULTS

Patient Demographics

The institutional database queried included 654 AUS and 859 IPP patients. A total of 187 AUS and 63 IPP patients met inclusion criteria (Supplementary Table 1). Ninety-six patients (14%) in the AUS group were excluded from analysis due to history of prior IPP placement of concurrent IPP at time of AUS surgery. A total of 351 patients (53%) were excluded from analysis in the AUS group due to no documented history of prostatectomy (*n* = 107), or lacking BMI data (*n* = 244) due to the prostatectomy being performed at an outside center (Supplementary Figure). Six hundred and forty-two patients (76%) were excluded from the IPP group due to no prior documented history of prostatectomy (Supplementary Figure).

Compared to men in the IPP cohort, men in the AUS cohort were older [median(IQR): 70.1 (66.0−74.8) vs 68.1 (64.3 −71.3) years, *P* = 0.01], using more PPD prior to UPS [median (IQR): 5 (3−6) vs 0 (0−1) PPD, *P* <0.01], more likely to have harbored pathologic T3a or greater disease at the time of RP (62.6% vs 38.2%, *P* = 0.02), and more likely to have received ADT during the 12 months preceding UPS (14.4% vs 3.2%, *P* = 0.01) or at any time point (22.5 vs 9.5%, *P* = 0.03). Among patients included with the IPP control group vs those that were included, IPP patients included in the control had higher rates of coronary artery disease (22.2% vs 9.5%, *P* <0.01) (Supplement Table 3), but not other differences in comorbidity.

Weight Changes Over Time

The cohorts were compared based on mean BMI at four time points: RP, UPS (AUS or IPP), and 6 and 12 months post-UPS (Fig. 1A). Mean BMI was similar between the AUS and IPP cohorts at time of RP [Median(IQR): 28.8 (25.6−31.2) vs 28.8 (25.8 − 32.3) kg/m2, *P* = 0.6], at UPS [Median(IQR): 28.9 (26.4−32.4) vs 28.7 (25.4−31.7) kg/m2, *P* = 0.4], and 6 months after UPS [Median(IQR): 28.3 (25.9−31.5) vs 29.5 (26.1 −32.1) kg/m2, *P* = 0.4]. At 12 months post-UPS, the men in the AUS cohort exhibited a significantly lower BMI compared to those in the IPP cohort [Median(IQR): 28.2 (25.2−31.0) vs 29.6 (27.6−33.5) kg/m2, *P* = 0.02].

One hundred twenty men had BMI data available from both RP and UPS. Those in the AUS cohort (*n* = 86) experienced an increase in BMI between prostatectomy and UPS that was significantly more positive than that experienced by men in the IPP cohort (*n* = 34) [Median(IQR) BMI change: + 0.7 (+ 0.01 to + 1.5) vs - 0.3 (−1.5 to −0.7) kg/m2, *P* <0.01] (Table 1). Two hundred sixteen men had BMI data available from both

