Balancing continence function and oncological outcomes during robot-assisted radical prostatectomy (RARP)

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• A critical point in the evaluation of the radical prostatectomy (RP) outcomes is whether patients who obtain good cancer control also obtain good functional results.
• Specifically, urinary continence recovery seems to have a more relevant impact on the patient's health-related quality of life in comparison with potency recovery. Moreover, this functional outcome is relevant for all patients who underwent RP regardless of the execution of a nerve-sparing approach to preserve potency.
• Data coming from robot-assisted RP (RARP) series show excellent results for early and definitive urinary continence recovery and for negative surgical margins. Unfortunately, no data are available about the combination of these two relevant outcomes after RARP.
• In this review article, we describe our surgical technique to minimize the risk of urinary incontinence and positive surgical margins and summarize data concerning continence recovery and early oncological outcomes after RARP.

What's known on the subject? and What does the study add?
In the last decade, the desire to reduce the invasiveness of traditional open and laparoscopic surgery and, above all, the attempt of achieving better functional results, produced the increased interest in and the popularity of robotic techniques both in Europe and the USA.

In the present study we reported on our original surgical technique, and our perioperative, functional and oncological results, as well as on data from the most important published studies.

KEYWORDS

continence, prostatectomy, outcomes

INTRODUCTION

The wide diffusion of the opportunistic PSA-screening caused a significant increase in the number of prostate cancer diagnoses in young man with long life expectancy. Therefore, the ideal treatment should render patients cancer-free minimizing the potential side effects. Radical prostatectomy (RP) is the recommended surgical treatment for patients with a life expectancy of >10 years and clinically localized prostate cancers [1]. The most common side-effects of this procedure are represented by urinary incontinence (UI) and erectile dysfunction. Although the main aim of the robot-assisted laparoscopic prostatectomy (RALP) procedure remain reaching a complete extirpation of the primary tumour, the patients satisfaction can be negatively affected by the presence of UI and/or erectile dysfunction during the follow-up. Therefore, a critical point in the evaluation of the RP outcomes is whether patients who obtain good cancer control also obtain a good functional result. This is a relevant issue considering that UI and erectile dysfunction can have a significant negative impact on the patient's health-related quality of life.

Anatomical retropubic RP (RRP), described by Walsh *et al.* [2] in 1982, has been the most commonly used surgical treatment for clinically localized prostate cancer for many years. In the past decade, the desire to reduce the invasiveness of traditional open surgery and, above all, the attempt of achieving better functional results produced the increased interest and popularity of laparoscopic techniques, both in Europe and the USA. Specifically, optical magnification has been considered one of the strongest advantages of traditional laparoscopy in achieving better results for urinary continence and potency recovery after RP. In addition, robotic technology allows surgeons meticulous, precise and accurate movements, fundamental to achieve preservation of the key anatomical structures for urinary continence and potency, and minimize perioperative complications [3].

Besides preoperative factors like age, morbidity and history of the patient, surgical factors can influence the time of urinary continence recovery after RP. In surgery for prostate cancer, there is the duality of cancer control vs functional outcome. Some surgical manoeuvres finalised to maximize the urethral stump and/or the cavernosal nerves preservation could increase the risk of iatrogenic positive surgical margins (PSMs) further negatively influencing the oncological outcomes.

In the present paper, we describe our surgical technique to minimize the risk of UI and PSMs and we summarize data concerning continence recovery and early oncological outcomes after RARP.

PERSONAL SURGICAL TECHNIQUE

The patient's legs are placed in a semi-lithotomy position and a transurethral catheter is indwelled. A 12-mm trocar is inserted into the supra-umbilical incision site (Primary or camera port). The remaining ports are placed under direct camera supervision. Two 8-mm instrument trocars are placed about 7–10 cm (one hand breadth) lateral of the umbilicus in the direction of the anterior superior iliac spine. A 5-mm assistant port is placed lateral to the camera port and superior to the right robotic port. A second 12-mm assistant port is placed 7–10 cm directly lateral to the right robotic port. A third 8-mm robotic port (for the fourth arm) is placed 7–10 cm lateral to the left robotic port 2 cm above and anteriorly to the anterior superior iliac spine. The patient is now placed in a 30° Trendelenburg position, the robot is brought in between the legs and docked.

