

Impact of obesity on male urethral sling outcomes

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Abstract

Background: The impact of obesity on AdVance male urethral sling outcomes has been poorly evaluated. Anecdotally, male urethral sling placement can be more challenging due to body habitus in obese patients. The objective of this study was to evaluate the impact of obesity on surgical complexity using operative time as a surrogate and secondarily to evaluate the impact on postoperative pad use.

Methods: A retrospective cohort analysis was performed using all men who underwent AdVance male urethral sling placement at a single institution between 2013 and 2019. Descriptive statistics comparing obese and non-obese patients were performed.

Results: A total of 62 patients were identified with median (IQR) follow up of 14 (4–33) months. Of these, 40 were non-obese and 22 (35.5%) were obese. When excluding patients who underwent concurrent surgery, the mean operative times for the non-obese *versus* obese cohorts were 61.8 min *versus* 73.7 min ($p=0.020$). No Clavien 3–5 grade complications were noted. At follow up, 47.5% of the non-obese cohort and 63.6% of the obese cohort reported using one or more pads daily ($p=0.290$). Four of the five patients with a history of radiation were among the patients wearing pads following male urethral sling placement.

Conclusion: Obese men undergoing AdVance male urethral sling placement required increased operative time, potentially related to operative complexity, and a higher proportion of obese compared with non-obese patients required postoperative pads for continued urinary incontinence. Further research is required to better delineate the full impact of obesity on male urethral sling outcomes.

Keywords: incontinence, male sling, obesity, reconstruction

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Introduction

The male urethral sling was introduced in the 1990s as an alternative to artificial urinary sphincter for men with mild urinary incontinence, generally less than three pads required per day.¹ It has repeatedly been shown to improve the number of pads required with minimal complications.^{1–4} The AdVance male sling system is one of the most popular male urethral slings that is placed as a retrourethral transobturator sling. Risk factors for failed continence following sling placement include weak residual urethral sphincter function, poor sphincter coaptation, no tunneling of the sling, low bladder capacity, and number of preoperative pads used.^{5–7} Anecdotally,

men with obesity are considered more challenging surgically for placement of a retrourethral sling because of body habitus challenges associated with passing the trocar, however, there are few studies examining the impact of obesity on male sling surgery or outcomes.^{8,9} The aim of this study was to evaluate the impact of obesity on AdVance male urethral sling placement, focusing on operative time as a surrogate for surgical complexity and need for pads postoperatively.

Methods

Exempt status was gained from the Institutional Review Board (IRB) for the conduct of this study.

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Table 1. Demographic details of obese and non-obese males undergoing urethral sling placement.

	Non-obese (BMI <30) n = 40 (%)	Obese (BMI ≥30) n = 22 (%)	p value
Age, mean (SD)	67.0 (12.5)	67.5 (6.9)	0.870
BMI, mean (SD)	26.7 (2.3)	33.7 (2.8)	< 0.001
kg at surgery, mean (SD)	84.9 (12.7)	107.0 (10.9)	< 0.001
Diabetes	7 (17.5)	8 (36.4)	0.126
History of prostatectomy	34 (85.0)	18 (81.8)	0.733
History of pelvic radiation	2 (5.0)	3 (13.6)	0.337
>2 pads per day prior to sling	15 (37.5)	4 (18.2)	0.154
Pads per day prior to sling, median (IQR)	1.5 (1.5–3)	1.5 (1.5–2.5)	0.258
Prior continence surgery	0	0	n/a
Prior urethral stricture surgery	4 (10.0)	0	0.287
Concurrent surgery	5 (12.5)	0	0.151
Operative time, mean (SD)*	61.8 (12.5)	73.7 (24.8)	0.020
Operative time, median (range)*	61 (42–99)	65 (55–121)	0.115
Complication	0	0	n/a
Follow up, median (IQR)	16 (3–35.5)	12 (5–33)	0.965
Pads used at follow up	19 (47.5)	14 (63.6)	0.290

*Operative time if no concurrent surgeries.
BMI, Body mass index; IQR, interquartile range; n/a, not applicable; SD, standard deviation.

