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Retzius-Sparing versus Standard Robot-Assisted Radical Prostatectomy: A Comparative Prospective Study of Nearly 500 Patients

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Abbreviations and Acronyms

BCR = biochemical recurrence
EQ-5D-3L = European QoI Group five-dimensional questionnaire
ICIQ-MLUTS = International Consultation on Incontinence Questionnaire - Male Lower Urinary Tract Symptoms
IIEF-5 = International Index of Erectile Function questionnaire
NS = nerve sparing
PROMs = patient reported outcome measures
PSA = prostate specific antigen
PSM = positive surgical margin
QOL = quality of life
RARP = robot-assisted radical prostatectomy
RS-RARP = Retzius sparing robot-assisted radical prostatectomy
UI = urinary incontinence

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Purpose: We compared standard robot-assisted radical prostatectomy and Retzius-sparing robot-assisted radical prostatectomy in a multicenter study using prospective patient reported outcome measures of functional recovery and quality of life plus standard pentafecta outcomes.

Materials and Methods: Patient and physician reported data on 483 patients who underwent robot-assisted radical prostatectomy and Retzius-sparing robot-assisted radical prostatectomy from August 2017 to April 2020 by 3 experienced surgeons had been prospectively collected. Perioperative and pentafecta outcomes were analyzed using SPSS software. Patient reported outcome measures for urinary function, erectile function and quality of life were reported at baseline and at 7 days and 1, 3, 6, 9 and 12 months postoperatively.

Results: A total of 201 patients underwent robot-assisted radical prostatectomy and 282 had Retzius-sparing robot-assisted radical prostatectomy. Patient and tumor characteristics were similar except for fewer low risk and more intermediate risk disease in robot-assisted radical prostatectomy vs Retzius-sparing robot-assisted radical prostatectomy ($p < 0.001$). High risk disease was similar between groups ($p = 0.071$). Immediate urinary continence was higher in Retzius-sparing robot-assisted radical prostatectomy group (70.4% vs 58.1%, $p = 0.02$), with less nocturnal enuresis prevalence ($p = 0.011$) and bother ($p = 0.009$) with no significant differences afterwards. A better quality of life ($p = 0.004$) was reported 1 week after surgery. No other differences in functional or quality of life outcomes, perioperative parameters, complications or margin rates were found.

Conclusions: Retzius-sparing robot-assisted radical prostatectomy is associated with better immediate continence than anterior robot-assisted radical prostatectomy with no differences in longer-term functional recovery, quality of life or other important outcomes. The overall similarity in outcomes between groups lends support to the view that the surgical technique matters less than the surgeon performing it.

Key Words: prostatic neoplasms, prostatectomy, robotic surgical procedures

Robot-assisted radical prostatectomy is the most common surgical treatment for prostate cancer. Its success can be defined according to pentafecta outcomes of continence recovery, erectile function return, no complications, negative surgical margins and no biochemical recurrence at 1 year.[1] Urinary incontinence has a massive impact on quality of life and treatment satisfaction after radical prostatectomy.[2] The highest rates of UI and associated bother are noted during the first 12 months after surgery.[3] There is a wide

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variability of results reported in the literature partly due to the lack of uniformity in defining, assessing and reporting UI after radical prostatectomy. Furthermore, capturing patient reported outcome measures using validated questionnaires is far preferable to using physician reports with their inherent biases to evaluate functional compromise after surgery.[4]

There are 2 main approaches to perform RARP, the standard/anterior approach and the Retzius sparing/posterior. The RS-RARP was first described by Galfano et al.[5] The prostate is removed entirely through the rectovesical space resulting in preservation of all structures in the Retzius space.[6] This technique is also technically feasible in challenging surgical scenarios such as very large prostates/median lobes, postTURP, kidney transplant recipients and salvage prostatectomies.[7–9]

While better early functional outcomes have been described particularly with regards to urinary continence using RS-RARP,[10] it has been criticized for a higher positive surgical margin rate in some series, particularly for apical and anterior tumors.[11] However, recent data support the oncological safety of this technique even in high risk and pT3 disease,[12] conferring effective midterm cancer control similar to conventional RARP.[13,14] Hence, it appears that increased surgical experience with RS-RARP leads to lower PSM rates. The same is also true for complications.[10]

In this study, we provide the first comparative effectiveness report of prospective patient-reported outcome measures including QOL plus pentafecta outcomes in a multicenter series of patients that includes high risk prostate cancer who underwent RS-RARP and RARP by high volume United Kingdom (UK) surgeons beyond their learning curve.

PATIENTS AND METHODS

From August 2017 to April 2020, 483 consecutive patients underwent RARP or RS-RARP by 3 experienced robotic surgeons (more than 500 prior minimally invasive radical prostatectomies).

Patient Selection and Data Collection

All patients who underwent RARP or RS-RARP were included in the study regardless of clinicopathological features. The indication for one technique or the other was surgeon preference; one surgeon exclusively performed RARP, one exclusively RS, and one surgeon performed both techniques selecting RS-RARP cases based on nonanterior tumor location, without large median lobes, TURP defects or larger than 100 cc. The indication for pelvic lymph node dissection was by surgeon discretion, in consideration of European Association of Urology guidelines.[15] Nerve-sparing was performed according to standardized planning, based on patient baseline functional features, magnetic resonance imaging and clinicopathological findings. Selection criteria for Retzius-sparing surgery were based on surgeon discretion and patient choice but importantly did not exclude high risk cases or those with apical and anterior tumors.

The data were prospectively collected by the patient management software Carebit which was used to fully automate the generation, sending, and recording of completed questionnaires by patients at each time interval. This software was custom-built for this study and provided the opportunity for excellent data capture.

