Posterior support for urethrovesical anastomosis in robotic radical prostatectomy: single surgeon analysis

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Introduction: *Posterior urethrovesical anastomotic support has been reported to improve early return of urinary continence following radical prostatectomy. We adapted this technique to evaluate enhancement of early urinary control in patients undergoing robotic radical prostatectomy.*

Materials and methods: *Forty-two consecutive men undergoing radical prostatectomy by a single surgeon between September and December 2007 received a posterior urethrovesical supporting stitch prior to the standard urethrovesical anastomosis (group 1). Operative data, postoperative complications, and follow up data were compared with those of the 42 consecutive men who underwent robotic radical prostatectomy by the same surgeon between March and August 2007 with a standard urethrovesical anastomosis (group 2). Continence was assessed at routine follow up visit 6 to 8 weeks following catheter removal. Continence was defined as zero pads or small security liner for infrequent urinary leakage in 24 hours.*

Results: *Thirty-four (81%) and 37 (88%) men in groups 1 and 2 respectively had follow up available between 45 and 75 days following prostatectomy. Preoperative demographics were similar between the two groups. At a mean follow up of 60 and 53 days following surgery, 29/34 (85%) of men in group 1 and 32/37 (86%) of men in group 2 were continent. On multivariate logistic regression analysis, no factors were associated with improved continence between the two groups.*

Conclusions: *Posterior urethrovesical anastomotic support did not result in improved early urinary control following radical prostatectomy. Excellent urinary control can be achieved in the patients undergoing robotic radical prostatectomy without posterior urethrovesical anastomotic support.*

Key Words: robotic, radical prostatectomy, urinary incontinence, urethrovesical

Introduction

Most men undergoing radical prostatectomy experience temporary urinary incontinence. Long term urinary incontinence following robotic prostatectomy has been reported to be approximately 5%-10%.[1-3] At our institution, patients wearing one thin security liner or no pads for urinary leakage constituted 95.2% of patients at one year.[4] Since very high long term continence rates following robotic radical prostatectomy have been established at several institutions,[1-3] improving short term urinary continence has become a prominent goal in improving patient quality of life following surgery.

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Recently, several institutions of excellence have published data addressing improvement of early continence through increased support of the urethrovesical anastamosis. These reports by F. Rocco,[5] B. Rocco,[6] and Nguyen[7] have shown enhanced outcomes, with continence rates improved significantly within 12 weeks. These techniques have been adapted in open, laparoscopic and robotic surgical approaches. We modified the posterior supporting stitch,[5] adapting it to a robotic platform, and prospectively recorded patient urinary function to evaluate if posterior urethrovesical support can improve on patient functional outcomes.

Materials and methods

Forty-two consecutive men undergoing robotic radical prostatectomy between August 2007 and December 2007 constitute group 1. Baseline demographics, pathologic results, and operative parameters were recorded in prospective computerized IRB approved database. These patients underwent robotic radical prostatectomy as previously described without variation in technique until after urethral transection.[4] Following transection of the urethra, a 7 cm 3-0 monocryl suture with a knotted end is brought through the posterior bladder at the 5 o'clock position, approximately 1 cm-2 cm posterior of bladder lumen, Figure 1. This suture is then brought through the anterior layer of Denonvillier's fascia, and then through the posterior periurethral tissues. Working from right to left, six passes are made through these layers, cinching after the third pass. Following the fourth pass, the suture is looped through twice, tying down this posterior support. We take care to avoid entrapping the preserved neurovascular bundles, avoid rectal injury, and avoid occluding the ureter as it enters the bladder. After the sixth pass, this suture is tied and cut. We then perform a modified van Velthoven anastomosis[8] with two arms of a 3-0 monocryl suture, one dyed and one undyed as previously described. These patients were compared to the 42 consecutive men who underwent radical prostatectomy by one surgeon between March and August 2007, immediately prior to these patients (group 2).

All patients returned to clinic 6 to 8 days following surgery (10-14 days if they required extensive bladder neck reconstruction) for gravity cystogram and catheter removal. Follow up data concerning urinary function was obtained at the first postoperative visit, approximately 6-8 weeks after surgery. At the follow up visit, International Prostate Symptom Score (IPSS), IPSS Bother Score and Sexual Health Inventory for Men

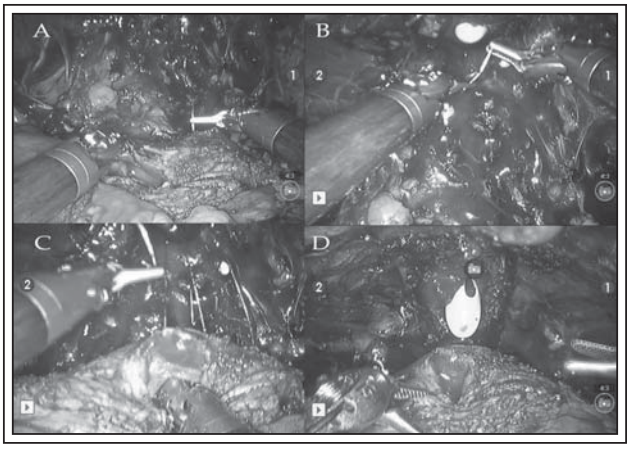

Figure 1. a) Following transection of the urethra, a 7 cm 3-0 monocryl suture with a knotted end is brought through the posterior bladder at the 5 o'clock position, approximately 1 cm-2 cm posterior of bladder lumen. b) This suture is then brought through the anterior layer of Denonvillier's fascia, and then through the posterior periurethral tissues. c) Working from right to left, six passes are made through these layers, cinching after the third pass. d) After the sixth pass, this suture is tied and cut.