All patients who underwent AdVance male urethral sling placement between January 2013 and January 2019 at a single institution by two surgeons (MJM, TAG) were identified for inclusion

in the study. Preoperative, intra-operative, and postoperative variables were collected using retrospective chart review. Preoperative variables included height (cm), weight (kg), body mass index (BMI), age at surgery, medical comorbidities, prior surgeries, and preoperative pads per day. Intra-operative variables included operative time, concurrent procedures, and reference to being a challenging procedure. Postoperative variables included length of hospitalization, 30-day complications, pad use at follow up, and duration of follow up (months). Obesity was defined as BMI ≥30.

The primary outcome of interest was the impact of obesity on surgical complexity. We chose to use operative length as a surrogate for surgical complexity. The secondary outcome was impact of obesity on postoperative pad use. To evaluate the primary outcome, we used Student's *t* test to compare mean operative time between obese and non-obese patients. Patients with concurrent surgeries (*n* = 5) were excluded from this test to avoid bias. To evaluate the secondary outcome, we defined postoperative pad use as patients reporting use of any pads *versus* no pads at most recent follow-up appointment. Fisher's exact test was used to compare the obese and non-obese cohorts. The remainder of the statistical analysis was descriptive and used Fisher's exact test for categorical variables and Student's *t* test for parametric continuous variables [presented as mean (SD)] and the Mann-Whitney test for nonparametric continuous variables [presented as median (IQR)]. A multiple logistic regression was performed to evaluate the impact of BMI and preoperative pads on the outcome of any pads required at follow up. While radiation would have been a valuable variable to include, it was decided to exclude it given its low prevalence in the population of the study. A *p* value < 0.05 was set *a priori* to represent statistical significance. All statistics were performed using Stata Version 12.1 (StataCorp, College Station, TX, USA).

Results

A total of 62 patients were identified for inclusion in the study with median (IQR) follow up of 14 (4–33) months after surgery. Of these, 40 patients (64.5%) were non-obese and 22 (35.5%) were obese (Table 1). The majority of patients had postprostatectomy incontinence (83.9%). Of the 15 patients with diabetes, 5 patients had insulin-dependent diabetes, 4 of which were in the obese

cohort. Five patients had a history of pelvic radiation for prostate cancer. A total of 19 patients (30.6%) reported using more than two pads daily prior to urethral sling placement. Five patients in the non-obese cohort underwent concurrent surgeries, i.e. circumcision, bladder neck dilation, hydrocelectomy, Deflux injection, and Monti channel revision. When excluding these patients who underwent concurrent surgery, the mean operative times for the non-obese *versus* obese cohorts were 61.8 min *versus* 73.7 min ($p=0.020$) (Table 1). Two patients remained in the hospital overnight due to comorbidities. One patient was hospitalized for two nights due to Monti channel revision. On multiple logistic regression, adjusting for BMI at the time of surgery, using more than two pads preoperatively was associated with a 4.0 increased odds of requiring pads at follow up (OR 1.2–13.5, $p=0.027$).

There were no Clavien 3–5 grade complications noted. Minor complications were found among two patients who experienced transient urinary retention and one patient who developed a perineal hematoma that resolved without intervention. At follow up, 47.5% of the non-obese cohort and 63.6% of the obese cohort reported using one or more pads daily ($p=0.290$). Four of the five patients with a history of radiation were among the patients wearing pads following male urethral sling placement.

Discussion

The impact of obesity on AdVance male urethral sling placement has not previously been well evaluated, although anecdotally many feel that performing the surgery is more challenging due to the length and curve of the trocars used for sling placement. In the current study, we found that obesity was associated with longer operative times for placement of AdVance male urethral slings for urinary incontinence which may correspond with surgical complexity. In addition, while not statistically significant, a higher proportion of men in the obese cohort required pads at follow up following sling placement.