Surgical Technique

All patients underwent surgery with the daVinci® robotic system using the 4-arm configuration. A 25° to 30° Trendelenburg position was used in all cases and pneumoperitoneum was induced by an open Hasson technique. Six trocars were placed in a fan array configuration, and low-pressure surgery was possible with the use of the Airseal insufflation system.

In the RARP group the transperitoneal anterior approach was performed as described by Menon et al[16] or the Montsouris technique.[17] When indicated, NS was performed with a posterolateral release of the neurovascular bundles. In the RS-RARP group the posterior Retzius-sparing technique described by Galfano et al was used[5,10] with some modifications—not always using a peritoneal hitch stitch, sometimes using a Pansadoro stitch to retract the bowel and using a barbed suture for the anastomosis. When indicated, NS was performed using either an intrafascial or interfascial dissection based on preoperative magnetic resonance imaging planning. The vesicoprostatic junction was isolated and sectioned, sparing the bladder neck when deemed oncologically safe. The vesico-urethral anastomosis was performed with a Van Velthoven technique using 3-zero barbed sutures in both groups. A suprapubic catheter was placed at the end of the procedure in most RS-RARP and RARP patients though was used more commonly in the former group.

Evaluated Variables/Covariates and Study Endpoints

For each patient we prospectively collected clinicopathological, perioperative and complication variables (tables 1 through 3).

Patient reported outcome measures for quality of life, urinary and erectile function of patients treated with RARP and RS-RARP were recorded. The scores from the International Consultation on Urinary Incontinence on Male Lower Urinary Tract Symptoms and International Index of Erectile Function-5 questionnaires were recorded at baseline and at 1, 3, 6, 9 and 12-month followup, while the scores from the European QOL Group were recorded at these time points plus 1 week after surgery. Immediate urinary continence defined as 1 safety or no pad within 1 week of catheter removal and immediate potency defined as erections sufficient for intercourse within the first month after surgery were also measured.

The study endpoints were pentafecta outcomes (continence, potency, BCR, complications and PSM), PROMs of functional recovery, QOL and perioperative outcomes of RS-RARP and RARP.

Statistical Analysis

Statistical analysis was performed using SPSS® v.25.0 software. Descriptive statistics were performed for all clinicopathological variables. Categorical variables were presented as proportion and percentages while continuous variables were presented as mean and standard deviation or median and interquartile range. Chi-square and independent t-tests were used to compare categorical and

Table 1. *Patient and tumor characteristics*

	Overall		RARP		RS-RARP		p Value
			Patient Characteristics				
Total No.	483		201		282		
Age at surgery:							0.971
Mean±SD (range)	61.81±7.569	(38–80)	60.41±7.499	(42–80)	62.81±7.474	(38–79)	
Median (IQR)	62	(56–68)	60	(54–66)	63	(57–69)	
Body mass index, kg/m^2:							0.265
Mean±SD (range)	26.77±3.804	(17–39)	26.73±3.494	(19–39)	26.70±4.017	(0–39)	
Median (IQR)	26	(24–29)	26	(22–30)	26	(21–31)	
No. Charlson comorbidity index (%):							0.211
0	456	(94.4)	187	(93.0)	269	(95.4)	
1 or more		27 (5.6)	14	(7.0)	13	(4.6)	
Prostate volume, ml:							0.295
Mean±SD (range)	41.32±18.941	(15–151)	42.58±17.663	(17–134)	40.42±19.786	(15–151)	
Median (IQR)	37	(29–48)	37	(19–55)	36	(17–55)	
PSA (ng/dl):							0.297
Mean±SD (range)	9.42±16.634	(0.80–260)	10.38±16.604	(1.20–200)	8.75±16.652	(0.80–260)	
Median (IQR)	6.4	(4.6–9.1)	6.5	(4.6–9.2)	6.4	(4.6–9.1)	
No. previous abdominal surgery (%)	70	(14.5)	15	(7.4)	55	(19.5)	<0.001*
No. previous benign prostatic hyperplasia surgery (%)	14	(2.9)	7	(3.4)	7	(2.9)	0.518
No. previous prostate Ca surgery (%)	6	(1.2)	0	(0)	6	(2.1)	0.037*
No. neoadjuvant chemotherapy (%)	4	(0.83)	3	(1.5)	1	(0.4)	0.174
No. neoadjuvant hormone therapy (%)	23	(4.8)	12	(6)	11	(3.9)	0.292
			Tumor Characteristics				
No. Gleason score (%):							
6	48	(9.94)	4	(2.0)	44	(15.6)	<0.001*
7 (3+4)	263	(54.5)	118	(58.7)	145	(51.4)	0.113
7 (4+3)	105	(21.7)	49	(24.4)	56	(17.7)	0.235
8–10	67	(13.9)	30	(14.9)	37	(13.1)	0.572
Cores:							
Taken:							
Mean±SD (range)	20.08±11.003	(1–75)	20.37±10.619	(1–55)	19.97±11.164	(2–75)	0.109
Median (IQR)	18	(12–25)	20	(12–24)	17	(12–26)	
Involved:							
Mean±SD (range)	7.16±5.306	(1–62)	8.15±4.984	(1–32)	6.78±5.384	(1–62)	0.325
Median (IQR)	6	(6–9)	7	(5–11)	6	(4–9)	
Max length:							
Mean±SD (range)	7.18±4.182	(0–20)	8.26±4.999	(0–20)	6.76±3.74	(1–20)	<0.001*
Median (IQR)	7	(4–10)	8	(5–11)	7	(4–10)	
No. D'Amico risk (%):							
Low	35	(7.3)	3	(1.5)	32	(11.3)	<0.001*
Intermediate	284	(58.8)	139	(69.2)	145	(51.4)	<0.001*
High	164	(33.9)	59	(29.4)	105	(37.2)	0.071
No. cT stage (%):							
cT1c	190	(39.3)	85	(42.3)	105	(37.2)	0.262
cT2	218	(45.1)	97	(48.3)	121	(42.9)	0.244
cT3	75	(15.5)	19	(9.5)	56	(19.9)	0.002*