The opening of the peritoneum is made in a triangular space, which is defined by the umbilical ligament, the vas deferens and the abdominal wall. The hot shears are used to incise the peritoneum lateral to the grasped ligament to access the retropubic space. This peritoneal incision is done in the described triangle and carried down to the vas deferens. The space is opened using simple divergent traction of the graspers. It is continued to the lateral pelvic wall, until the endopelvic fascia is seen at the bottom bilaterally. The bladder is now freed laterally on the contralateral side, the urachus is cut and the bladder is completely detached. The bladder neck region is defatted.

The puboprostatic ligaments, prostate, prostatovesical junction, and bladder are clearly defined. The endopelvic fascia is incised on its line of reflexion to gain access to the lateral surface of the prostate gland in close contact with the fibres of the levator ani muscles. A holding stitch (2/0 polyglactin 910) is placed in the mid prostate and the prostate is lifted up with the fourth arm. The bladder neck becomes visible as an 'inverted V' on the prostate.

Using the bipolar forceps, the bladder is bluntly pulled medially just beyond the junction with the prostate. The combination of gentle superior retraction of the bladder with traction on the catheter shows a clear outline of the prostatovesical junction.

After deflation of the catheter balloon, the bladder neck is dissected using the hot shears with a lateral approach. The plane between the bladder neck and the prostate is identified laterally, on both sides of the bladder neck, by following the curved contours of the prostatic base. The bladder and prostate are retracted and the prostatovesical junction is identified, and the dissection is completed until the postero-lateral fatty window to the pre-seminal vesicles area is reached.

Anteriorly, the bladder neck incision is made in the midline and deepened, the Foley catheter is encountered and the bladder is entered. As soon as the catheter is visible, it is grasped by the robotic fourth arm using a prograsp forceps through the eye of the catheter. The robotic arm then pulls the catheter cephalad and anteriorly to prepare the posterior dissection.

With meticulous dissection, the posterior bladder neck is incised under direct vision. After the incision of the bladder neck, the anterior muscular layer of the Denonvilliers' fascia (vesico-prostatic muscle) is encountered.

A transverse incision is made on the anterior Denonvilliers' fascia close to the prostate. There should be minimal use of cautery in the area of the seminal vesicles, to avoid injury to cavernosal nerves. After isolation of the vas deferens, it is divided and the severed end is grasped to provide upward and cranial traction to dissect the vesicles. The tip of seminal vesicles is mobilized by clipping its arterial blood supply, then the seminal vesicles are dissected laterally. The remaining arterial branches supplying the seminal vesicles should be clipped and divided.

In low-risk patients where nerve preservation is feasible, the posterior layer of Denonvilliers' fascia (which contains communicating nerve fibres) is left on the rectum while in high-risk patients it is included with the specimen. The fourth arm is used to elevate the prostate superiorly and cranially by grasping the left seminal vesicle, while the assistant grasps the right seminal vesicle. An incision in Denonvilliers' fascia is made a few millimetres below the base of the prostate. The posterior Denonvillers' fascia has a characteristic pearly white appearance. Once incised, the peri-rectal fat is visible covering the fascia propria of rectum and the incision is continued on the Denonvillers' fascia laterally along the entire width of prostate. The rectum can be separated from the prostate using scissors, under direct vision. The fascial space is dissected down all the way to the apex and laterally over the neurovascular bundles (NVBs).

The NVB should be released at least partially before division of the pedicles is begun. The dissection is accomplished between the prostate capsule and endopelvic fascial covering. The visceral leaflet of the endopelvic fascia covering the prostate is incised towards pubo-prostatic ligaments or prostate apex. By doing so, a subtle groove appears on the postero-lateral edge of the prostate, which helps to direct the dissection of the bundle toward the urethra. This manoeuvre releases the bundle laterally and the NVB stands out and is progressively separated from the prostate. In high-risk patients, where a nerve-sparing approach is not recommended, this step is not performed.

