

## Perineal and robot-assisted vesico-urethral reconstruction for anastomotic strictures after RP

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### ARTICLE INFO

#### Keywords:

Vesico-urethral anastomotic stricture  
Bladder neck contracture  
Robotic radical prostatectomy

### Introduction

Vesico-urethral anastomotic stricture (VUAS) following radical prostatectomy is a rare clinical condition in the robot-assisted procedure era, due to the improved magnification of the surgical field and the perfect knowledge of the anatomic structures deputed to maintaining the mechanisms for urinary continence.

Improvements in surgical technique such as muco-mucosal apposition, tension-free anastomosis, water-tight vesico-urethral suture, have been recognized as significant contributors to precise vesico-urethral reconstruction. Conversely, excessive intraoperative blood loss, urinary extravasation and previous history of trans-urethral prostatectomy have been commonly cited as predisposing factors for the development of postoperative scars. [1].

Terminology used in the definition of VUAS distinguishes the condition from bladder neck contracture (BNC) and identifies the exact site of the contracture/stenosis/stricture. The majority of cases involves the bladder neck and bulbo-membranous urethra mainly in patients who received radical prostatectomy plus adjuvant radiotherapy. [2].

Diagnosis of VUAS is mainly based on symptoms and retrograde urethro-cystogram imaging to identify whether or not the sphincter mechanism is involved and the length of the strictured segment, although delineation of the precise anatomy is often complex. [2]. Stricture length is a significant factor for prognosis and correlates with probability of recurrence after reparative surgeries such as urethral dilation, trans-urethral scar incision or resection and perineal urethral buccal mucosa repair. [3].

Results obtained via different surgical techniques are amply described, with the hindrance of VUAS and BNC often not being properly distinguished in the reported series of patients treated. Notwithstanding, a 0 to 69% success rate has been reported for patients with bladder neck stricture after urethral dilation and/or cold-knife incision and/or holmium laser incision and/or trans urethral resection, while a 60 to 93% success rate was obtained for patients treated via an abdominal and/or perineal approach. [3–7].

Repair of a long-length urethral stricture often implies the complete loss of urinary continence, whilst it does not appear to have significant impact on sexual potency if previously preserved.

The risk of developing VUAS/BNC as a complication after radical prostatectomy falls from 30% of patients treated by Retropubic Radical Prostatectomy (RRP) to less than 5% of patients who received Robotic Assisted Radical Prostatectomy (RARP). Subjects with a histological diagnosis of T3 cancer, positive surgical margins and/or Gleason score >7 and treated by RARP who required early adjuvant radiotherapy, reported an overall 8.4% rate of VUAS. [8].

Lavollè et al. treated six patients with anastomotic stricture who had previously undergone radical prostatectomy by extraperitoneal robot-assisted vesico-urethral reconstruction obtaining a 50% success rate. [9].

Dinerman et al. presented a case report on a patient with long-length post prostatectomy vesico-urethral stricture by combining robotic-abdominal and open-perineal surgical procedure. [10, 11].

The combined abdomino-perineal approach allows to provide “complete” scar removal and a new vesico-urethral anastomosis at a

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<https://doi.org/10.1016/j.urology.2021.100114>

Received 20 July 2021; Received in revised form 6 December 2021; Accepted 14 December 2021

Available online 20 December 2021

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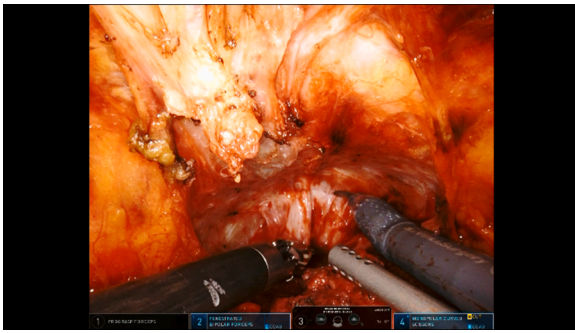


Fig. 1. Bladder neck dissection.

lower risk of developing subsequent recurrences of the stricture also in patients with long-length strictures. An extensive dissection of the bladder neck and bulbo-membranous urethra does imply the complete loss of urinary continence, that can however be recovered through subsequent or concomitant artificial sphincter implant. This novel combined technique was adopted on a series of three patients of whom two previously treated by RARP and one by RRP.