*Statistically significant.

continuous variables, respectively. Nonparametric Mann-Whitney U tests were used to compare ordinal variables. A p value of <0.05 was considered significant and all p values were 2-sided. The EQ-5D-5L questionnaire index scores were calculated using the UK value sets.[18]

RESULTS

Patient and Tumor Characteristics

A total of 201 patients underwent RARP and 282 had RS-RARP. There were no differences in age (60 vs 63, p=0.971), body mass index (26 vs 26, p=0.265), Charlson score (Charlson score=0 was 93% vs 95.4%, p=0.211), preoperative PSA (6.5 and 6.4, p=0.297), previous benign prostatic hyperplasia surgery (3.4% vs 2.9%, p=0.518), as well as neoadjuvant chemotherapy (1.5% vs 0.4%, p=0.174) and hormonotherapy (6% vs 3.9%, p=0.292) in RARP and RS-RARP groups, respectively. Previous abdominal surgery (7.4% vs 19.5%, p <0.001) and previous prostate cancer treatment (0% vs 2.1%, p=0.037) rates were higher in the RS-RARP group.

There were more patients with Gleason 6 disease at biopsy in the RS-RARP group (2% vs 15.6%, p <0.001) with no statistically significant differences reported among other Gleason groups. The number of biopsy cores taken (20 and 17, p=0.109) and involved (7 and 6, p=0.325) as well as the mean max core length (8.26 vs 6.76 mm, p <0.001) were clinically similar in the RARP and RS-RARP groups, respectively. By D'Amico classification,

Table 2. *Perioperative outcomes*

	Overall	RARP	RS-RARP	p Value
Total No.	483	201	282	
Operative time, mins:				<0.001*
Mean±SD (range)	143±36.934 (60–350)	134±37.863 (60–350)	149±35.003 (85–300)	
Median (IQR)	135 (120–160)	125 (120–150)	150 (120–170)	
Console time, mins:				0.029*
Mean±SD (range)	114.68±31.568 (60–218)	110.59±25.838 (60–218)	117.64±33.783 (60–210)	
Median (IQR)	110 (90–130)	105 (100–120)	110 (90–138)	
Estimated blood loss, ml:				0.047*
Mean±SD (range)	216.52±127.078 (0–1,000)	230.15±129.370 (0–1,000)	206.81±124.742 (30–800)	
Median (IQR)	200 (100–300)	200 (150–300)	200 (100–300)	
No. PLND (%)	129 (26.7)	50 (24.9)	79 (28.0)	0.442
No. NS (%):				
Overall	444 (91.9)	183 (90.6)	261 (92.6)	0.549
Bilateral	355 (73.5)	154 (76.7)	201 (71.3)	0.190
No. catheter type (%):				<0.001*
Urethral	155 (32.1)	83 (41.3)	72 (25.5)	
Suprapubic	328 (67.9)	118 (58.7)	210 (74.5)	
Length of stay, days:				0.975
Mean±SD (range)	2.06±0.754 (1–14)	2.06±0.893 (1–14)	2.06±0.644 (1–14)	
Median (IQR)	2 (2–2)	2 (2–2)	2 (2–2)	
No. complications (%):				0.083
Overall	19 (3.9)	4 (2)	15 (5.3)	
Clavien 1	6	3	3	
Clavien 2	8	1	7	
Clavien 3	5	0	5	
Clavien 4–5	0	0	0	
No. transfusions (%)	5 (1.0)	0 (0)	5 (1.8)	0.058

*Statistically significant.

there were more low risk (11.3% vs 1.5%, p <0.001) and less intermediate risk (51.4% vs 69.2%, p <0.001) patients in the RS-RARP compared to RARP group with similar proportions of high risk patients in both surgical cohorts (table 1).

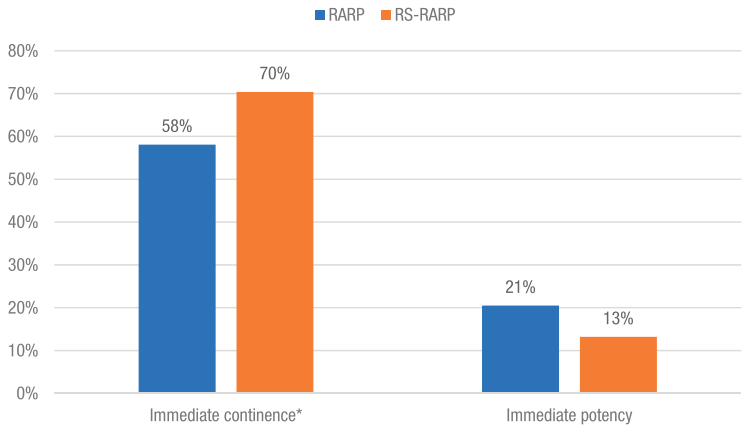
Perioperative Outcomes

Operative times and estimated blood loss were clinically similar in both groups. There were no significant differences in overall (90.6% vs 92.6%, p=0.549) and bilateral (76.7% vs 71.3%, p=0.190)