Once the NVBs lateralised, the remnants of the attachments of the bladder to the lateral base of the prostate can be safely clipped and cut. The prostatic vascular pedicles are separated by a thin fat plane from the postero-lateral NVBs. Upward, cranial and contralateral traction on the vas deferens and seminal vesicle exposes the lateral prostate pedicles. The pedicles are then dissected so that large Hem-o-lock clips can be placed to secure them. The dissection is carried along the lateral aspect of the prostate towards the apex under the endopelvic fascia, retracting the prostate medially. Small arterial and venous branches originating in the bundles and running towards the prostate (perforating branches) are secured with 2-mm clips. Both sharp and blunt dissection is performed and the NVBs are swept laterally. The dissection is continued on both sides, until the prostatic apex is reached, ensuring the complete release of the NVBs. The specimen is now attached only by urethra and dorsal vein

FIG. 1. Tangential division of dorsal venous complex. The puboprostatic ligaments and the dorsal vein complex are divided tangentially close to the prostate until the avascular plane separating the urethra from the venous complex is reached.

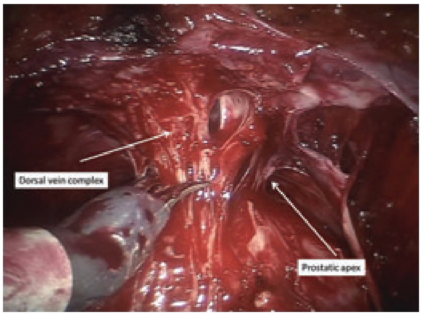
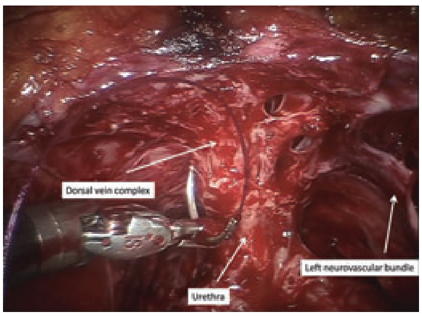


FIG. 2. The dorsal venous complex is ligated in a running fashion with a 3/0 poliglecaprone 25 suture on an UR-6 needle, passing the needle under the dorsal vein complex in a cephaled direction.



complex. In high-risk patients, after ligation and division of prostatic pedicles, the prostatectomy is continued anteriorly with an extra-fascial technique, with resection of the prostatic fascia and of the NVBs up to the apex.

The prostate is pulled cephalad and the intra-abdominal pressure increased to 20 mmHg. The puboprostatic ligaments and the dorsal vein complex are divided tangentially close to the prostate until the avascular plane separating the urethra from the venous complex is reached (Fig. 1). After completion of the dissection, the dorsal venous complex is selectively ligated in a running fashion with a 3/0 poliglecaprone 25 suture on an UR-6 needle, passing the needle under the dorsal vein complex in a cephalad direction (Fig. 2).

FIG. 3. Apical and urethral dissection.

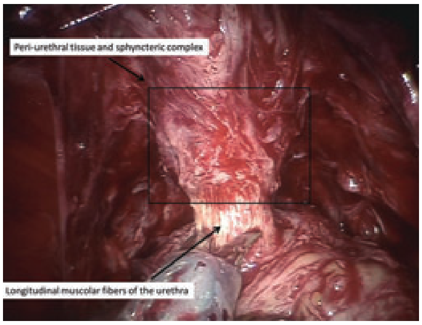
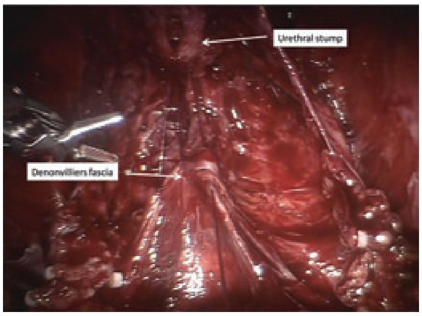


FIG. 4. Posterior muscolo-fascial plate reconstruction: The posterior layer of Denonvilliers' fascia is sutured to the posterior sphincter complex by a running suture (3/0 poliglecaprone 25 on UR-6 needle) from left to right.



