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Investigation of the Relationship between Prostate Weight and Clinical Outcomes in Retzius-Sparing Robot-Assisted Radical Prostatectomy

Retzius Koruyucu Robot Yardımlı Radikal Prostatektomide Prostat Ağırlığı ile Klinik Sonuçlar Arasındaki İlişkinin Araştırılması

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Abstract

Objective: To examine the relationship between prostate weight and oncological and functional outcomes of Retzius-sparing robot-assisted radical prostatectomy (RS-RARP).

Materials and Methods: Data of the patients who underwent RS-RARP in our clinic between December 2018 and December 2020 were evaluated retrospectively. A total of 106 patients with 12-month postoperative follow-up data were included in the study. The patients were separated into 2 groups according to the weights of the pathology specimens as Group 1 (n=53, prostate weight less than 50 g), and Group 2 (n=53, prostate weight more than 50 g). Postoperative oncological and functional data were analyzed. At the end of the 12th month, continence was regarded as requirement of no pad or 1 pad per day. Potency was considered as the ability to have sexual intercourse. Prostate-specific antigen (PSA) above 0.2 ng/ml in the follow-up period was considered as biochemical recurrence.

Results: Preoperative PSA levels were comparable between groups (9.78+7.84 ng/ml vs. 11.87+8.38 ng/ml). There was no difference in clinical cancer stages and The International Society of Urological Pathology (ISUP) scores between the groups. Median vesicourethral anastomosis time (30 minvs.33 min) and median operative time (240 min vs. 240 min) were comparable in both groups (p>0.05). There was no difference in localized disease and locally advanced disease rates between the groups (pT2: 58.5% vs. 67.9%, pT3: 41.5% vs. 32.0%). Surgical margin positivity (SMP) ([16.9% (n=9) vs 9.4% (n=5]), and 12th month biochemical recurrence rates (11.32% vs 3.77%) were similar in groups 1 and 2 (p>0.05). Postoperative urinary continence rates at 12 months were 89% and 90% in Groups 1 and 2, respectively (p>0.05). Continence status was not different between the groups. Potency rates at 12 months were comparable between the groups.

Conclusion: RS-RARP can be applied in patients with any size of prostates with comparable functional and oncological outcomes.

Keywords: Retzius-sparing, prostate weight, robotic, prostatectomy, potency, urinary continence

Öz

Amaç: Retzius koruyucu robot yardımlı radikal prostatektominin (RS-RARP) onkolojik ve fonksiyonel sonuçları ile prostat ağırlığı arasındaki ilişkiyi araştırmak.

Gereçler ve Yöntemler: Aralık 2018 ile Aralık 2020 tarihleri arasında kliniğimizde RS-RARP uygulanan hastaların verileri retrospektif olarak değerlendirildi. Ameliyat sonrası 12 aylık takip verileri toplanan 106 hasta çalışmaya dahil edildi. Hastalar patoloji örneklerinin ağırlığına göre 2 gruba ayrıldı (Grup 1, n=53, prostat ağırlığı 50 gramdan az ve Grup 2, n=53, prostat ağırlığı 50 gramdan fazla). Ameliyat sonrası onkolojik ve fonksiyonel veriler analiz edildi. 12. ayın sonunda kontinans hiç ped kullanmama veya günde 1 ped kullanma olarak kabul edildi. Potens cinsel ilişkiye girebilme yeteneği olarak kabul edildi. Takip döneminde prostat spesifik antijen (PSA)'nın 0.2 ng/ml'nin üzerinde olması biyokimyasal nüks olarak kabul edildi.

Bulgular: Ameliyat öncesi PSA düzeyleri gruplar arasında benzerdi (9.78+7.84 ng/ml ve 11.87+8.38 ng/ml). Gruplar arasında klinik kanser evreleri ve Uluslararası Ürolojik Patoloji Derneği (ISUP) skorları açısından fark yoktu. Median vezikoüretral anastomoz süresi (30 ve 33 dk) ve ameliyat süresi her iki grupta da benzerdi (240 ve 240 min, p>0.05). Gruplar arasında lokalize hastalık ve lokal ileri hastalık oranları açısından fark yoktu (pT2: %58.5'e karşı %67.9, pT3: %41.5'e karşı %32.0). Cerrahi sınır pozitifliği (SMP) oranları Grup 1 ve 2 için sırasıyla %16.9 (n=9) ve %9.4 (n=5), 12. ay biyokimyasal nüks oranları ise %11.32 ve %3.77 idi (p>0.05). Ameliyat sonrası 12. ayda idrar kontinansı Grup1 ve Grup 2'de sırasıyla %89 ve %90 idi (p>0.05). Kontinans durumu gruplar arasında farklı değildi. Gruplar arasında 12. aydaki potens oranları benzerdi.

