Treatment of Post-Prostatectomy Incontinence With Male Slings in Patients With Impaired Detrusor Contractility on Urodynamics and/or Who Perform Valsalva Voiding

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Abbreviations and Acronyms

AUS = artificial urinary sphincter

BCI = bladder contractility index

DO = detrusor overactivity

ICS = International Continence Society

Pabd = abdominal pressure

PdetQmax = detrusor pressure at maximum flow rate

PGI-I = Patient Global Impression of Improvement

PPI = post-prostatectomy urinary incontinence

PVR = post-void residual

Qmax = maximum flow rate

SUI = stress urinary incontinence

UDS = urodynamics

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For another article on a related topic see page 1524.

Purpose: Male slings have emerged as a popular and efficacious treatment for men with post-prostatectomy stress urinary incontinence. Traditionally slings have been used with caution or avoided in men with impaired detrusor contractility or Valsalva voiding because of concern that patients will not be able to overcome the fixed resistance of a sling during micturition. We propose that men with post-prostatectomy urinary incontinence who have impaired contractility and/or void with abdominal straining for urodynamics can be safely treated with slings.

Materials and Methods: A retrospective review of patients with post-prostatectomy urinary incontinence who underwent an initial sling procedure between January 2004 and January 2010 was conducted at a single institution. Preoperative urodynamic characteristics, and postoperative Patient Global Impression of Improvement, post-void residual and noninvasive uroflow data were examined. Patients were grouped by poor bladder contractility or Valsalva voiding status. Exclusion criteria were lack of preoperative urodynamics and/or postoperative post-void residual. A total of 92 patients were analyzed. The variables were compared using the Student t test and the chi-square test.

Results: No statistically significant difference was shown in postoperative post-void residual (mean 4 months postoperatively) or urinary retention when comparing by bladder contractility or Valsalva voiding. In the subset of patients with available postoperative uroflow data, there were no differences in postoperative maximum flow rate or voided volume.

Conclusions: Men with post-prostatectomy urinary incontinence with urodynamic findings suggesting impaired contractility or Valsalva voiding can be safely treated with sling surgery if they have normal preoperative emptying.

Key Words: urinary incontinence, stress; suburethral slings; prostatectomy; Valsalva maneuver

Urinary incontinence after radical prostatectomy continues to be a widespread and difficult problem for urologists to treat. The rate of post-radical prostatectomy urinary incontinence ranges greatly in the published literature, from 2% to 87% after surgery, with varying definitions.[1] Long-term PPI that significantly impacts quality of life and requires surgical treatment occurs in approximately 5% of cases.[1] The majority of patients with PPI have SUI related to intrinsic sphincter deficiency.[2] The gold standard for the treatment of PPI has been the artificial urinary sphincter, with high

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satisfaction rates greater than 90% and total continence rates of approximately 30%.[3,4]

More recently the use of male slings has emerged as a popular and efficacious treatment modality for patients with PPI as an alternative to the AUS. Success rates of the male sling vary, with short and intermediate term success rates ranging from 40% to 96% based on varying definitions of success.[5–7] The male sling does offer several potential advantages compared to the AUS, including the avoidance of a mechanical device and circumferential urethral compression. However, many surgeons are reluctant to perform a sling procedure in men with impaired detrusor contractility or Valsalva voiding because of concern that the detrusor will not be able to overcome the fixed resistance of a sling during micturition.[8] The avoidance of slings in men with impaired contractility and/or Valsalva voiding has mostly been based on the hypothesis that the fixed compression provided by a sling will not be overcome by the impaired detrusor as some of the literature examining the use of female slings for SUI would suggest, although a dearth of similar literature exists for the male population.[9] Based on our experience, we propose that men with PPI who have impaired contractility and/or void with abdominal straining during urodynamics can be safely treated with sling surgery.

MATERIALS AND METHODS

A retrospective review was conducted from a database of 335 patients who underwent surgical treatment of PPI at a single institution between January 2004 and January 2010. Patients were included in the analysis if they had undergone primary initial treatment of PPI with male sling by a single surgeon (VN). Exclusion criteria were repeat/revision procedures, lack of preoperative UDS reports, diagnosis of neurogenic voiding dysfunction and/or lack of postoperative PVR measurement. The patients were treated with the AdVance® sling, InVance® sling or Virtue® sling based on surgeon and patient preference. Surgical techniques are described elsewhere.[10,11] Institutional review board approval was obtained to conduct initial prospective data gathering and record review of these patients.

Preoperative evaluation included a detailed history and physical, pad weight test and videourodynamics. UDS were performed according to the standards of the ICS according to a standardized protocol for PPI.[12,13] Preoperative urodynamic parameters including DO, bladder capacity or maximum cystometric capacity, detrusor pressure, Pabd, Qmax, PdetQmax and PVR were obtained from the UDS reports, and followed definitions set by the ICS.[14] All patients also had preoperative noninvasive uroflow and post-void residual measurements. The primary objective of this study was to assess postoperative bladder emptying in men with impaired contractility and/or Valsalva voiding, and compare these to those of men with normal contractility. A secondary objective was to compare overall patient satisfaction in the same patients using the PGI-I.[15] Based on previous work we considered a score of 1 or 2 on the PGI-I scale, corresponding to very much better or much better, as a surgical success.[16] Bladder contractility was determined using the bladder contractility index (PdetQmax + 5*Qmax).[17] Impaired bladder contractility was defined as BCI less than 100. Voiding by abdominal straining (also referred to as Valsalva or abdominal voiding) was defined as a change in Pabd at Qmax from baseline greater than 10 (ΔPabd greater than 10).[18] A secondary analysis was also performed categorizing Valsalva voiding as ΔPabd greater than 20. This more stringent, and possibly more accurate, characterization considers the variable, operator dependent nature of UDS testing. Bladder outlet obstruction was also calculated preoperatively using the bladder outlet obstruction index (PdetQmax – 2*Qmax) and defined by the ICS nomogram.[17] Postoperatively all patients had PVR measurements taken and a subset also had postoperative noninvasive uroflow performed. PVRs included were taken from the first available measurement excluding the first postoperative visit, as it was believed that this would represent a more accurate reflection of stabilized postoperative voiding. Statistical analysis was performed using SPSS® Statistics software and the variables were compared using the Student t test or the chi-square test.

RESULTS

A total of 110 patients were identified who underwent a first-time sling procedure by a single surgeon. Of these patients 92 (84%) had all necessary data and were included in the final analysis (see figure). Of the included patients 50 had an AdVance® sling, 38 had an InVance® sling and 4 underwent a Virtue® sling placement. No patients underwent surgical intervention or required catheterization for postoperative obstructive voiding or poor emptying. Patients were categorized into groups based on bladder contractility or Valsalva voiding.

There were 50 men (54%) diagnosed with impaired contractility with BCI scores less than 100, while 42 (46%) had BCI scores greater than 100. The mean age between the 2 groups was not statistically significantly different (table 1). Preoperative UDS characteristics between the 2 groups differed significantly in several areas. Patients with poor contractility had significantly greater mean post-void residuals (17.4 vs 4.1 ml, $p = 0.01$). However, this was not clinically significant as all patients emptied well with a maximum PVR of 140 and 150 ml in the poor and normal contractility groups, respectively. These patients were outliers as they were the only ones in either group with a PVR greater than 100 ml. Men with poor contractility also had a lower mean bladder capacity (296 vs 382 ml, $p < 0.001$) and lower mean Qmax (8.4 vs 23.8 ml per second, $p = < 0.001$). Conversely mean PdetQmax, percent of patients