Table 3. *Oncological outcomes*

	Overall	RARP	RS-RARP	p Value
Total No.	483	201	282	
No. pathological Gleason score (%):				
6	17 (3.5)	1 (0.5)	16 (5.7)	0.002*
7 (3+4)	326 (67.5)	136 (67.3)	190 (67.4)	0.947
7 (4+3)	96 (19.9)	40 (19.8)	56 (19.9)	0.991
8–10	44 (9.1)	24 (11.9)	20 (70.6)	0.068
No. pT stage (%):				0.253
pT2	331 (68.5)	132 (65.7)	199 (70.6)	
pT3	152 (31.5)	69 (34.3)	83 (29.4)	
No. pN (%):				0.294
0	101 (78.3)	36 (17.9)	65 (23.1)	
1	28 (21.7)	14 (7.0)	14 (5.0)	
No. nodes:				
Overall:				
Mean±SD (range)	14.612±8.273 (2–44)	11.78±5.028 (2–25)	16.41±8.460 (5–44)	0.002*
Median (IQR)	14 (9–18)	11 (8–15)	15 (10–22)	
Positive:				
Mean±SD (range)	0.645±1.436 (0–10)	0.941±2.034 (0–10)	0.469±1.060 (0–5)	0.079
Median (IQR)	0 (0–0)	1 (0–10)	0 (0–0)	
No. PSM (%):				
Overall	72 (14.9)	28 (13.9)	44 (15.6)	0.600
T2	30 (9.1)	14 (10.5)	16 (8.0)	0.562
T3	42 (27.6)	14 (20.3)	28 (33.7)	0.254
Apex	28 (5.8)	13 (6.5)	15 (5.3)	0.594
No. BCR, 1-yr (%)	18 (3.7)	14 (7.0)	4 (1.4)	0.002*
Followup:				0.446
Mean±SD (range)	16.99±8.405 (2–33)	16.44±8.248 (3–32)	17.39±8.508 (2–33)	
Median (IQR)	16 (10–24)	16 (10–24)	16 (10–24)	

*Statistically significant.

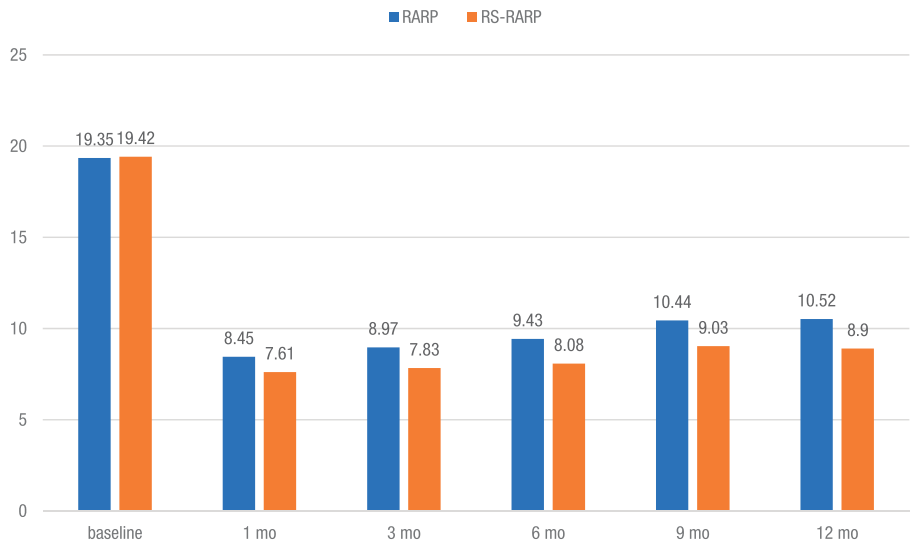


		RARP	RS-RARP	p-value
Immediate continence (n=399)	n (%)	68 (58,1%)	198 (70,4%)	0,020*
Immediate potency (n=399)	n (%)	24 (20,5%)	37 (13,2%)	0,069

Legend: RARP = robot assisted radical prostatectomy, RS-RARP = Retzius-sparing - robot assisted radical prostatectomy, n = number, (%) = percentage.

Figure 1. Immediate functional outcomes (continence and potency) among groups

nerve sparing procedure rates or lymphadenectomy rates (24.9% vs 28%, p=0.442) between groups. Length of stay was identical in both groups (median 2 days). Suprapubic catheterization was used more frequently in the RS-RARP group (74.5% vs 58.7%, p <0.001) and a urethral

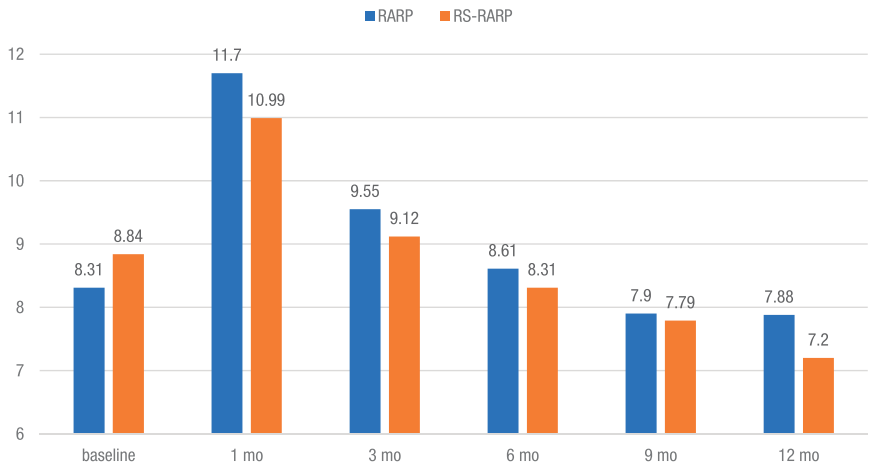


		RARP	RS-RARP	p-value
Baseline (n=344)	mean ± SD (range)	19,35 ± 7,168 (0 - 25)	19,42 ± 6,921 (0 - 25)	0,933
1 mo (n=337)	mean ± SD (range)	8,45 ± 8,269 (0 - 25)	7,61 ± 7,22 (0 - 25)	0,171
3 mo (n=320)	mean ± SD (range)	8,97 ± 8,372 (0 - 25)	7,83 ± 6,644 (0 - 25)	0,178
6 mo (n=289)	mean ± SD (range)	9,43 ± 8,287 (0 -25)	8,08 ± 6,888 (0 - 25)	0,134
9 mo (n=250)	mean ± SD (range)	10,44 ± 8,495 (0 - 25)	9,03 ± 7,440 ± (0 -25)	0,168
12 mo (n=217)	mean ± SD (range)	10,52 ± 9,059 (0 - 25)	8,90 ± 8,231 (0 - 25)	0,178

Legend: IIEF-5 = International Index of Erectile Function, mo = months, RARP = robot assisted radical prostatectomy, RS-RARP = Retzius-sparing - robot assisted radical prostatectomy, n = number, SD = standard deviation.