Sonuç: RS-RARP, benzer fonksiyonel ve onkolojik sonuçlarla her boyutta prostatı olan hastalarda uygulanabilir.

Anahtar kelimeler: Retzius koruyucu, prostat ağırlığı, robotik, prostatektomi, potens, üriner kontinans

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Introduction

Prostate cancer is a prevalent disease among men, and surgical intervention is often recommended for its management [1]. One of the surgical techniques gaining popularity is Retzius-sparing robot-assisted radical prostatectomy (RS-RARP). This approach aims to minimize damage to the surrounding structures and improve functional postoperative outcomes [2].

RS-RARP is a technique that involves the robot-assisted removal of the prostate gland while preserving the Retzius space. This approach aims to minimize damage to the surrounding nerves and tissues, leading to improved functional outcomes [3,4].

Prostate size is a special condition that requires surgical experience during the removal of the prostate in patients who underwent RARP [5]. There are limited studies on the impact of prostate size on post-RS-RARP oncological and functional outcomes. In this study, we aimed to examine the influence of prostate weight on post-RS-RARP oncological and functional outcomes [6,7].

Materials and Methods

After obtaining the local ethics committee approval (Antalya Training and Research Hospital Ethics Committee (2023/07-17), we retrospectively included 106 patients who underwent RS-RARP between December 2018 and December 2020 in our study. Clinical data, perioperative variables, and postoperative follow-up data were collected for analysis. All surgeries were applied using the da Vinci® Robotic Surgical System (Xi, USA). RS-RARP was conducted via the transperitoneal approach.

The patients were separated into 2 groups according to the weight of the pathology specimens. Group 1 included patients with prostate specimens weighing less than 50 grams. Group 2 comprised of patients with prostate specimens weighing more than 50 grams.

Erectile function and continence status were evaluated at the end of the 12th month. No pad or only one pad usage per day was considered as continence. An erection sufficient for sexual intercourse was considered as potency. A prostate-specific antigen (PSA) value above 0.2 ng/ml in follow-up period was regarded as biochemical recurrence.

Statistical Analysis

SPSS version 22.0 for Windows software (SPSS, Chicago, IL, USA) program was used. The Shapiro-Wilk test was performed to determine normality of distributions for continuous variables. Normally distributed continuous variables were compared with the Student's t-test and non-normally distributed variables with the Mann-Whitney U test. Pearson's chi-square or Fisher's exact test was used for the analysis of categorical data. Normally distributed continuous variables were expressed as mean plus standard deviation (SD) and non-normally distributed variables as median. Categorical variables were expressed as numbers and percentages. $P<0.05$ was accepted as the the level of statistical significance.

Table 1. Preoperative characteristics of the patients

		Group 1 (n=53)	Group 2 (n=53)	P
Age (years)		65.72±5.32 (51-75)	66.45±6.35 (49-79)	>0.05
BMI (kg/m2)		26.12±3.51	27.18±3.52	>0.05
Preperative PSA (ng/ml)		9.78±7.84 (2.4-55)	11.87±8.38 (1.15-48)	0.084
Clinic cancer stage (n, %)	**T1**	41 (77.3)	47 (88.6)	0.121
	T2	12 (22.6)	6 (11.3)	
Potent patients ratio at preoperatif period (n, %)	**1**	35 (66.0)	37 (69.8)	0.676
Prostate biopsy ISUP score (n, %)	**1**	25(47.1)	32 (60.3)	0.131
	2	16 (30.1)	12 (22.6)	
	3	7 (13.2)	1 (1.9)	
	4	3 (5.7)	6 (11.3)	
	5	2 (3.8)	2 (3.8)	

BMI: body mass index; ISUP: international society of urological pathology

Results

The median age of the patients was 65.72±5.32 (51-75) years and 66.45±6.35 (49-79) years for Groups 1 and 2, respectively. There was no significant difference between Groups 1 and 2 in terms of age, BMI, preoperative PSA levels, clinical T stages, ISUP scores, and potency rates. The preoperative characteristics of the patients are summarized in **Table 1**.