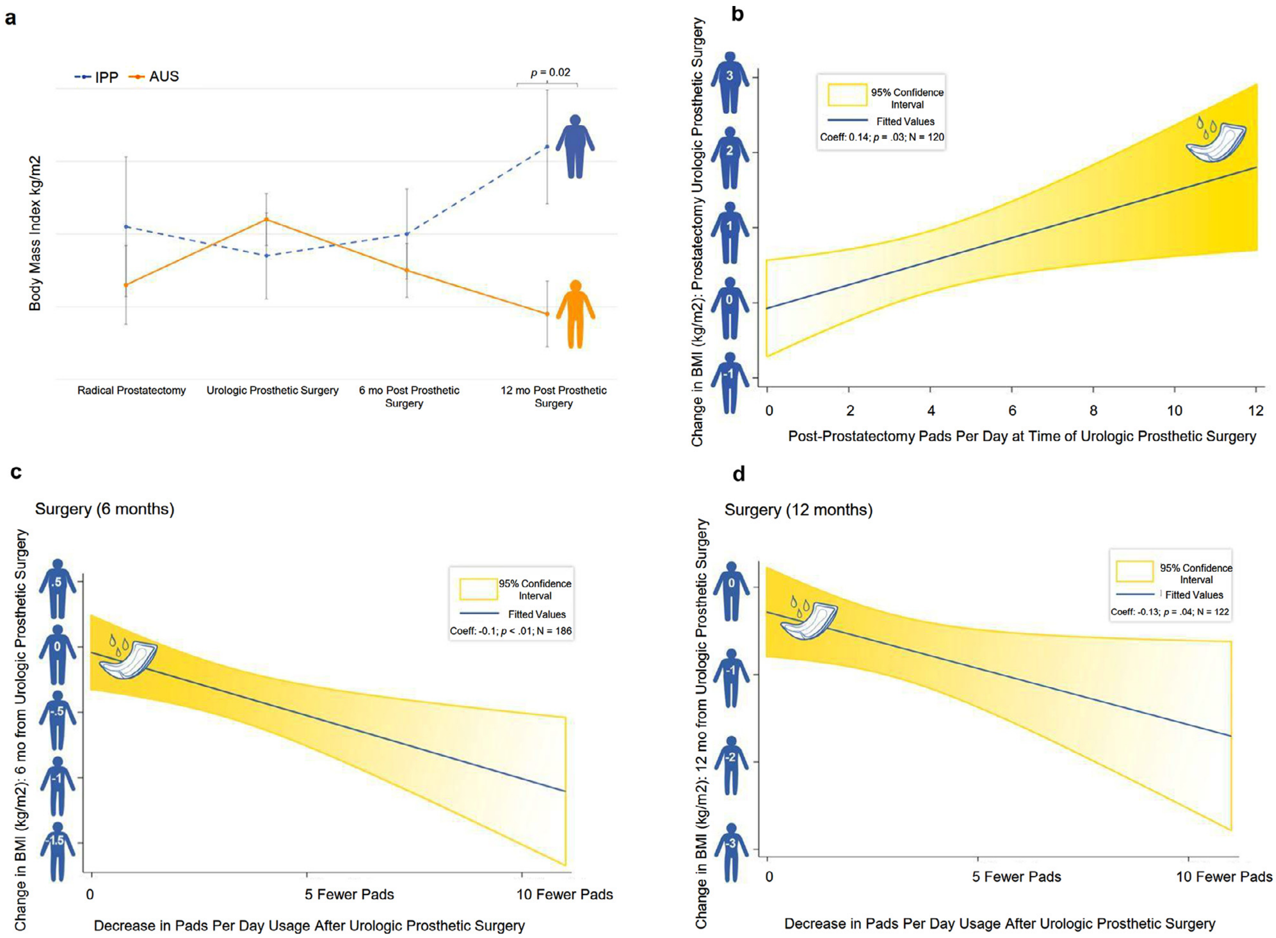

Figure 1. (A) Mean body mass index (BMI) at key surgical time points stratified by type of prosthesis (artificial urinary sphincter or inflatable penile prosthesis). Error bars represent standard error of the mean for each group (B) Univariable linear regression analysis comparing change in BMI from radical prostatectomy (RP) to urologic prosthetic surgery (UPS) as a function of preoperative pads per day (PPD) usage. Blue line represents fitted values, while the shaded region represents 95% confidence intervals. (C and D) Univariable linear regression analyses comparing change in BMI at 6 months post-UPS (C) and 12 months post-UPS (D) as a function of net improvement in PPD usage. The blue line represents fitted values and the shaded region represents 95% confidence intervals. (Color version available online.)

