

# Continence outcomes following robotic radical prostatectomy: Our experience from 150 consecutive patients

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## ABSTRACT

**Introduction:** Urinary continence is an important outcome parameter after robot assisted radical prostatectomy (RARP). We evaluated the continence outcomes following RARP using a double-layered urethrovesical reconstruction.

**Materials and Methods:** One hundred fifty consecutive patients undergoing RARP and double-layered urethrovesical reconstruction were prospectively studied for preoperative, intraoperative and post operative parameters. Key points followed during surgery were: Minimal dissection of sphincteric complex, preservation of puboprostatic ligament, selective ligation of deep venous complex and both posterior and anterior reconstruction using the Von Velthoven stitch. Intraoperative bladder fill test was done at the end of anastomosis to rule out urine leak. Check cystogram was done prior to catheter removal in the outpatient department. Patients were subsequently followed at regular intervals regarding the status of urinary continence. All patients irrespective of adjuvant therapy were included in the analysis.

**Results:** The mean age was 64 years (standard deviation  $\pm 6.88$ ), and mean serum PSA was 20.2 ng/ml. The mean BMI was 25.6 (SD:  $\pm 3.84$ ). The mean prostate weight was 44.09 gm (range 18-103 gm, SD:  $\pm 15.59$ ). Median days to catheter removal after surgery was 7 (range 4-14 days) days. Cystographically determined urinary leaks were seen in two patients. Urine leak was managed by delaying catheter removal for 1 week. Minimum 6 month follow up was available in 126 patients. 'No pad' status at 1 week, 1 month, 3 months, 6 months and 1 year was 15.1%, 54.9%, 78%, 90.5% and 94.1%, respectively.

**Conclusion:** Excellent continence outcomes are observed in patients undergoing double-layered urethrovesical reconstruction.

**Key words:** Prostate cancer, Robotic surgery, Continence, Robotic prostatectomy, double-layered urethrovesical reconstruction

## INTRODUCTION

Prostate cancer is the most common cancer diagnosed in men and the second most common cause of death from cancer in industrialized countries. In India, the incidence of prostate cancer is second among all

the cancers in men and a rising mean annual percentage change of 0.14-8.6.<sup>[1]</sup> More Indian men with prostate cancer are being diagnosed with a localized prostate cancer as a result of awareness, screening and improved diagnostic armamentaria. Robot-assisted radical prostatectomy (RARP) has become the most preferred surgical modality for the treatment of localized prostate cancer.<sup>[2]</sup> However, postoperative urinary incontinence remains one of the most bothersome complications with reported incidence of 7-40%.<sup>[3]</sup> Significant improvement in continence results following RARP has been reported in recent series. Several technical modifications proposed and put into practice over the years have contributed to improved overall continence rates as well as faster return to continence. The underlying basic concept of all these techniques is to maintain normal anatomical and functional structures in the pelvis or to restore the anatomy to the best possible extent. Some of the surgical modifications to improve early continence outcomes described in the literature include (but not limited to): Sparing of the puboprostatic ligaments,<sup>[4-6]</sup> bladder neck preservation,<sup>[7-9]</sup> posterior reconstruction of Denonvilliers'

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musculofascial plate,<sup>[10-13]</sup> restoration of the puboprostatic collar,<sup>[14]</sup> and complete reconstruction of the periurethral supportive tissues.<sup>[15,16]</sup> However, the technique of RARP is an evolutionary continuum and improved continence result is the additive effect of all the individual steps. We performed double-layered urethrovesical anastomosis using two, monofilament Van Velthoven stitches in 150 consecutive patients. The aim of this study is to evaluate continence outcomes in our patients.