Surgical margin positivity (SMP) rates were found as 16.9% (n=9) and 9.4% (n=5) in Groups 1 and 2, respectively (p=0.390). The twelfth month biochemical recurrence rates were 11.32% and 3.77% for Groups 1 and 2, respectively without any statistically significant intergroup difference (p=0.270).

There was no significant difference between Groups 1 and 2 in terms of pathological T stage, ISUP scores, lymphadenectomy, and lymph node positivity rates. Main oncological results are summarized in **Table 2**. At 12 months, there was no significant difference between Groups 1 and 2 in terms of potency and continence rates (**Table 3**).

Discussion

In this study, we aimed to invesigate the influence of RS-RARP on postoperative oncological and functional outcomes. There are few studies on this topic in the literature. Oncological outcomes, such as SMP and biochemical recurrence, are crucial

Table 2. Oncological outcomes of the patients

		Group1 (n=53)	Group 2 (n=53)	P
12th month PSA (ng/ml)		0.026±0.06	0.018±0.04	**0.034**
Patological T stage (n, %)	**T2**	31(58.5)	36(67.9)	0.314
	T3	22 (41.5)	17 (32.0)	
Specimen ISUP score (n, %)	**1**	14(26.4)	28 (52.8)	**0.046**
	2	22 (41.5)	18 (33.9)	
	3	7 (13.2)	2 (3.8)	
	4	5 (9.4)	2 (3.8)	
	5	5 (9.4)	3 (5.7)	
Lymphadenectomy (n, %)		23 (43.3)	16 (30.1)	0.159
Lymph node positivity (n, %)		7 (13.2)	3 (5.7)	0.480

ISUP: international society of urological pathology

Table 3. Functional results of the patients

	Group 1 (n=53)	Group 2 (n=53)	P
Urinary continency at 12th month (n, %)	47 (88.6)	48 (90.6)	0.750
Potent patients ratio at postoperative 12th month (n, %)	15 (28.3)	14 (26.4)	0.172

in assessing the long-term success of RS-RARP. Several studies have explored the impact of prostate volume on these outcomes.

Santok et al. analyzed 294 patients who underwent RS-RARP. They divided the patients into three groups based on estimated prostate volume by transrectal ultrasonography and compared surgical outcomes between the groups. They found that there was no significant difference in terms of biochemical recurrence rates among patients with different prostate volumes [8]. Similarly, Galfano et al., analyzed 750 patients undergoing RS-RARP in three groups according to post-RP prostate specimen weights (<40 g, 40-60 g, >60 g). They reported comparable surgical margin positivity rates in prostate cancer cases, regardless of prostate volume [9]. Our study design has also taken weights of pathology specimens of prostate into consideration. There was no significant difference in ISUP scores of patients categorized regarding the weights of pathology specimens of prostates as Groups 1 and 2.

In addition, pathologic T stages, SMP and biochemical recurrence rates were comparable between Groups 1 and 2, regardless of prostate volume. However, in our study the mean of postoperative 12th-month control PSA levels were lower in the large prostate group. These findings indicate that prostate volume does not appear to have a significant influence on post-RS-RARP oncological outcomes.

Xu et al. conducted a comparative study between RS-RARP and conventional RARP. The study found that RS-RARP had better early continence recovery rates compared to conventional RARP. However, there were no significant differences between both groups in terms of continence rates during the follow-up period [10]. Zorn et al. reported no difference between continence rates regardless of prostate volume in patients who had undergone conventional RARP [11]. Although prostate volume seems to significantly affect perioperative surgical dynamics in RS-RARP studies, no effect of prostate weight on late-term continence rates was found in our study [12].

A multivariate analysis of prospective randomized controlled trials performed on 139 conventional RARP patients have shown that only smaller prostate volume was predictive of potency. In addition, lower prostate weight was the only factor found to be correlated with early return of potency [13]. Although, the relationship between prostate weight and early-term potency rates was not evaluated in our study population of RS-RARP patients, potency rates in the long-term did not differ between the groups.

The main limitations of our study were its retrospective and non-randomized design in addition to its small-scale patient population. In order to avoid bias in patient selection in our study, patients were included chronologically starting from the first date of RS-RARP surgery in our clinic to the present. In the future, a prospective study with a higher number of patients who underwent RS-RARP is planned as the second phase of the study.

Conclusion

RS-RARP can be performed regardless of prostate weight in patients with small- or large-sized prostates with similar oncological and functional outcomes.