### Procedure

The detailed technique includes extended transperineal mobilization of the urethra, detachment of the urethral stump from the scar tissue, concomitant robotic approach with bladder neck dissection, scar tissue removal from both sides of the perineal plane, vesico-urethral re-anastomosis with prior complete dissection of the penile crura and infra-rural passage of the urethral stump in case of exceeding urethral shortening.

In one of the patients included in the present series, the concomitant placement of AMS 800 artificial urinary sphincter was performed.

The procedure is performed under general anesthesia, the patient placed in Trendelenburg position, and the robot docked from the side. The port placement is similar to that for robotic-assisted radical prostatectomy. The patient's legs are then placed in stirrups to allow the perineal surgeon space for maneuver.

#### 1) Robotic approach of the retropubic space of Retzius

The robotic approach includes the blunt dissection of the retropubic space of Retzius, which may present some challenges in relation to the previous surgical approach adopted for radical prostatectomy. A robotic approach is more straightforward in subjects with a history of open retropubic radical prostatectomy, whilst more difficult in individuals with a history of trans-peritoneal surgical approach.

#### 1) Bladder neck dissection

This second step is the most delicate part of the procedure (Fig. 1). The bladder neck is dissected laterally and opened paying care to preserving the ureteral meatus bilaterally. The scar tissue and urethra are completely separated from the bladder neck. A blunt lateral dissection of the bladder neck is adopted to facilitate a tension-free re-anastomosis with the urethral stump.

#### 1) Scar tissue removal

Scar tissue removal is performed with attention to avoid rectal wall injuries.

#### 1) Perineal approach to the vesico-urethral anastomosis

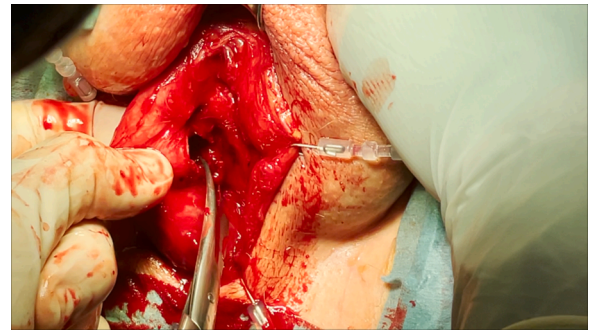


Fig. 2. perineal approach to the urethra.

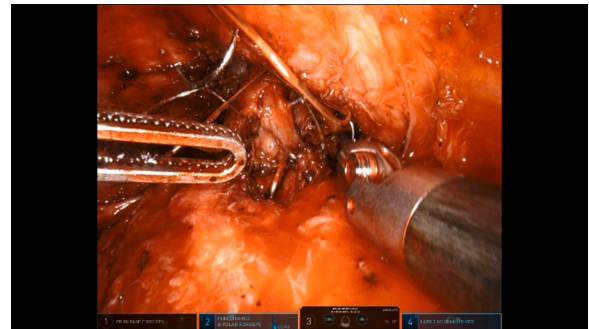


Fig. 3. vesico\_urethral anastomosis.

After a midline incision, the urethra is dissected, mobilized and detached from the anastomosis (Fig. 2). The urethral stricture is completely removed and the urethral length adjusted to obtain a tension-free anastomosis.

In case the residual urethral is considered too short, the urethral stump is passed under the crura penis to obtain a tension free vesico-urethral anastomosis.

#### 1) Peri-urethral scar tissue removal

The perineal surgeon performs peri-urethral scar tissue removal and checks its complete removal from the bladder neck.

#### 1) Vesico-urethral re-anastomosis

The urethral stump is passed through the incision and the robotic surgeon performs refinement of the urethral margins and sutures according to Van Velthoven with a double armed monofilament 3-0 suture (Fig. 3). A definitive urethral silicon 18 Charrier catheter is placed and cuffed in the bladder for at least a month.