(SHIM) scores were recorded on questionnaire forms prior to physician entering the room, and continence data based on pads per day was assessed via direct questioning by a physician assistant.

Fisher's exact test and chi-squared were used for analyzing nominal data, and student's t test was used for continuous variables. Multivariate logistic regression was used for the outcome variable of continence at follow up. Statistical analysis was done on JMP 7 software (Cary, NC) with $p < .05$ considered significant.

Results

All patients returned for cystogram, and 34 patients (81%) in group 1 and 37 patients (88%) in group 2 returned for follow up appointment between days 45 and 75 following catheter removal. Patients in group 1 and group 2 had similar preoperative demographics, although group 1 was noted to have more aggressive cancer on final pathologic staging, Table 1. Use of nerve sparing profiles were similar. Patients in group 1 had a significantly longer robotic console time by 23 minutes (161 versus 138 min, $p = 0.008$). Nine patients in group 1 (21%) and 8 patients in group 2 (19%) required bladder neck reconstruction ($p = .78$). Catheter duration was not significantly different

TABLE 1. **Demographic data of patients**

	Group 1	Group 2	p value
# patients	42	42	
Mean/# (SD or %)			
Age	60.1 (7.9)	60.8 (6.6)	0.67*
PSA	5.8 (3.1)	5.3 (2.7)	0.45*
BMI	29 (4.1)	28.1 (3.4)	0.30*
Preop IPSS	9.3 (8.2)	10.2 (6.1)	0.59*
Preop Quality of life score	2.0 (1.4)	1.8 (1.5)	0.54*
Preop SHIM	19.6 (6.8)	16.9 (7.9)	0.11*
Prostate weight (g)	47.6 (13.8)	46.2 (14.0)	0.65*
Length of stay (days)	1.1 (.6)	1 (0)	0.23*
Catheter duration	8.5 (3.9)	8.4 (2.5)	0.86*
Operative time (min)	199 (41)	178 (48)	0.03*
Mean follow up (days)	60 (10)	53 (15)	0.01*
Continent	29 (85%)	32(86%)	.89**
Nerve sparing			0.75 +
Wide excision	5	6	
Standard nerve sparing	24	19	
U/L lateral prostatic fascia sparing	7	9	
B/L lateral prostatic fascia sparing	6	8	
Gleason sum			0.04 +
6	5	14	
7	32	26	
≥ 8	5	2	
Path stage			.15**
≤ pt2c	32	37	
≥ pt3a	10	5	
Positive margin rates			
pT2	4/32 (13%)	4/37 (11%)	
pT3	3/10 (30%)	3/5 (60%)	

*- student's t test; + - Fisher's exact test;** - chi squared test

between groups 1 and 2 (8.5 ± 3.9 days versus 8.4 ± 2.5 days, p = 0.86). Two of 42 patients in group 1 (4.8%) and 3/42 patients in group 2 (7.1%) had small leak on cystogram requiring extended catheter duration (p = .64) without need for additional intervention. No patient in either group presented with acute urinary retention following urethral catheter removal.

Overall 29/34 (85%) of men in group 1 and 32/37 (86%) of men in group 2 were continent. There was a significant increase in operative time (from Veress needle insertion until skin closure) and robotic console time in group 1 patients. Mean pad usage between group 1 and group 2 was not significantly different (0.85 ± 1.5 versus 0.95 ± 1.5, p = 0.80). Postoperative IPSS (8.2 ± 5.0 versus 8.1 ± 4.7, p = 0.97), bother score (2.3 ± 1.5 versus 2.3 ± 1.1, p = 0.83) and SHIM (5.9 ± 4.8 versus 4.9 ± 6.3, p = .46) were similar between groups 1 and 2.

On multivariate logistic regression analysis, PSA (p = .27), preoperative IPSS (p = .12), preoperative SHIM (p = .16), age (p = .64), BMI (p = .08), nerve sparing (p = .11), prostate weight (p = .58) and use of posterior supporting stitch (p = .33) were not independent predictors of urinary continence. Similar results were seen with multivariate linear regression using pads per day as a continuous variable.

Discussion

The impetus to improve early continence following radical prostatectomy has resulted in several innovative surgical techniques and modifications. Montorsi described preservation of the rhabdosphincter as a critical factor to hasten return of postoperative continence and has shown improved results with that technique.[9] Nerve sparing has also been suggested to improve early continence, although this is not universally accepted.[10,11] Bladder neck preservation, puboprostatic ligament preservation,[12] and seminal vesicle sparing[13] have been implicated to affect early urinary continence in previous reports. Recently, improvement of early continence with urethrovesical support has been described with promising results from several institutions.