Figure 2. IIEF-5 scores among groups at different followup

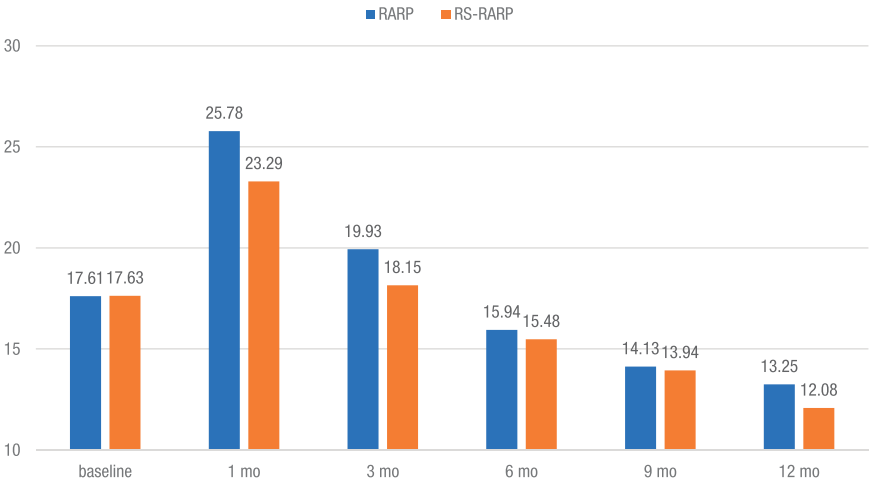
a)



		RARP	RS-RARP	p-value
Baseline (n=357)	mean ± SD (range)	8,31 ± 5,956 (0 - 31)	8,84 ± 5,676 (0 - 28)	0,400
1 mo (n=365)	mean ± SD (range)	11,70 ± 6,609 (2 -31)	10,99 ± 7,244 (1 - 36)	0,340
3 mo (n=338)	mean ± SD (range)	9,55 ± 6,240 (0 - 29)	9,12 ± 5,934 (0 - 35)	0,525
6 mo (n=307)	mean ± SD (range)	8,61 ± 5,742 (0 - 29)	8,31 ± 6,318 (0 - 39)	0,670
9 mo (n=258)	mean ± SD (range)	7,90 ± 5,221 (0 - 24)	7,79 ± 5,696 (0 -32)	0,879
12 mo (n=227)	mean ± SD (range)	7,88 ± 4,642 (1 - 20)	7,20 ± 5,138 (0 -26)	0,311

Legend: ICIQ-MLUTS = International Consultation on Urinary Incontinence on Male Lower Urinary Tract Symptoms, mo = months, RARP = robot assisted radical prostatectomy, RS-RARP = Retzius-sparing - robot assisted radical prostatectomy, n = number, SD = standard deviation.

b)



		RARP	RS-RARP	p-value
Baseline (n=357)	mean ± SD (range)	17,61 ± 20,182 (0 - 100)	17,63 ± 20,367 (0 -85)	0,993
1 mo (n=365)	mean ± SD (range)	25,78 ± 23,631 (0 - 129)	23,29 ± 24,353 (0 - 111)	0,334
3 mo (n=338)	mean ± SD (range)	19,93 ± 20,212 (0 - 84)	18,15 ± 19,972 (0 - 115)	0,428
6 mo (n=307)	mean ± SD (range)	15,94 ± 18,551 (0 - 90)	15,48 ± 18,961 (0 - 103)	0,833
9 mo (n=258)	mean ± SD (range)	14,13 ± 15,555 (0 -82)	13,94 ± 18,292 (0 - 109)	0,933
12 mo (n=227)	mean ± SD (range)	13,25 ± 14,333 (0 - 68)	12,08 ± 15,297 (0 - 81)	0,563

Legend: ICIQ-MLUTS = International Consultation on Urinary Incontinence on Male Lower Urinary Tract Symptoms, mo = months, RARP = robot assisted radical prostatectomy, RS-RARP = Retzius-sparing - robot assisted radical prostatectomy, n = number, SD = standard deviation.

Figure 3. ICIQ-MLUTS prevalence (*a*) and bother (*b*) scores among groups at different followup