## MATERIALS AND METHODS

Between April 2010 and August 2013, clinical and pathologic data were prospectively recorded of all cases who underwent RARP and total anatomical reconstruction. All the patients underwent RARP through transperitoneal approach using 4 arm da Vinci surgical system. Key points followed during prostatic dissection were: Minimal dissection of sphincteric complex with preservation of puboprostatic ligament, nerve sparing surgery whenever indicated, selective ligation of deep venous complex, preservation of maximal urethral length. Reconstruction consisted of double-layered anastomosis done by reapproximation of Denonvillier's fascia and posterior rhabdosphincter, as well as reapproximation of the puboprostatic ligaments to the anterior pubovesical collar.<sup>[15]</sup> Two, 3-0 double-armed monofilament sutures were used. The first suture was started at 5'o clock position for posterior reconstruction and creation of posterior plate by approximating posterior rhabdosphincter (on urethral side) to posterior layer of Denonvilliers fascia (on bladder side). Using the second suture, the urethrovesical anastomosis (inner layer) was then completed all around by performing mucosa to mucosa approximation. Finally, the outer layer was completed by approximating the puboprostatic ligament to the anterior pubovesical collar. Bladder fill test with 120 ml saline was done after completion of anastomosis. Any significant leak noted during bladder fill test was repaired by interrupted sutures. Indwelling Foley catheter was kept in all the cases. Check cystogram was done prior to catheter removal in the outpatient department on Day 7 of surgery. Catheter removal was done if no leak was noted on cystogram. Patients were instructed to perform 'Kegel exercises' starting 3 days after catheter removal.

Follow up: Demographic, operative and follow-up data were retrieved from the electronic database in the hospital's electronic medical records. Patients were followed at regular intervals (at 1 week, 4 weeks, 3 months, 6 months and 12 months post catheter removal) in the outpatient clinic or contacted on phone/email regarding the status of urinary continence and number of pad used. Continence was defined as using 'no pad' or just a security liner. All patients irrespective of adjuvant therapy were included in the analysis.

Data collection and follow-up correspondence were conducted in accordance with the hospital's ethical guidelines.

## RESULTS

From April 2010 to August 2013, 153 patients underwent RALP by the two surgeons in a single institution. Of these patients three international patients were excluded from analysis due to non-availability of follow up data. Clinical and pathologic characteristics of the patients are shown in Table 1. The mean age was 64 years (standard deviation  $\pm$  6.88), and the mean serum PSA was 20.2 ng/ml. The mean BMI was 25.6 (SD:  $\pm$ 3.84), and the mean prostate weight (on final specimen) was 44.09 gm (range 18-103 gm, SD:  $\pm$ 15.59). Median postoperative hospital stay was 3 days. Median days to catheter removal after surgery were 7 (range 4-14 days). Cystographically determined urinary leaks were seen in two patients. Urine leak was managed by delaying the catheter removal for another 1 week. At least 6 month follow up was available in 126 patients. 'No pad' status at 0 week, 1 month, 3 months, 6 months and 1 year was 15.1%, 54.9%, 78%, 90.5% and 94.1%, respectively [Table 2 and Figure 1]. No significant correlation was found on multivariate logistic regression analysis in rate of continence and prostate size, nerve sparing status or age of patient. However, trend toward early continence was noted in younger patients.

## DISCUSSION

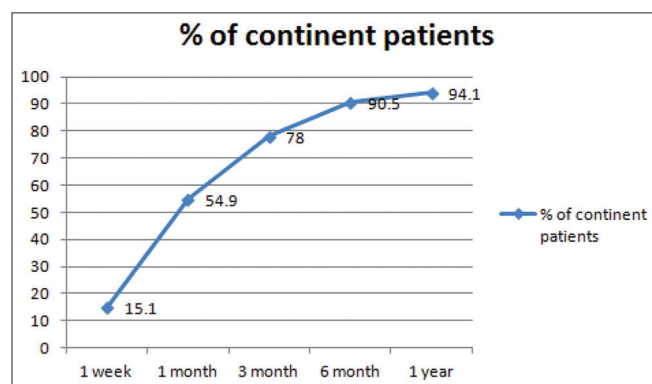
The focus of treatment for localized prostate cancer is not only better cancer control but also to maintain the quality

**Table 1: Clinical and pathologic characteristics of the study population**

Mean age (range, year)	64.7 (47-84)
Mean preoperative PSA (range, ng/ml)	20.2 (1.9-63)
BMI (kg/m <sup>2</sup> ), mean (range)	25.6 (17-38.9)
IPSS, median (range)	15 (2-26)
Clinical stage% (n)	
T1	33.8 (51)
$\geq$ T2	66.2 (99)
Biopsy Gleason score % (n)	
$\leq$ 6	53.8 (81)
$\geq$ 7	46.2 (69)
Pathologic features	
Organ-confined% (n)	60.7 (91)
Prostatectomy Gleason $\geq$ 7, % (n)	78 (117)
Extracapsular extension% (n)	39.3 (59)
Overall Positive surgical margin % (n)	19.5 (29)
T2 Positive surgical margins % (n)	10 (9)
Seminal vesical invasion% (n)	20 (30)
Pelvic lymph node metastases% (n)	8 (12)

