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Influence of Modified Posterior Reconstruction of the Rhabdosphincter on Early Recovery of Continence and Anastomotic Leakage Rates after Robot-Assisted Radical Prostatectomy

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Abstract

Background: Posterior reconstruction (PR) of the rhabdosphincter has been previously described during retropubic radical prostatectomy, and shorter times to return of urinary continence were reported using this technical modification. This technique has also been applied during robot-assisted radical prostatectomy (RARP); however, contradictory results have been reported.
Objective: We describe here a modified technique for PR of the rhabdosphincter during RARP and report its impact on early recovery of urinary continence and on cystographic leakage rates.
Design, setting, and participants: We analyzed 803 consecutive patients who underwent RARP by a single surgeon over a 12-mo period: 330 without performing PR and 473 with PR.
Surgical procedure: The reconstruction was performed using two 6-in 3-0 Poliglecaprone sutures tied together. The free edge of the remaining Denonvillier's fascia was identified after prostatectomy and approximated to the posterior aspect of the rhabdosphincter and the posterior median raphe using one arm of the continuous suture. The second layer of the reconstruction was then performed with the other arm of the suture, approximating the posterior lip of the bladder neck and vesicoprostatic muscle to the posterior urethral edge.
Measurements: Continence rates were assessed with a self-administrated, validated questionnaire (Expanded Prostate Cancer Index Composite) at 1, 4, 12, and 24 wk after catheter removal. Continence was defined as the use of "no absorbent pads." Cystogram was performed in all patients on postoperative day 4 or 5 before catheter removal.
Results and limitations: There was no significant difference between the groups with respect to patient age, body mass index, prostate-specific antigen levels, prostate weight, American Urological Association symptom score, estimated blood loss, operative time, number of nerve-sparing procedures, and days with catheter. In the PR group, the continence rates at 1, 4, 12, and 24 wk postoperatively were 22.7%, 42.7%, 91.8%, and 96.3%, respectively; in the non-PR group, the continence rates were 28.7%, 51.6%, 91.1%, and 97%, respectively. The modified PR technique resulted in significantly higher continence rates at 1 and 4 wk after catheter removal ($p = 0.048$ and 0.016, respectively), although the continence rates at 12 and 24 wk were not significantly affected ($p = 0.908$ and $p = 0.741$, respectively). The median interval to recovery of continence was also statistically significantly shorter in the PR group (median: 4 wk; 95% confidence interval [CI]: 3.39–4.61) when compared to the non-PR group (median: 6 wk; 95% CI: 5.18–6.82; log-rank test, $p = 0.037$). Finally, the incidence of cystographic leaks was lower in the PR group (0.4% vs 2.1%; $p = 0.036$). Although the patients' baseline characteristics were similar between the groups, the patients were not preoperatively randomized and unknown confounding factors may have influenced the results.
Conclusions: Our modified PR combines the benefits of early recovery of continence reported with the original PR technique with a reinforced watertight closure of the posterior anastomotic wall. Shorter interval to recovery of continence and lower incidence of cystographic leaks were demonstrated with our PR technique when compared to RARP with no reconstruction.

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1. Introduction

Excellent continence outcomes have been consistently reported after robot-assisted radical prostatectomy (RARP): the 1-yr continence rate reaches >90% in most of the large, single-center, prospective studies [1,2]. However, the early recovery of urinary continence remains a challenge.

Reports on early continence differ widely, likely secondary to the lack of a standardized surgical technique, varied surgical experience, and discrepancies in the definition and assessment of urinary continence. Consequently, several technical modifications have been recently described in an attempt to improve early return of continence after radical prostatectomy (RP), including bladder neck preservation [3], incorporation of the striate urethral sphincter to the anastomosis [4], puboprostatic ligament sparing [5], tubularization of the bladder neck [6], and posterior reconstruction (PR) of the rhabdosphincter [7,8]. Among these techniques, PR is currently the most widely adopted by the highest-volume RARP centers.