### Conclusions

Long-length vesico-urethral strictures after radical prostatectomy are a rare problem with serious implications on the patient's quality of life.

The abdomino-perineal approach with an extensive urethral mobilization and combined robot-assisted and open perineal procedure allows for the complete removal of the scar tissue, the re-anastomosis of healthy tissues reducing the risk of recurrences, despite the need for subsequent artificial urinary sphincter placement to obtain the urinary continence recovery.

The video related to this article can be found online at: [doi:10.1016/j.urolvj.2021.100114](https://doi.org/10.1016/j.urolvj.2021.100114).

### CRedit authorship contribution statement

**Riccardo Bartoletti:** Conceptualization, Methodology, Validation, Writing – original draft, Supervision, Project administration. **Girolamo Morelli:** Conceptualization, Methodology, Visualization, Project administration. **Franca Melfi:** Investigation, Visualization, Project administration. **Andrea Cocci:** Investigation, Writing – review & editing. **Alessandro Zucchi:** Investigation, Writing – original draft, Writing – review & editing.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### References

- [1] P.G. Borboroglu, J.P. Sands, J.L. Roberts, C.L. Amling, Risk factors for vesicourethral anastomotic stricture after radical prostatectomy, *Urology* 56 (2000) 96–100.
- [2] A.R. Mundy, D.E. Andrich, Posterior urethral complications of the treatment of prostate cancer, *BJU Int.* 110 (2012) 304–325.
- [3] C.M. Rosenbaum, M. Fisch, M.W. Vetterlein, Contemporary management of vesico-urethral anastomotic stenosis after radical prostatectomy, *Front. Surg.* 7 (2020). Article 587271.
- [4] R. Park, S. Martin, J.D. Goldberg, H. Lepor, Anastomotic strictures following radical prostatectomy: insights into incidence, effectiveness of intervention, effect on continence, and factors predisposing to occurrence, *Urology* 57 (2001) 742–746.
- [5] G. Giannarini, F. Manassero, A. Mogorovich, F. Valent, M. De Maria, D. Pistolesi, P. De Antoni, C. Selli, Cold-knife incision of anastomotic strictures after radical retropubic prostatectomy with bladder neck preservation: efficacy and impact on urinary continence status, *Eur. Urol.* 54 (2008) 647–656.
- [6] D. Nikolawsky, S.A. Blakely, D.A. Hadley, P. Knoll, A.P. Windsperger, R.P. Terlecki, B.J. Flynn, Open reconstruction of recurrent vesicourethral anastomotic stricture after radical prostatectomy, *Int. J. Nephrol.* 46 (2014) 2147–2152.
- [7] W. Shahrouh, A. Hodhod, A. Kotb, O. Prowse, H. Elmansy, Dorsal buccal mucosa graft urethroplasty for vesico-urethral anastomotic stricture postradical prostatectomy, *Urology* 130 (2019) 210.
- [8] C.C. Parker, N.W. Clarke, A.D. Cook, et al., Timing of radiotherapy after radical prostatectomy (RADICALS-RT): a randomized controlled phase 3 study, *Lancet* 396 (2020) 1413–1421.
- [9] A. Lavollè, A. De La Taille, C. Chahwan, et al., Extraperitoneal robot-assisted vesicourethral reconstruction to manage anastomotic stricture following radical prostatectomy, *Urology* 133 (2019) 129–134.
- [10] B. Dinerman, N. Hauser, J.C. Hu, R.S. Purohit, Robotic-assisted abdomino-perineal vesico-urethral anastomotic reconstruction for 4.5 centimeter post-prostatectomy stricture, *Urol. Case Rep.* 14 (2017) 1–2.
- [11] J.A. Cavallo, A.J. Vanni, G.W. Dy, S. Stair, N.A. Shakir, D. Canes, L.C. Zhao, Clinical outcomes of a combined robotic, transabdominal, and open transperineal approach for anastomotic posterior urethroplasty, *J. Endourol.* 35 (9) (2021 Sep) 1372–1377, <https://doi.org/10.1089/end.2020.0973>. Epub 2021 May 19. PMID: 33820448.