UPS and 6 months post-UPS (AUS = 168, IPP = 48), and 127 men had BMI data available from both UPS and 12 months post-UPS (AUS = 91, IPP = 36). Men in the AUS cohort exhibited a mean BMI reduction while men in the IPP cohort exhibited a mean BMI increase at both 6 months [Median (IQR): −0.5 (−1.1 to - 0.1) vs + 0.5 (−0.7 to + 0.8) kg/m^2, *P* <0.01] and 12 months post-UPS [Median(IQR): −1.0 (−1.8 to −0.1) vs + 0.4 (−0.5 to + 0.8) kg/m^2, *P* <0.01] (Table 1). At 12 months post-UPS, AUS patients experienced a reduction in body weight by 6 kg compared to controls [Median(IQR): 90.4 (80.3− 100.1) vs 96.4 (87.1− 108.8) kg, *P* = 0.03]. Compared to IPP patients, nearly one-third of patients in the AUS cohort had CWL at 12 months post-UPS (31.8% vs 8.3%, *P* <0.01).

PPI Severity and BMI Change

On univariable linear regression analysis, worsening PPI severity was associated with a greater rate of BMI increase between RP and UPS at a rate of 0.14 kg/m2 per additional daily incontinence pad used (coeff = 0.14, *P* = 0.03) (Fig. 1B). Two hundred sixteen men had BMI data available from both UPS and 6 months post-UPS (AUS = 168, IPP = 48), and 127 men had BMI data available from both UPS and 12 months post-UPS (AUS = 91, IPP = 36). On univariable linear regression analysis, greater reductions in daily incontinence pad use were associated with larger reductions in BMI at 6 months (coeff = −0.1, *P* <0.01) and 12 months (coeff = −0.13, *P* = 0.04) post-UPS (Fig. 1c, D).

Multivariable Analysis

Multivariable linear regression modeling that adjusted for age, comorbidity, prostate cancer grade group, advanced pathologic T stage, and receipt of either RT or ADT in the 12 months prior to UPS was used to examine the contribution of PPI severity to BMI change between RP and UPS (Table 2). Increasing PPD usage was independently associated with a greater BMI change by + 0.5 kg/m2 per incontinence pad used (*P* <0.01). Increasing age contributed to decreasing BMI at time of UPS (coeff = −0.3, *P* <0.01). Increasing time from prostatectomy to UPS had a weak effect on increasing BMI (coeff = + 0.002, *P* = 0.01).

Multivariable linear regression modeling that adjusted for PPI severity, age, comorbidity, and receipt of either RT or ADT in the 12 months before or after UPS was used to examine the contribution of AUS insertion to BMI change between UPS and