The PR technique, as described by Rocco and colleagues [7,8], consists of a two-step reconstruction with apposition of rhabdosphincter to the remaining Denonvillier's fascia (first step) followed by fixation of the Denonvillier's fascia median raphe complex to the posterior bladder neck (second step). The purpose of the reconstruction is to avoid caudal retraction of the sphincteric complex, preserving the urethra in its anatomic and functional position in the pelvic floor. Shorter time to recovery of urinary continence was reported by Rocco et al [7,8] in an open RP series when compared to a historical control group. The technique was subsequently reported by the same authors during laparoscopic RP, and similar improvement on early recovery of urinary continence was shown [9].

The PR technique recently has been applied during RARP with several technical modifications and inconsistent results [10–18]. The only randomized trial evaluating continence outcomes after reconstruction of the periprostatic tissues during RARP showed no improvement in early continence rates. Notwithstanding, the authors have noticed a secondary benefit of this technique in decreasing the anastomotic leak rates [12]. Nevertheless, the technique described in this study was different from the two-step reconstruction originally reported by Rocco et al [7–9].

We describe here a modified technique for PR of the rhabdosphincter during RARP and report its impact on early recovery of urinary continence and on cystographic leakage rates.

2. Materials and methods

We analyzed 803 consecutive patients who underwent RARP over a 12-mo period: 330 without performing PR and 473 with PR. The data were prospectively collected in a customized database and retrospectively analyzed. All the procedures were performed by a single surgeon (VRP). Our ethics committee approved the prospective collection of the data and all patients provided written informed consent. The characteristics of patients included in the study are shown in Table 1.

Continence rates were assessed with the self-administrated validated Expanded Prostate Cancer Index Composite (EPIC) questionnaire [19] at 1, 4, 12, and 24 wk after catheter removal. The questionnaire was administered either at the follow-up office visit or via e-mail. The definition of continence was based on patients' responses to the questionnaire item selected to reflect the range of incontinence severity (ie, "How many pads or adult diapers per day did you usually use to control leakage during the last 4 weeks?"). Continence was defined as the use of no pads. The number of weeks after catheter removal until continence was recovered was also assessed and recorded.

2.1. Surgical technique

All cases were carried out using a transperitoneal six-port technique, as described by the authors previously [20]. An anterior approach was adopted by dissecting the Retzius space and ligating the dorsal venous complex. A periurethral suspension stitch was then placed [21] in all patients. This step was followed by bladder neck dissection and athermal mobilization of the seminal vesicles. A nerve-sparing (NS) procedure was performed, as a rule, in patients with cT1–cT2a prostate cancer, biopsy Gleason score ≤7, and preoperative Sexual Health Inventory for Men (SHIM) score >21. In selected patients with Gleason score ≥8 and small tumor volume, a NS procedure was also performed. The NS was modified and performed athermally with an early retrograde release of the neurovascular bundle [22].

In the PR group, a modified PR technique was carried out prior to vesicourethral anastomosis. The reconstruction was performed using two 3-0 Poliglecaprone sutures (on RB-1 needles) tied together, with each individual length being 12 cm. Ten knots were placed when tying the sutures to provide a bolster. The free edge of the remaining Denonvillier's fascia was identified after the prostatectomy and approximated to the posterior aspect of the rhabdosphincter and the posterior median raphe using one arm of the continuous suture. As a rule, four passes are taken from the right to the left and the suture is tied

Table 1 – Patients' baseline characteristics

Patients' characteristics	Without reconstruction	Posterior reconstruction	*p* value
Patients, *n*	330	472	–
Age, yr, median (IQR)	61 (57–67)	61 (55–66)	0.101
BMI, kg/m^2, median (IQR)	28 (25–30)	28 (26–31)	0.135
PSA level, ng/ml, median (IQR)	5 (3.8–6.6)	4.9 (3.9–6.7)	0.801
AUA-SS, median (IQR)	6 (3–12)	7(3–12)	0.666
Biopsy Gleason score, No. (%)			
≤6	183 (55.6)	279 (58.9)	0.601
7	120 (36.3)	157 (33.2)	
≥8	27 (8.1)	37 (7.9)	

IQR = interquartile range; BMI = body mass index; PSA = prostate-specific antigen; AUA-SS = American Urological Association symptom score.