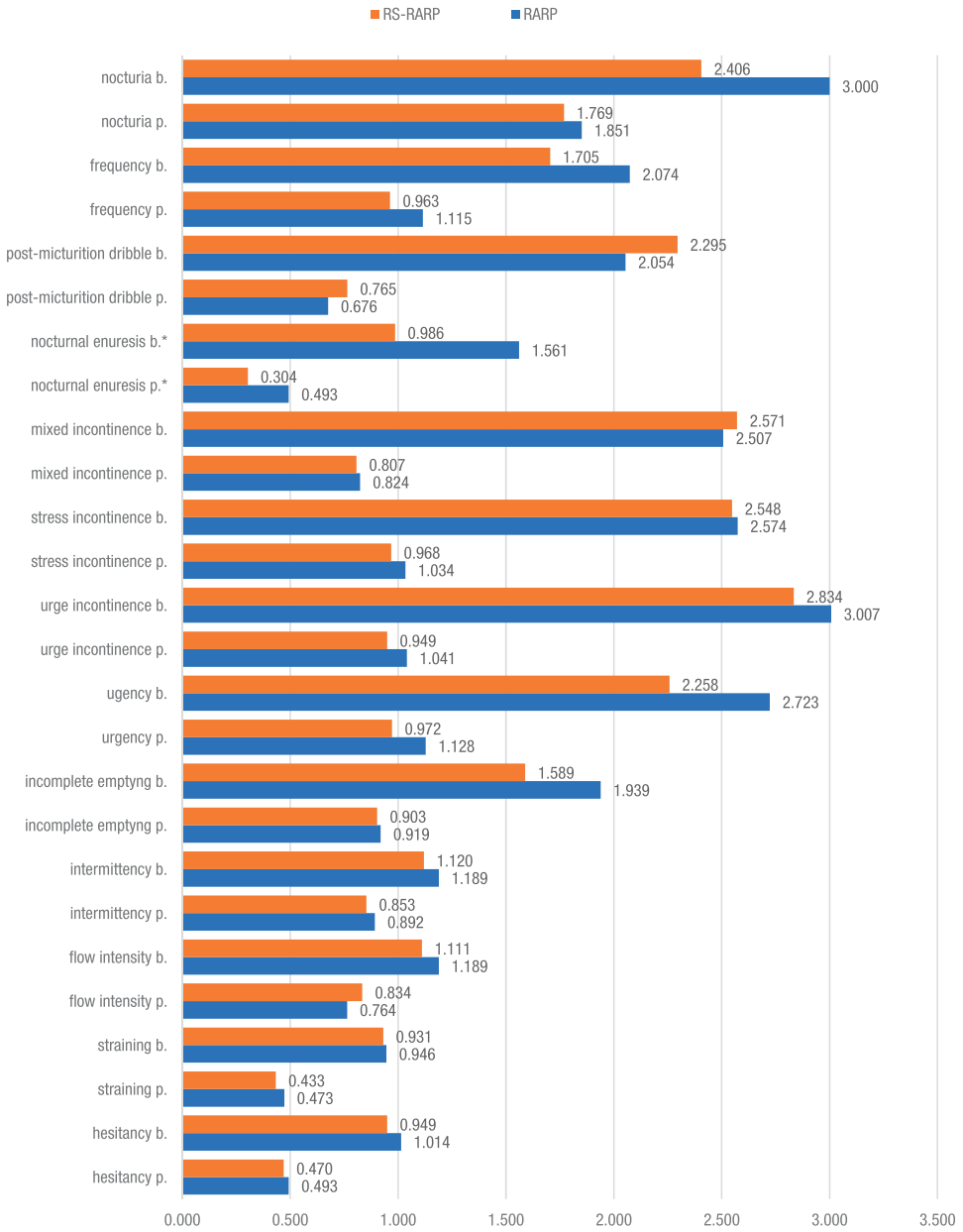


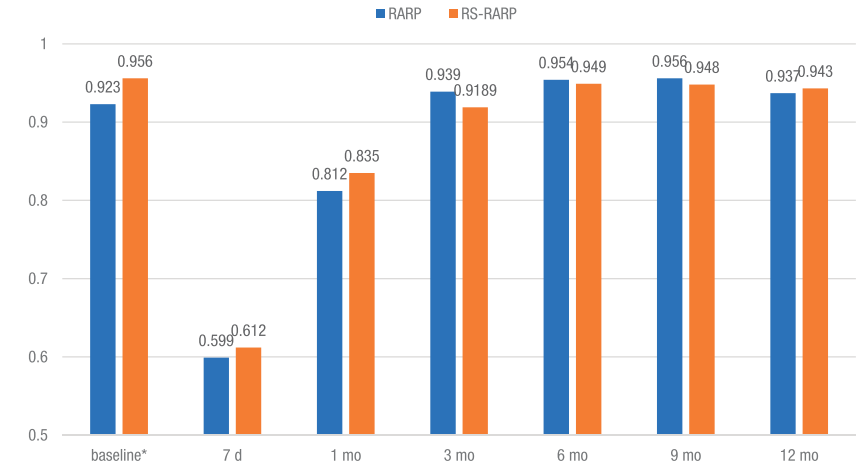
Figure 4. ICIQ-MLUTS questionnaire subscale analysis among groups at 1 month after surgery. *p.*, prevalence; *b.*, bother.

catheter more often placed in RARP patients (41.3% vs 25.5%, p <0.001). Overall complication (2% vs 5.3%, p=0.083) and transfusion (0% vs 1.8%, p=0.058) rates were similar between the groups. No high grade (Clavien 4-5) complications occurred in either group (table 2).[19]

Oncological Outcomes

Oncological outcomes are shown in table 3. Almost 90% of the patients had Gleason score 7 final pathology with no significant differences among the RS-RARP and RARP groups. The distributions of pathological T2 and T3 disease were comparable in the RARP and RS-RARP groups (65.7% vs 70.6% and 34.3% vs 29.4%, p=0.253, respectively). No difference in pN staging (p=0.294) and number of positive nodes (p=0.079) was recorded. There were no differences in overall PSM rate (13.9% vs 15.6%, p=0.600) in the RARP and RS-RARP groups respectively. These rates remained similar after stratification for pT2 (10.5% vs 8.0%, p=0.562) and pT3 (20.3% vs 33.7%, p=0.254) subgroups. Apical PSM rate was also comparable in both groups (6.5% vs 5.3%, p=0.594). One-year BCR rates were higher in the RARP group (7% vs 1.4%, p=0.002) but so was nonGleason 6 histology (p=0.002). Followup was comparable between RS-RARP and RARP groups (median 16 months in both groups; p=0.446; table 3).