Table 1. BMI and BMI change of AUS and IPP patients at Key surgical time points

Variable	AUS (n = 187)	IPP (n = 63)	P-Value
Weight (Kg) at Prostatectomy	(n = 86)	(n = 34)	0.9
Mean (SD)	92.5 (17.7)	94.3 (19.9)	
Median (IQR)	89.4 (83.1 – 100.7)	88.7 (79.9 – 104.3)	
BMI at Prostatectomy	(n = 86)	(n = 34)	0.6
Mean (SD)	28.8 (5.0)	29.6 (5.6)	
Median (IQR)	28.8 (25.6 – 31.2)	28.8 (25.8 – 32.3)	
Weight (Kg) at Urologic Prosthetic Surgery	(n = 187)	(n = 63)	0.2
Mean (SD)	95.6 (17.5)	91.0 (24.2)	
Median (IQR)	94.0 (83.5 – 104.3)	90.7 (78.5 – 103.5)	
BMI at Urologic Prosthetic Surgery	(n = 187)	(n = 63)	0.4
Mean (SD)	29.7 (4.9)	29.2 (4.7)	
Median (IQR)	28.9 (26.4 – 32.4)	28.7 (25.4 – 31.7)	
Clinically significant weight loss (>5%) Prostatectomy to Urology Prosthetic Surgery, n (%)	6 (3.2)	5 (7.9)	0.2
Change BMI from Prostatectomy to Urologic Prosthetic Surgery	(n = 86)	(n = 34)	< 0.01
Mean (SD)	1.0 (2.2)	– 0.6 (1.9)	
Median (IQR)	0.7 (0.01 – 1.5)	– 0.3 (-1.5 – 0.7)	
Weight (Kg) 6 months from Urologic Prosthetic Surgery	(n = 168)	(n = 48)	0.8
Mean (SD)	93.7 (17.6)	90.6 (25.3)	
Median (IQR)	92.1 (82.4 – 102.4)	90.6 (79.0 – 107.6)	
BMI 6 months from Urologic Prosthetic Surgery	(n = 168)	(n = 48)	0.4
Mean (SD)	29.0 (4.8)	29.5 (4.3)	
Median (IQR)	28.3 (25.9 – 31.5)	29.5 (26.1 – 32.1)	
Clinically significant weight loss (>5%) 6 months from Urology Prosthetic Surgery, n (%)	23 (13.7)	3 (6.3)	0.2
Change BMI 6 months from Urologic Prosthetic Surgery	(n = 168)	(n = 48)	< 0.01
Mean (SD)	−0.6 (1.0)	0.4 (1.7)	
Median (IQR)	−0.5 (-1.1 – -0.1)	0.05 (-0.7 – 0.8)	
Weight (Kg) 12 months from Urologic Prosthetic Surgery	(n = 91)	(n = 36)	0.03
Mean (SD)	91.5 (15.0)	98.8 (17.3)	
Median (IQR)	90.4 (80.3 – 100.1)	96.4 (87.1 – 108.8)	
BMI 12 months from Urologic Prosthetic Surgery	(n = 91)	(n = 36)	0.02
Mean (SD)	28.4 (4.3)	30.7 (4.7)	
Median (IQR)	28.2 (25.2 – 31.0)	29.6 (27.6 – 33.5)	
Clinically significant weight loss (>5%) 12 months from Urology Prosthetic Surgery, n (%)	29 (31.8)	3 (8.3)	< 0.01
Change BMI 12 months from Urologic Prosthetic Surgery	(n = 91)	(n = 36)	< 0.01
Mean (SD)	−1.1(1.3)	0.5 (2.5)	
Median (IQR)	−1.0 (-1.8 – -0.1)	0.4 (-0.5 – 0.8)	

Artificial Urinary Sphincter (AUS), inflatable penile prosthesis (IPP), standard deviation (SD), interquartile range (IQR), body mass index (BMI)

12 months post-UPS (Table 3). Multivariable modeling showed that receipt of AUS was independently associated with a decrease in BMI of - 2.83 (−9.5 %) kg/m2 (P = 0.02), 12 months after UPS (Table 3). Increasing age at UPS (coeff = −0.2, P <0.01) was negatively associated and DM (coeff = + 2.2, P = 0.02) was positively associated with BMI change 12 months post-UPS.

COMMENT

This is the first study to assess the relationships of PPI severity and correction with patient weight. Men with PPI tended to gain weight between following prostatectomy and leading up to AUS insertion. Increasing BMI has been well studied as a driver of cardiovascular disease, cancer development, and earlier death in the United States and globally.[9,12] Increasing severity of PPI was associated with faster rates of BMI gain during this period. Following AUS insertion, one-third of patients experienced CWL, with multivariable modeling suggested that AUS insertion was associated with losing nearly 10% body weight, well above the 5% threshold for CWL established in the literature.[13,14] We suspect that these findings will be intuitive to clinicians who are familiar with the physical and psychological toll of bothersome PPI, which can cause afflicted men to refrain from activity and self-isolate.[15]

SUI Correction and Weight Changes

Minimal literature exists regarding weight changes as a function of SUI correction. One retrospective study evaluated weight changes before and after mid-urethral sling surgery in US military women (n = 207).[16] Those serving in active duty (n = 76) demonstrated a mean weight gain and mean weight loss of roughly 1% in the year before and year after SUI correction (+ 0.38 vs

Table 2. Multivariable linear regression model of BMI change at urologic prosthetic surgery