At the apex, the urethra is clearly recognisable, but the best way to visualize the urethra is to dissect along the contour of the prostate around the apex very closely. Division on both sides of the apical pillars (Walsh pillars) and pushing fascia to delineate urethra allows the urethra to stand out quite distinctly. The dissection is extended distally to avoid cutting into a lip of posterior prostate (follow the contours or shape of apex of the prostate, which may vary). The lateral dissection separates any residual attachment between the NVBs and lateral surface of the prostate. The anterior urethral wall is opened just below the apical limit, exposing the Foley catheter. The posterior wall and the underlying recto-urethralis muscle are then divided close to the prostate with a cold knife while retracting the prostate cephalad. The division of the recto-urethralis muscle completely frees the specimen, which is placed in an Endobag sac. The prostate gland is left inside for removal at the end of procedure through the supra-umbilical port.

The posterior layer of Denonvilliers' fascia (fibrous layer) is sutured to the posterior sphincteric complex by a running absorbable barbed suture (3/0 V-loc^{TM} on UR-6 needle) from left to right (Fig. 3). This suture is then continued back to left in a second layer incorporating the anterior layer of Denonvilliers' fascia (muscular) into the posterior urethro-vesical anastomosis. This restores the posterior anatomy connecting the fascia to urogenital diaphragm (Fig. 4). This anastomosis is then continued to the left until the 9 o'clock position. A second absorbable barbed suture is now used from this location back to the right oversewing and thus reinforcing the posterior anastomosis. The anastomosis is continued upwards with the two sutures from both sides until the anastomosis is completed. Some perivesical fat is placed in these barbed sutures with an extra stitch and both are cut. A 18 F catheter is placed into the bladder and the balloon is filled with 10 mL of water.

URINARY CONTINENCE RECOVERY AFTER RALP

More data on the return to continence after RALP are available from surgical series and only few studies compared this approach with the traditional laparoscopic RP or with open RRP [4]. The reported continence rates ranged from 30% to 89% at 3 months, from 50% to 95% at 6 months and from 62% to 97% at 12 months [5]. Table 1 summarises the 12-month urinary continence recovery in the main published series (Table 1). Regarding the continence definition, most of the authors considered those patients who did not use pads after RP to be continent. The main confounding factor is represented by the classification of patients using security pads. Numerous studies included these patients as continent. Notably, most of the studies used non-validated questionnaires or patient-interview to assess urinary continence, which can significantly contribute to the heterogeneity of results. Interestingly, Shikanov *et al.* [12] evaluated a small group of patients undergoing bilateral nerve-sparing RALP, comparing different subjective and objective definitions of continence. In that evaluation 98% of the patients declared no pad use at the 24-month follow-up visit. However, only 80% of patients were considered continent based on their answer to the The University of California Los Angeles Prostate Cancer

Index questionnaire given at the same time. These figures reconfirm the importance of using validated questionnaires to evaluate the return to continence after RALP to obtain objective, reproducible and comparable data.

For the available comparative studies, the data are very limited, and we found only few reports that used validated questionnaires to evaluate urinary continence. Initially, Tewari *et al.* [13] showed an earlier recovery of urinary continence in patients treated with RALP than in those treated with RRP. The time needed to reach urinary continence was 160 days after RRP and 44 days after RALP ($P <$ 0.001). By contrast, no significant differences in 3-month and 12-month urinary continence recovery were reported in series by Ahlering *et al.* [14] and Krambeck *et al.* [10], respectively. In 2009, Ficarra *et al.* [15] published the results of a prospective, non-randomized study comparing RRP and RALP. After a 12-month minimum follow-up, 88% of patients in the RRP group and 97% of those in the RALP group were continent ($P = 0.01$). Specifically, the mean time to continence was 75 days in the RRP group and only 25 days in the RALP group, respectively ($P < 0.001$) [15]. In the same year, Rocco *et al.* [16] published a study comparing RALP with a historical control group of patients who underwent RRP. They reported at 6- and 12-month after surgery significant advantages in terms of urinary continence recovery in favour of RALP. More recently, the advantages of RALP in terms of urinary continence recovery has also been reported by Di Pierro *et al.* [17] comparing 47 patients who underwent RRP and 22 receiving RALP after 12-month follow-up.