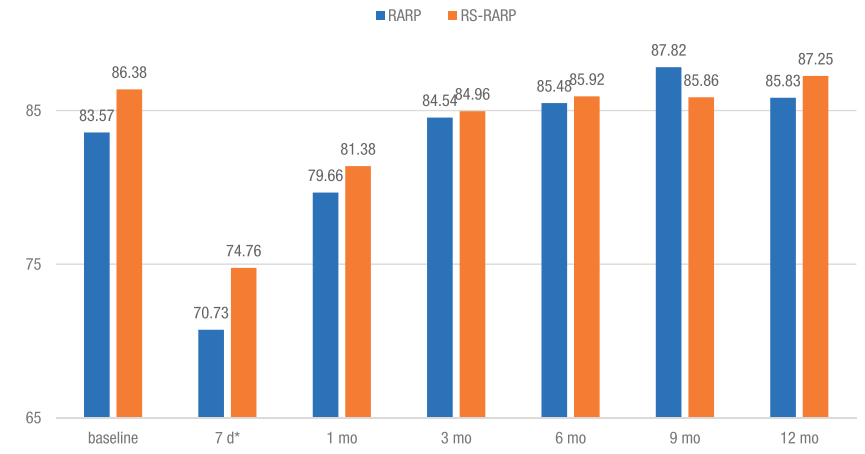
a)



		RARP	RS-RARP	p-value
Baseline (n=359)	mean ± SD (range)	0,923 ± 0,147 (0,174 - 1)	0,956 ± 0,099 (0,495 - 1)	0,031*
7 d (n=374)	mean ± SD (range)	0,599 ± 0,258 (-0,54 - 1)	0,612 ± 0,269 (-0,452 - 1)	0,453
1 mo (n=368)	mean ± SD (range)	0,812 ± 0,208 (-0,200 – 1)	0,835 ± 0,189 (0,174 - 1)	0,341
3 mo (n=337)	mean ± SD (range)	0,939 ± 0,121 (0,433 – 1)	0,9189 ± 0,155 (0,096 - 1)	0,352
6 mo (n=311)	mean ± SD (range)	0,954 ± 0,106 (0,527 - 1)	0,949 ± 0,109 (0,377 - 1)	0,640
9 mo (n=262)	mean ± SD (range)	0,956 ± 0,1193 (0,377 - 1)	0,948 ± 0,119 (0,174 - 1)	0,523
12 mo (n=224)	mean ± SD (range)	0,937 ± 0,145 (0,377 - 1)	0,943 ± 0,127 (0,174 - 1)	0,868

Legend: EQ-5D = European Quality of live group 5 dimensions questionnaire, d = days, mo = months, RARP = robot assisted radical prostatectomy, RS-RARP = Retzius-sparing - robot assisted radical prostatectomy, n = number, SD = standard deviation.

b)



		RARP	RS-RARP	p-value
Baseline (n=359)	mean ± SD (range)	83,57 ± 19,358 (0 - 100)	86,38 ± 16,151 (0 - 100)	0,110
7 d (n=374)	mean ± SD (range)	70,73 ± 18,743 (0 - 100)	74,76 ± 18,442 (1 - 100)	0,004*
1 mo (n=368)	mean ± SD (range)	79,66 ± 14,971 (7 - 100)	81,38 ± 15,391 (0 - 100)	0,140
3 mo (n=337)	mean ± SD (range)	84,54 ± 15,949 (0 - 100)	84,96 ± 14,147 (1 - 100)	0,725
6 mo (n=311)	mean ± SD (range)	85,48 ± 13,123 (20 - 100)	85,92 ± 113,959 (0 - 100)	0,559
9 mo (n=262)	mean ± SD (range)	87,82 ± 10,281 (40 - 100)	85,86 ± 15,86 (8 - 100)	0,823
12 mo (n=224)	mean ± SD (range)	85,83 ± 13,640 (8 - 100)	87,25 ± 11,341 (30 - 100)	0,515

Legend: EQ-5D = European Quality of live group 5 dimensions questionnaire, d = days, mo = months, RARP = robot assisted radical prostatectomy, RS-RARP = Retzius-sparing - robot assisted radical prostatectomy, n = number, SD = standard deviation.

Figure 5. EQ-5D index (*a*) and visual analog scale (*b*) scores among groups at different followup

Functional and QOL Outcomes

The immediate urinary continence at catheter removal was better in the RS-RARP group (70.4% vs 58.1%, p = 0.02). There was no statistically significant difference in the immediate potency rate between the 2 groups (20.5% vs 13.2%, p = 0.069; fig. 1).

No significant differences in overall urinary symptoms (prevalence and bother) and erectile function were recorded at baseline and at 1, 3, 6, 9 and 12 months after surgery between the 2 groups (figs. 2 and 3, *a* and *b*). No differences emerged between groups after stratification by clinical staging and nerve sparing technique. However, a detailed subscale analysis demonstrated less nocturnal enuresis prevalence (0.304 vs 0.493, p = 0.011) and bother (0.986 vs 1.561, p = 0.009) at 1 month after surgery in the RS-RARP group. No differences were observed in any of the other items (fig. 4).

There was no difference in baseline EQ-5D-3L scores between both patient cohorts with the exception of a slightly better baseline EQ-5D index score in the RS-RARP group (0.956 vs 0.923, p = 0.031). A better EQ-5D visual analog scale score was recorded in the RS-RARP group during the immediate postoperative course (74.76 vs 70.73, p = 0.004), while there was no difference at 3, 6, 9 and 12 months after surgery (fig. 5, *a* and *b*).