Variable	Coef.	*P*-Value	95% Confidence Interval
Preoperative pads per day	0.46	< 0.01	0.13 – 0.78
Age at urologic prosthetic surgery	−0.27	< 0.01	−0.41–0.13
Time prostatectomy to urologic prosthetic surgery	0.002	0.01	0.0–0.003
Comorbid Conditions			
Hypertension	1.00	0.37	−1.24–3.28
Diabetes mellitus	1.50	0.22	−0.86–3.79
Coronary artery disease	−0.47	0.71	−2.99–2.06
Smoking history	−0.35	0.71	−2.27–1.56
Preoperative Prostatectomy PSA	−0.02	0.65	−0.10–0.06
Prostate cancer grade group			
1	*Ref.*	*Ref.*	*Ref.*
2	−2.42	0.31	−7.15–2.30
3	−4.85	0.06	−9.99–0.28
4	−5.39	0.06	−10.96–0.18
5	−2.48	0.36	−7.88–2.91
Pathologic T Stage			
< pT3a Disease	*Ref.*	*Ref.*	*Ref.*
> pT3a Disease	−0.18	0.89	−2.72–2.37
Radiation within 1 year prior to urologic prosthetic surgery			
No	*Ref.*	*Ref.*	*Ref.*
Yes	−0.37	0.82	−3.62–2.87
ADT within 1 year prior to urologic prosthetic surgery			
No	*Ref.*	*Ref.*	*Ref.*
Yes	0.33	0.84	−2.86–3.51

Artificial urinary sphincter (AUS), inflatable penile prosthesis (IPP), standard deviation (SD), interquartile range (IQR), body mass index (BMI).

−0.26 kg/m2, *P* = 0.002). A weight reduction of 5% is associated with significant health benefits and is used as the definition for CWL in trials evaluating weight loss interventions.[13,14,17,18]

In the present study, correction of PPI with AUS insertion was associated with a BMI loss of 1.1 units 12 months post-operatively, and multivariable modeling suggested that AUS insertion was independently associated with a mean BMI reduction of - 2.83 kg/m^2 one year later. Analysis of absolute weight changes showed nearly a third of men undergoing AUS experienced CWL compared to controls. Overall, men undergoing AUS experienced a mean reduction of body weight by 4% at 12 months post-UPS.

Table 3. Multivariable linear regression model of BMI change 12 months post urologic prosthetic surgery

Variable	*Coef.*	*P*-Value	*95% Confidence Interval*
Receipt of AUS			
No	*Ref.*	*Ref.*	*Ref.*
Yes	−2.83	0.02	−5.21–0.45
Preoperative pads per day	0.29	0.11	−0.07–0.66
Age at urologic prosthetic surgery	−0.23	< 0.01	−0.35–0.11
Comorbid conditions			
Hypertension	0.60	0.46	−0.98–2.17
Diabetes mellitus	2.22	0.02	0.34–4.09
Coronary artery disease	0.48	0.63	−1.49–2.45
Smoking history	−0.33	0.68	−1.90–1.25
Radiation within 1 year before urologic prosthetic surgery	−1.17	0.43	−4.09–1.75
Radiation within 1 year after urologic prosthetic surgery	−0.87	0.72	−5.70–3.96
ADT within 1 year before urologic prosthetic surgery	0.88	0.71	−3.73–5.49
ADT within 1 year after urologic prosthetic surgery	0.47	0.84	−4.22–5.16

Prostate-specific antigen (PSA), androgen deprivation therapy (ADT), artificial urinary sphincter (AUS).

Post-Operative Weight Changes After Non-Urologic Surgery

The literature exploring post-operative weight changes after non-bariatric surgery is limited. It is well established that procedures manipulating the alimentary tract are associated with post-operative weight loss due to challenges with oral intake and/or impaired digestion or absorption.[19,20] Weight loss is also a common sequela of cardiac surgery; however this is often attributed to a persistent post-operative inflammatory state rather than changes in activity.[21,22] In patients undergoing total knee arthroplasty several studies have reported clinically significant post-operative weight loss (> 5%) in the majority of patients due to increased physical activity tolerance.[23−25] Other studies have reported post-operative weight gain, highlighting the multifactorial complexity of weight change.[26,27] To our knowledge prior research has not addressed weight changes after outpatient operations without long-term nutritional counseling or exercise implications, such as inguinal hernia repair and cholecystectomy.