Ethics Committee Approval: The study was approved by the Health Science University Antalya Training and Research Hospital Ethics Committee (Approval date and no: 25.05.2023/7-17)
Informed Consent: An informed consent was obtained from all the patients.
Publication: The results of the study were not published in full or in part in form of abstracts.
Peer-review: Internally and externally peer-reviewed.
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References

[1] Georgiades F, Konstantinou K, Kouriefs C. Robotic assisted laparoscopic radical prostatectomy following open trans-vesical adenomectomy: A single centre experience and review of the literature. Urologia 2021;88:135-9. https://doi.org/10.1177/0391560320979858

[2] Galfano A, Ascione A, Grimaldi S, Petralia G, Strada E, Bocciardi AM. A new anatomic approach for robot-assisted laparoscopic prostatectomy: a feasibility study for completely intrafascial surgery. Eur Urol 2010;58:457-61. https://doi.org/10.1016/j.eururo.2010.06.008

[3] Ahlering TE, Kaplan AG, Yee DS, Skarecky DW. Prostate weight and early potency in robot-assisted radical prostatectomy. Urology 2008;72:1263-8. https://doi.org/10.1016/j.urology.2008.05.055

[4] Asimakopoulos AD, Miano R, Galfano A, Bocciardi AM, Vespasiani G, Spera E, et al. Retzius-sparing robot-assisted laparoscopic radical prostatectomy: Critical appraisal of the anatomic landmarks for a complete intrafascial approach Clin Anat 2015;28:896-902. https://doi.org/10.1002/ca.22576

[5] Martínez CH, Chalasani V, Lim D, Nott L, Al-Bareeq RJ, Wignall GR, et al. Effect of prostate gland size on the learning curve for robot-assisted laparoscopic radical prostatectomy: does size matter initially? J Endourol 2010;24:261-6. https://doi.org/10.1089/end.2009.0325

[6] Montorsi F, Wilson TG, Rosen RC, Ahlering TE, Artibani W, Carroll PR, et al. Best practices in robot-assisted radical prostatectomy: recommendations of the Pasadena Consensus Panel. Eur Urol 2012;62:368-81. https://doi.org/10.1016/j.eururo.2012.05.057

[7] Hsu EI, Hong EK, Lepor H. Influence of body weight and prostate volume on intraoperative, perioperative, and postoperative outcomes after radical retropubic prostatectomy. Urology 2003;61:601-6. https://doi.org/10.1016/s0090-4295(02)02422-6

[8] Santok GD, Abdel Raheem A, Kim LH, Chang K, Lum TG, Chung BH, et al. Perioperative and short-term outcomes of Retzius-sparing robot-assisted laparoscopic radical prostatectomy stratified by gland size. BJU Int 2017;119:135-41. https://doi.org/10.1111/bju.13632

[9] Galfano A, Panarello D, Secco S, Di Trapani D, Barbieri M, Napoli G, et al. Does prostate volume have an impact on the functional and oncological results of Retzius-sparing robot-assisted radical prostatectomy? Minerva Urol Nefrol 2018;70:408-13. https://doi.org/10.23736/S0393-2249.18.03069-2

[10] Xu JN, Xu ZY, Yin HM. Comparison of Retzius-Sparing Robot-Assisted Radical Prostatectomy vs. Conventional Robot-Assisted Radical Prostatectomy: An Up-to-Date Meta-Analysis. Front Surg 2021;8:738421. https://doi.org/10.3389/fsurg.2021.738421

[11] Zorn KC, Orvieto MA, Mikhail AA, Gofrit ON, Lin S, Schaeffer AJ, et al. Effect of prostate weight on operative and postoperative outcomes of robotic-assisted laparoscopic prostatectomy. Urology 2007;69:300-5. https://doi.org/10.1016/j.urology.2006.10.021

[12] Phukan C, Mclean A, Nambiar A, Mukherjee A, Somani B, Krishnamoorthy R, et al. Retzius sparing robotic assisted radical prostatectomy vs. conventional robotic assisted radical prostatectomy: a systematic review and meta-analysis. World J Urol 2020;38:1123-34. https://doi.org/10.1007/s00345-019-02798-4

[13] Ahlering TE, Kaplan AG, Yee DS, Skarecky DW. Prostate weight and early potency in robot-assisted radical prostatectomy. Urology 2008;72:1263-8. https://doi.org/10.1016/j.urology.2008.05.055