The results of these available comparative studies do not confirm data coming from the Surveillance, Epidemiology and End Results dataset [18]. In 2009, Hu *et al.* [18] reported that patients undergoing minimally invasive RP had a higher chance of being diagnosed with UI, compared with those having RRP, although the subsequent rate of treatments for UI were similar in the two groups. The results of this last population-based study must be considered with caution due to several issues, including use of coding of UI or erectile dysfunction, non-standardized outcome definitions, and lack of essential information such as

TABLE 1 12 Month urinary continence recovery reported in the main published RARP series [modified from 6]

Reference	Origin	Cases	Follow-up, months	Definition	Continence, %
Menon *et al.* 2007 [7]	USA	2652	12	0 pads	84
Patel *et al.* 2007 [8]	USA	500	12	0 pads	97
Zorn *et al.* 2007 [9]	USA	300	12	0 pads	90
Badani *et al.* 2007 [10]	USA	1110	12	0 pads	93
Krambeck *et al.* 2009 [11]	USA	286	12	0 pads	92
Novara *et al.* 2010 [5]	Europe	208	12	No leak at ICIq-SF	90.4
Overall					**89 (70–97)**

patient's preoperative status. Moreover, the analysis explored only data prior to 2007 and is therefore significantly influenced by the learning curve of numerous centres.

Most data concerning preoperative predictors of the return to continence are from RRP series. Age was considered as the most important factor associated with urinary continence recovery. A population-based longitudinal cohort study including >1200 men treated with RRP showed that age was significantly associated with continence rates. Specifically, patients aged <60 years were shown to have a better chance of continence [19]. Conversely, another large prospective study evaluating urinary continence after RRP using an non-validated questionnaire, failed to identify age as a predictor of continence [20]. Recently, Novara *et al.* [5] published the first study evaluating the predictors of urinary continence in patients who underwent RALP. In that study, the multivariable analysis showed that only patient age and Charlson comorbidity index were significantly associated with 12-month continence status, while only a non-statistically significant trend was noted for patient body mass index [5]. Because no other study has evaluated the factors predictive of continence recovery after RALP this finding cannot be compared with previous data. The finding that the Charlson comorbidity index can be useful in predicting the continence rate is the most original contribution coming from this European study.

An accurate dissection of the prostatic apex preserving puboprostatic ligaments, sphincter and membranous urethra, continence nerves, cavernosal nerves and bladder neck has been proposed to improve urinary continence recovery in patients who undergo RP. For surgical technique several technical variations have been described to improve early continence rates after RRP. Many of these techniques have subsequently been used in RALP, including periurethral retropubic suspension stitch [21], posterior bladder neck reinforcement, and reconstruction of Denonvilliers' musculo-fascial plate (Rocco stitch) [22]. Recently, Coelho *et al.* [23] described a modified posterior reconstruction technique reporting in a comparative, non-randomized study a shorter interval to continence recovery and lower incidence of cystographic leaks compared with RALP without reconstruction. Conversely, in another prospective, non-randomized, comparative study, Joshi *et al.* [24] showed no significant difference in any of the analysed outcome measures. Specifically, posterior reconstruction of the musculofascial complex does not appear to improve early UI after RALP. The single available randomized controlled trial evaluating the efficacy of periprostatic tissue reconstruction during RALP failed to show any statistically significant advantage of this technique [25].

ONCOLOGICAL OUTCOMES AFTER RALP

One of the aims of the new laparoscopic techniques is to reach oncological outcomes similar to those reported with traditional open surgery. Biochemical disease-free survival (bDFS), cancer-specific survival, and overall survival are the main oncological outcomes in patients receiving a curative treatment for prostate cancer. However, considering the long natural history of most prostate cancers, biochemical recurrence

TABLE 2 *PSMs rates reported in the main RARP series [modified from 6 and 26]*

References	Origin	Cases, *n*	PSM rate, % Overall	pT2	pT3
Cathelineau *et al.* 2004 [27]	Europe	105	22	12	43
Atug *et al.* 2006 [28]	USA	140	26	18	
Joseph *et al.* 2006 [29]	USA	325	13	10	27–37
Van Appledorn, 2006 [30]	USA	150	17		
Borin *et al.* 2007 [31]	USA	400	12.5	6	19–40
Menon *et al.* 2007 [7]	USA	2652	13	1.5	
Mottrie *et al.* 2007 [32]	Europe	184	16	2.5	
Zorn *et al.* 2007 [9]	USA	300	21	15	52
Badani *et al.* 2007 [10]	USA	2766	13		
Jaffe *et al.* 2008 [33]	Europe	278	20		
Tewari *et al.* 2008 [34]	USA	700		5.4	
Chan *et al.* 2008 [35]	USA	660	18	11	45
Patel *et al.* 2008 [36]	USA	1500	9	4	34
Murphy *et al.* 2009 [37]	Australia	400	19	9.6	42
Ficarra *et al.* 2009 [4]	Europe	322	29	10	57
Ham *et al.* 2009 [38]	USA	321	33		
Jaffe *et al.* 2009 [39]	USA	362	20		
Coelho *et al.* 2010 [40]	USA	876	11.5	6–8	26–30