Urinary Incontinence and Physical Activity Impairment

Physical inactivity is well established as a primary source of weight gain, chronic disease development, and reduced longevity.[8] PPI severity and activity impairment impact were recently assessed among 43 Taiwaneese men at 2 weeks and 1, 2, and 3 months following prostatectomy using the Incontinence Impact Questionnaire.[6] The authors found PPI severity to be associated with a detrimental impact on physical activity, social relationships, emotional health, and travel. Further, as continence scores improved, physical activity scores improved over the study period.

Kannan et al. previously conducted a case control study to assess the burden of illness associated with urinary storage symptoms.[10] Their analysis included nearly 14,000 matched pairs of individuals who completed the Work Productivity and Activity Impairment (WPAI) questionnaire. Those with overactive bladder reported a 13% greater impairment in physical activity due to health ($P < 0.001$). Tang et al. used the WPAI to assess the impact of urinary incontinence on functional parameters among 1730 patients with overactive bladder (OAB). Those with incontinence ($n = 700$) reported significantly greater physical activity impairment than those without ($n = 907$) (41% vs 29% impairment, $P < 0.001$).[11]

The mental health consequences of LUTS with or without incontinence likely contribute to observed physical activity reductions. EpiLUTS, an international, cross-sectional survey, included responses from over 14,000 men. Among those with LUTS, 36% and 30% met self-reported criteria for clinical anxiety and depression, respectively.[28] In a smaller survey that included responses from over 600 men, incontinence was independently associated with higher rates of depression, loneliness, and sadness.[29]

Implications

The findings of the present study suggest that PPI often leads to meaningful weight gain. It follows that timely correction of PPI should be part of routine post-prostatectomy care. Indeed, the American Urological Association guideline on Incontinence after Prostate Treatment advises that men can be offered AIS if PPI persists for 6 months and that men should be offered AIS after 12 months of PPI. Unfortunately, a recent analysis of AIS procedures demonstrated a median time from prostate surgery to AIS of 32 months among 572 men, nearly one-third or who had been incontinent for five years or more.[30] Urologists must view timely AIS as a critical component of prostate cancer survivorship. The novel association between PPI and weight changes warrants further investigation with larger multicentered prospective series.

Limitations

While the current study presents novel results suggesting a meaningful association between PPI and clinically significant BMI change, it is not without limitations. The retrospective nature of the study leads it to be prone to selection bias and, confounding by indication. It is possible that receipt of AUS and IPP represents a surrogate for other physical or mental conditions that could impact weight. Additionally, AUS insertion could be a surrogate marker for worse prostate cancer disease. Patients in the current study who underwent AUS insertion had greater rates of pT3 disease, RT and ADT usage. However, we excluded patients undergoing systemic chemotherapy, and adjusted for RT and ADT in our multivariable analyses. We lack data on the natural history of BMI among men with PPI who do not undergo corrective surgical treatment. We used instead what we felt to be the best available control group - a cohort of similar men who had undergone prostatectomy and who underwent an additional quality of life surgery on a similar timeline. While the relationship between PPI, physical activity and quality of life have been reported in previous studies, we were unable to assess these metrics in our study. Overall follow-up was somewhat limited and future reports will be required to examine if the BMI and weight changes we observed are sustained over multiple years.

CONCLUSION

This is the first study to demonstrate that PPI severity is associated with weight gain following prostatectomy and that the correction of PPI with AUS insertion is associated with weight loss. These novel findings could have wide-reaching implications due to the well-established, profound impact of weight gain on overall health and longevity. Timely anti-incontinence surgery should be a standard component of prostate cancer survivorship care among men with persistent PPI, but further larger multi-centered studies are needed to validate our findings.

SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found in the online version at https://doi.org/10.1016/j.urology.2021.08.026.

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