DISCUSSION

The present study compares standard RARP to the emerging Retzius-sparing technique focusing on pentafecta outcomes, perioperative outcomes, and PROMs for functional recovery and QOL. The analysis was based on high quality data that were prospectively collected by the patient management software Carebit. This bespoke purpose-built software enabled extremely high data capture rates, with perioperative data completion at 100% and PROMs questionnaire completion rates close to 80% for all the followup points. This remarkable prospective and patient focused data collection adds reliability to our findings.

The RS-RARP technique allows the prostate gland to be removed from under the overlying detrusor apron entirely avoiding the pubovesical ligaments. Using propensity score matching analysis, Chang et al showed that RS-RARP is associated with less bladder neck descent at postoperative cystography and better early continence outcomes compared to standard RARP.[20] An international survey on worldwide diffusion of RS-RARP showed that an increasing number of institutions have explored the feasibility and reproducibility of this approach with controversial results.[21] A recent systematic review and analysis confirmed that RS-RARP is a safe and feasible alternative to standard RARP providing faster and greater recovery of continence within the first 12 months postoperatively, without increasing the risk of complications.[22]

Two randomized controlled trials aiming to investigate early functional outcomes showed better immediate continence rates in the Retzius-sparing group compared to standard RARP; 71% vs 48% (p = 0.01) and 51% vs 21% (p <0.001), respectively.[6,23] Galfano et al reported 40% of preoperatively potent patients who underwent RS-RARP had their first sexual intercourse within 1 month from surgery, with a median time to recovery of 52.5 days.[10] In our study the immediate continence rate in the RS-RARP group was in line with Dalela et al (70% vs 58%, p = 0.020) with no statistically significant difference in immediate potency (21% vs 13%, p = 0.069).[23]

Some authors have reported a trend towards higher PSM rates for the RS-RARP in particular in apical and anterior tumors. However, this trend did not achieve a statistical significance in a recent systematic review and meta-analysis.[24] Sayyid et al reported no significant differences in PSM between the groups with 17% and 13% of pT2 patients and 49% and 48% of pT3 patients in the Retzius-sparing and conventional groups, respectively.[25] A recent retrospective comparative study reported no differences in PSM and BCR with a lower greater than 3 mm margins rate in RS-RARP patients compared to standard RARP (7.1% vs 8.6%, p = 0.016).[14] Moreover, Lim et al using propensity score matching analysis showed an improvement in PSM rate when comparing the initial 25 patients with the subsequent 25 patients.[26] In our study the PSM rates are in line with published literature[27,28] and no differences in overall, T2, T3 and apical PSM rates were recorded between the groups.

Abdel Raheem et al reported effective BCR control with a median followup of 26 months in a consecutive series of 369 all-risk patients who underwent RS-RARP with preoperative PSA, advanced clinical stage and higher Gleason score being important predictors.[13] This has been confirmed also in our study. Indeed, we found extremely low BCR rates in the RS-RARP group compared to standard RARP at a median followup of 16 months (1.4% vs 7%, p = 0.002).

Most of the series in the literature have reported nonPROMs results and used varying definitions to report functional and QOL outcomes.[29] A strength of our study is that PROMs results were prospectively collected; these showed no significant differences between the 2 cohorts with the exception of a better QOL score (p = 0.004) at 1 week after surgery.

However, after a detailed subscale analysis, we found less nocturnal urinary symptom prevalence ($p=0.011$) and bother ($p=0.009$) at 1 month after RS-RARP. This unique finding has not been described in prior reports.

Our study confirms the results of other investigators showing an improvement in LUTS after prostatectomy including for the Retzius-sparing technique.[30] Indeed, in our cohorts the postoperative urinary symptom scores at 6 months reached the baseline level and improved significantly up to 1 year. The QOL results showed a significant improvement over time after surgery reaching the preoperative level at 3 months. These results are extremely important to counsel prostate cancer patients before surgery.

The main operative outcomes as well as complication rates were comparable between the 2 approaches with clinically similar console times. Lim et al did observe a higher operative time in RS-RARP, but this might have been due to surgeon learning curves in that study.[26]

The main strengths of our study are the large series of patients, the uniformity of the 2 groups with regards to the preoperative general, oncologic and functional features including the proportions of high risk patients, the completeness of the data, including during followup, the use of validated questionnaires providing high quality PROMs data and no learning curve bias with the comparison of multiple high volume surgeons. These strengths make this study unique in the present literature. The nonrandomized design is a limitation of the study.

CONCLUSION

RS-RARP showed better immediate continence rate and QOL compared to standard RARP, but with no differences recorded in other clinically relevant parameters at any other time point. The similarity in outcomes between groups lends support to the view that patients should choose their surgeon wisely rather than the specific technique used.

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EDITORIAL COMMENT

In this study Umari et al prospectively compared patient reported outcome measures (PROMs) after standard robot-assisted radical prostatectomy (RARP) or Retzius-sparing (RS) RARP. Although being a non-randomized study, the paper has several strengths. It has been performed by surgeons already expert in their approach, making it a real-life study, it accurately reports early oncological outcomes and it uses PROMs to measure functional outcomes, excluding the influence of the physicians in the interpretation of the results.

With those methods the authors showed that at catheter removal more than 7 of 10 patients barely do not need safety pads, which is an unimaginable achievement reached through ceaseless technical perfecting. Moreover, current data show no correlation between RS-RARP and higher rates of positive surgical management and biochemical recurrence. This is in contrast with the data reported by previous randomized controlled trials,[1] which were often biased by the lack of specific experience of most of the RS-RARP surgeons. It means that the strength of the RS-RARP compared to standard RARP indwells in its overlapping oncologic safety as well as its higher functional outcomes, which is the reason for its spreading in several centers throughout the world (reference 21 in article).

This article moves another step forward the admission of the superiority of Retzius-sparing radical prostatectomy in terms of immediate urinary continence recovery and quality of life. Robust data on long term followup and high risk prostate cancer patients are still needed.

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