after RP is the most frequently used surrogate end-point. Moreover, due to the fact that long-term oncological follow-up for RALP is still unavailable, PSM rate has been considered an important early outcome in evaluating the oncological safety of these new minimally invasive techniques.

SURGICAL MARGINS STATUS

The presence of a PSM is an independent risk factor for local disease recurrence, need for salvage treatment, and biochemical recurrence. Moreover, this parameter was used as a surrogate parameter to evaluate the quality of the surgical technique, mainly in pathologically organ-confined disease. In a recent review of the literature, we found that overall PSM rates ranged from 9% to 29% in the most important RALP series. Specifically, PSM rates were between 1.5% and 18% in pathologically organ-confined disease and between 19% and 57% in locally advanced disease (Table 2). Results reported in comparative studies were similar to those presented in surgical series. Cumulative analysis of the comparative studies published until 2008 reporting data on margin status showed statistically significant differences in favour of RALP. These data seem to indicate a potential advantage for the robotic approach in reducing PSM compared with RRP [4]. However, comparative studies published in the last 2 years have shown conflicting results. Some studies confirmed previous results reporting better results in patients who had RALP compared with RRP considering both overall PSMs and PSMs in pathologically organ-confined disease [17,41]. Conversely, other authors showed that patients who underwent RALP were more likely to have PSM compared with those having RRP [41,42]. Interestingly, Williams *et al.* [42] reported a significantly lower PSM rate in men undergoing nerve-sparing RRP as compared with those having nerve-sparing RALP, whereas the opposite trend was noted for men undergoing a non-nerve-sparing approach. Similarly, Magheli *et al.* [43] reported statistically significant advantages in favour of open surgery for overall PSMs. However, stratifying the data according to pathological stage of primary tumor, PSM rates were overlapping in pT2 tumours and in favour of RRP in pT3 cases. Nevertheless, the most relevant data coming from a recent literature review is that most recent studies documented overlapping PSM rates between RRP and RALP, without significant differences also in terms of site location of PSM [26].

The presence of tumour at the inked margin in an organ-confined tumour could be considered an iatrogenic condition, above all in pathologically organ-confined disease. This concept suggests that a PSM could have been avoided with wider dissection or, conversely, they could be related to a more conservative procedure finalised to preserve a maximum of cavernosal nerves and striated sphincter. The available data from RALP series concerning PSMs location are limited and conflicting. Smith *et al.* [44] reconfirmed in their series that PSMs were most commonly found at the apex (12%), followed by posterior (5.5%) and anterior (3%) locations. Conversely, Zorn *et al.* [9] found posterolateral PSMs in 12.3% of cases, and apex PSMs in 5%. Similar data showing a predominant PSMs location at the posterolateral level were reported in another two studies [4,7]. It is possible that the percentage of detected PSMs and their prevalent location is correlated with the performed surgical technique. Specifically, it is possible that the higher percentage of posterolateral PSMs reported in RALP series is due to the wider diffusion of the intrafascial nerve-sparing technique in the era of robotic surgery.

BDFS

Interpretation of results in terms of bDFS needs to consider the PSA threshold used to define failure or recurrence. Available series reporting bDFS results adopted very different PSA threshold points, ranging from 0.1 to 0.4 ng/mL and rising further. In 2007, Menon *et al.* [7] reported the oncological data of 1142 cases with a minimum follow-up of 12 months (median 36 months, range 12–66). In this large series the 5-year bDFS was 91.6%. This result was influenced by preoperative PSA level and biopsy Gleason score. In 2009, Murphy *et al.* [37] reported a 5-year bDFS of 74% in a series of 400 patients with a mean follow-up of 22 months after RALP. In 2010 Menon *et al.* [45] published the oncological results of 1384 consecutive patients with a median follow-up of 5 years after RALP. The actuarial bDFS estimates at 3, 5, and 7 years were 90.6, 86.6 and 81.0%, respectively. Pathological Gleason grade 8–10, and pathological stage T3b/T4 were the most relevant independent predictors of disease recurrence [45].