**Table 2: Status of urinary continence on follow up**

	1 week	1 month	3 months	6 months	1 year
Patients, <i>n</i>	150	144	132	126	101
% urinary continence	15.1	54.9	78	90.5	94.1

**Figure 1:** Graph showing percentage of patients achieving continence during follow up

of life. Postoperative urinary incontinence (UI) following radical prostatectomy (RP) remains a bothersome issue. Large contemporary series have reported continence rates ranging from 84% to 97% at 1 year.<sup>[17]</sup> Thus, even though most of the patients regain their continence at 1 year, patients do suffer the psychological trauma of UI for varying period in the post operative phase. Over the years, several technical modifications and collective experience of open and conventional laparoscopic RP have contributed to the improvement seen in early and overall continence rates. Both posterior<sup>[10]</sup> and anterior reconstructions<sup>[14]</sup> have been independently shown to be helpful in improving early continence. In our patient we have taken advantage of both the approaches and noted that approximately 55% of our patients are fully continent just after 1 month of surgery. By 6 months 90% of our cohort regained continence. The results are comparable to other large series who have taken the similar reconstructive approach.<sup>[17-20]</sup>

Technical modifications allowing rapid return of urinary continence after surgery relies on maintaining anatomical and functional structures in the pelvis to the greatest possible extent.<sup>[21]</sup> The major components of the pelvic supporting system in males are Denonvilliers' fascia, puboprostatic ligament, endopelvic fascia, levator ani muscle and arcus tendineus fascia pelvis. Thus, not only preservation, but also reconstruction of these structures play a potential role in improving the recovery of urinary incontinence.<sup>[21]</sup> Based on this concept, three steps have been advocated intra-operatively to preserve post-prostatectomy continence: (1) Preservation of bladder neck, nerves, puboprostatic ligament, pubovesical complex and urethral length; (2) reconstruction of the rhabdosphincter posteriorly, anterior retropubic suspension, reattachment of the arcus tendineus to the bladder neck and total reconstruction of the

vesicourethral junction and (3) reinforcement of the bladder neck by plication and bladder neck sling suspension.<sup>[21]</sup>

In our patients we made no special attempt to preserve the bladder neck as the majority of cases were high risk with large volume of tumor. However, we did attempt to preserve the puboprostatic ligament and preserve maximal urethral length. During reconstruction, posterior reconstruction helps in restoring the anatomic and functional length of the rhabdosphincter and by providing posterior support to the urethra.<sup>[10]</sup> Although the delayed continence rate achieved at 1 year may be the same in patients with or without posterior reconstruction, several authors have reported achievement of faster continence (early continence) with this method.<sup>[10-12,15]</sup> We observed that more than 90% of our patients achieve continence by 6 months. Another potential advantage is that along with anterior reconstruction, it also takes away the tension from the actual urethrovesical anastomosis and makes it easier to perform (especially in difficult cases). Sammon *et al.*<sup>[20]</sup> have also reported significantly lower rates of cystographically determined anastomotic leak rate with double-layer anastomosis (none versus 10% when compared to single layered anastomosis). We have also noted a very low leak rate (<1%) in our patients.

We realize that our study has certain shortcomings, chiefly being the non-objective way of defining continence leak based upon usage of number of pads and not the urine leakage weight. However, the effect on results is minimal as our definition of continence was use of either 'no pad' or just a 'security liner'. No health-related quality of life score assessment was done during the study which could have added another parameter to the analysis. Also, all our patients underwent double-layered urethrovesical anastomosis therefore it is not possible for us to gauge the difference in outcomes between single-layered versus double-layered anastomosis (if at all).

In conclusion, double-layered urethrovesical anastomosis combines the benefits of both posterior and anterior reconstructions and provides excellent continence outcomes.

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