In open radical prostatectomy, Francesco Rocco described a posterior anastomotic supporting stitch improving urinary continence for 250 patients as compared to a historical control of 50 patients. He noted an almost 50% increase in continence at time of discharge, and 40% increase in continence at 1 and 3 months, although at 1 year, patients without the posterior support had similar continence rates.[5] In adapting Francesco Rocco's posterior urethrovesical support to laparoscopic approach, Bernardo Rocco saw that 74.2% of patients were continent at 3 days, 83.8% at 30 days, and 92.3% at 90 days.[6] These reports were based on a two step posterior support. The initial step involves bringing the posterior rhabdosphincter to Denonvillier's fascia and the second step is attaching the posterior bladder neck to the now supported rhabdo Denonvillier layer. Nguyen has also shown improvement in early postoperative continence with posterior support among patients undergoing minimally invasive radical prostatectomy.[7]

In this study, we did not see a statistically significant improvement in postoperative urinary function among men with a posterior supporting stitch. On further analysis, we noticed that the posterior stitch did not improve IPSS or IPSS bother scores in patients. We could not find any parameter (prostate weight, BMI, nerve sparing, preoperative IPSS/SHIM) which was associated with improvement in urinary control at initial follow up visit, including usage of posterior reconstruction. Nor could we identify a patient group which benefited from this posterior support.

A significant difference between patient groups was time to follow up in days (53 versus 60) for group 1 versus group 2, respectively. However, later follow up of group 1 would favor improved continence in this cohort, although this was not seen. Additionally, unlike Rocco's laparoscopic series,[6] we saw a significant increase in operative times between the two groups. Both the operative and robotic console time increased by approximately 20 minutes in group 1. While this didn't translate into an increase in estimate blood loss, (132 ± 82 ml versus 157 ± 79 ml, $p = .15$) we do not feel the increased anesthesia time is warranted for placement of this support.

This is not the first report that doesn't appreciate a significant increase in short term urinary continence following attempting to replicate a previously published technique. For instance, Walsh and Marshke described intussusception of the bladder neck as a method for improving early continence, having identified this technique from previously recorded cases.[14] Wille et al, adapted this technique and saw significant improvement in their 3 month, but not 12 month continence results as well.[15] Sakai did not appreciate this improvement in immediate continence in his cohort of patients.[16] Our inability to appreciate previous accounts of improvement with posterior support differs from the aforementioned example, however. Our patients achieved results comparable to Rocco's 83.8% continence (1 diaper per day or fewer at 1 month), without the addition of the posterior support. Sakai's patients had a substantially decreased continence rate (63% versus 82%) at 3 months in comparison with Walsh. While including the "Pagano" stitch in their technique, Moinzadeh et al, stress a multifaceted approach to improving urinary continence including preservation of the puboprostatic ligaments, and precise apical and seminal vesicle dissection.[17] We too believe that urinary continence is due to a variety of factors, but didn't find that a posterior supporting stitch is an important factor.

An ancillary benefit of posterior support is increased ease in accomplishing the urethrovesical anastomosis. By providing posterior support, tension is taken off the anastomotic stitch, and helps protect the risk of the stitch tearing through either the bladder neck or urethral stump. Tension free anastomosis and ease of anastomosis has been noted in other series,[7] however, in our patient cohort, this was not translated into improved continence for patients in the immediate postoperative period. Using the modified Van-Velthoven technique of cinching following the initial three urethral stitches,[8] we rarely encounter urethral tearing during anastomosis.

There are several potential criticisms to this study. First, this is not a prospective randomized study, and bias is inherent with historical control. However, many of original publications on the usage of posterior support are retrospective nonrandomized series using

historical controls.[7,18] Second, urinary leakage was only assessed at follow up visit following catheter removal. There was no data collected at 1 day, or other time points following removal catheter removal. This time frame was arbitrarily chosen for convenience, as it is when patients return following surgery for their initial PSA check. It is possible that at this time of follow up, the improvements in early continence were no longer significant. Rocco noted that at 30 days there was a significant increase in continence, however at 90 days this difference was no longer significant.[6] Patient recall bias did not produce reliable enough information for assessment of time to continence.

Pad usage is not the most robust measurement of urinary leakage available. Some patients will change urinary pads after only a few drops, while some patients are willing to tolerate 30 ml or more in their pads. Certain pads are designed to hold increasing amounts of urine. Rocco alluded to diapers in his study, while other authors have used security liners or pads as their benchmark.[6] Weights of urinary pads are the only reproducible and reliable measure of true urinary leakage,[19] although this trial wasn't designed to assess that parameter. However, it has been shown that only one pad per day does not significantly negatively impact patient quality of life,[20] and therefore we do believe this as an accurate measurement of functional continence.

Conclusion

This study shows immediate postoperative urinary incontinence in our patient population was not significantly improved by using posterior support of the urethrovesical anastamosis. We observed very high early continence rates overall, irrespective of supporting stitch. Long term data on these patients will demonstrate whether there is any improvement in secondary endpoints, such as sexual function or long term urinary continence. □

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