Recently, we performed an update of the oncological results of our initial cohort of 184 patients treated from February 2003 to December 2005. After a minimum follow-up of 60 months, the 3-, 5-, and 7-year bDFS estimates were 94, 86 and 81%. Specifically, the 5-year bDFS was 93% in pT2 tumors; 84% in pT3a and 43% in pT3b. According to pathological Gleason Score, the 5-year bDFS estimates were 90% in cancer with Gleason score 2–6, 86% in those with Gleason score 7, and 65% in those with Gleason score 8–10. There was also a statistical significant difference after data stratification according to surgical margins status. The 5-year bDFS was 88% in patients with negative surgical margins and 74% in those reporting PSMs (unpublished data).

Only few comparative studies are available. In 2008, the Duke Prostate Center showed that the risk of PSA recurrence for patients undergoing RALP or RRP was not significantly different after adjusting for clinical and pathological covariates [46]. In another comparative study, the 5-year PSA-free survival estimates were 87.8% after RRP, 88.1% after LRP and 89.6% after RALP, without any statistical difference among the three approaches [47]. Overlapping bDFS estimates among the three different approaches were also reported by Magheli *et al.* [43].

Similarly to previous studies, Barocas *et al.* [48] reported comparable effectiveness for RALP and RRP. At a median follow-up of 10 months, overall 3-year bDFS estimates were similar between the two groups. Similar figures were obtained also stratifying by stage, grade and margin status [48]. Finally, Di Pierro *et al.* [17] reported similar 12-month PSA recurrence after RALP and RRP in a centre with a limited caseload.

BALANCING URINARY CONTINENCE AND ONCOLOGICAL OUTCOMES

The appropriate preoperative counselling should be based on an accurate estimate of three main factors represented by cancer control, urinary continence and potency recovery. The need to combine the main RP outcomes was initially proposed and supported by Salomon *et al.* [49] in 2003. In 2005, Bianco *et al.* [50] proposed to combine bDFS, urinary and potency recovery rates into the 'trifecta' outcomes to identify patients who reached the ideal result after RRP. In patients who underwent RALP trifecta were reached in 57–91% of cases [12,51–53]. The more relevant aspect influencing negatively the trifecta results is represented by the potency recovery. Moreover, trifecta outcomes were evaluated only in a limited subgroup of patients preoperatively potent and continent and performing bilateral nerve-sparing RP. Therefore, we have no data about the combined results including only continence recovery and oncological outcomes (PSMs and bDFS). This information could be of special interest considering the potential correlation between the sphincter preservation and the risk of apical PSMs. The critical evaluation of the available data seems to show a wide variability in the correlation between these two parameters. It is possible to consider that the most important factor remains the surgical technique and the surgeon's experience to adequately balance the risk of an incomplete tumour excision and a 'good' sphincter preservation above all at apex level.

CONCLUSIONS

Data concerning oncological outcomes after RALP does not seem to be influenced by the surgical manoeuvres performed to preserve the anatomical structures involved in urinary continence recovery. The prevalence of PSMs at the prostate apex is very low and it does not seem to be in relationship with the higher percentages of urinary continence recovery reported in the main RALP series. The only surgical aspect correlated with an increasing risk of PSMs seems to be the execution of an intrafascial nerve-sparing technique. Reporting of combined outcomes after RALP focused above all the trifecta aspects. Therefore, we have no specific information concerning the combination of the oncological outcomes and urinary continence preservation in those patients who were either preoperatively impotent or received a non-nerve sparing procedure.

CONFLICT OF INTEREST

None declared.

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Abbreviations: **(RA)(R)RP**, (robot-assisted) (retropubic) radical prostatectomy; **RALP**, robot-assisted laparoscopic prostatectomy; **UI**, urinary incontinence; **PSM**, positive surgical margins; **NVB**, neurovascular bundles; **bDFS**, biochemical disease-free survival.