AdVance male urethral sling placement is known to be safe and durable. In a recent multi-institutional prospective trial, Ye *et al.* reported that 2.7% of patients developed Clavien grade 3 or higher complications, 12.4% required secondary surgical procedures for incontinence at 24 months follow up, and 19.4% of patients were using two

or more pads daily at 2 years follow up.⁴ Ye *et al.* reported acute postoperative urinary retention in 2.7% patients, similar to the current findings. The AdVance male urethral sling functions by compressing and repositioning the proximal urethra to an anatomic location (in the postprostatectomy setting) to improve urinary control.¹⁰ The best outcomes are seen in men with mild stress incontinence prior to surgery with studies reporting that severity of incontinence, defined by pad weight or number of pads, is one of the major predictors of postoperative continence.^{3,7,11} Studies have not previously evaluated whether obesity increases the strain on the mesh used for the AdVance sling; however, studies have suggested the importance of maintaining sufficient tension on the urethra.^{4,12,13} As a result of this, we felt that evaluating the outcomes of obesity would be helpful to understand which patients can benefit most from placement of a urethral sling.

In one of the few studies to examine whether obesity had an impact on 30-day complications following male sling, Alwaal *et al.* reported that men with a BMI of 40 or higher had a 12% incidence of 30-day complications compared with less than 4% of patients with a BMI of less than 40.⁸ While there are overall low numbers in this study, it certainly lends credence to the subjective concerns of urologists performing surgery on morbidly obese patients. In addition, Sacco *et al.* reported that patients with a BMI of 30 or higher and those with prior radiation experienced a higher incidence of failure within 6 months of surgery.⁹ Our findings corroborate each of these studies despite the fact that we were unable to evaluate fully the impact of radiation given our small numbers.

Quantifying the complexity of surgery is challenging, particularly when describing a cohort of patients undergoing a relatively short, safe surgery such as the male urethral sling. We chose to use operative time as a surrogate as the number of trocar passes was not consistently reported in the operative reports. In addition, no surgeon dictated that a case was particularly challenging although anecdotally each could remember certain cases that were more challenging due to body habitus. Obese patients frequently require multiple attempts to pass the trocars for sling placement which can lead to increased surgical time and could potentially lead to a higher incidence of postoperative complications. We report that obesity was associated with an average 11-min increase in operative time. Unfortunately no prior

study has evaluated operative time based on body weight so we are unable to compare these findings to other studies.

We chose to use the most conservative definition of pads used following surgery for the conduct of the study. On multiple occasions we noted that patients reported using multiple ‘soaked’ pads prior to surgery but reported using the same number following surgery and instead described them as ‘damp’, which made us wary of using the number of pads. In addition, we did not ask patients to weigh their pads, so quantifying volume leaked was not possible, prior to or following, surgery. We felt that using no pads *versus* any pads allowed the most conservative evaluation of the impact of the sling on the patient’s continence. Prior AdVance male urethral sling literature uses either 0–1 pads daily to define continence or no pads daily. Success rates vary between 23% and 73% depending on the definition and duration of follow up.^{2–5,12,14}

There are multiple limitations worth discussing. Firstly, this is a single institution, multi-surgeon, retrospective study of men undergoing AdVance male urethral sling placement. The number of patients included is limited and therefore results should be considered with this in mind. Patients were not regularly given a validated questionnaire and instead self-reported the number of pads they used. Urodynamics were not obtained prior to surgery to assess detrusor function or Valsalva leak point pressure. Leakage volume was not quantified to determine soaked *versus* damp pads, and it has been previously demonstrated that pad count is not a perfect surrogate for actual pad weight.¹⁵ To minimize the impact of this, we opted to use the most conservative outcomes for pad use. Finally, the number of trocars and complexity of surgery were not specifically described by the surgeon, resulting in the need to use operative time as a surrogate measure for complexity.

In conclusion, obese men undergoing AdVance male urethral sling placement required increased operative time, potentially related to operative complexity, and a higher proportion compared with non-obese patients required postoperative pads for continued urinary incontinence. Further research, preferably multi-institutional and prospective, will better delineate the full impact of obesity on male urethral sling outcomes. This research will hopefully enable more optimal patient selection moving forward to determine

those who will most benefit from male urethral sling placement.

Conflict of interest statement

The authors declare that there is no conflict of interest.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. IRB approval was granted.

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