Original Article

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Learning Curve of Laparoscopic Radical Prostatectomy Without Mentor Guidance: A Single Surgeon's Experience Following a 2-Month Observership

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Abstract

Objective: To evaluate the learning curve of a single surgeon performing 72 laparoscopic radical prostatectomy (LRP) cases without mentorship, following a two-month advanced laparoscopy observership.

Materials and Methods: The urologist, without prior LRP experience, underwent observership in a high-volume center before independently performing 72 LRP procedures over three years. Cases were divided into two groups: group A (first 36 cases) and group B (subsequent 36 cases). Data on demographics, operative parameters, complications, and surgical outcomes were analyzed. Crucial parameters, including total operation time, lymphadenectomy time, and urethrovesical anastomosis time, were compared between groups.

Results: Group B showed significant improvements in total operation time ($p=0.008$), lymphadenectomy time ($p=0.001$), and urethrovesical anastomosis time ($p<0.001$). However, group B, significantly influenced by high-risk cases and a rectal injury complication, had longer hospital stays and urinary catheter durations. Despite a higher rate of high-risk cases in group B, there was no significant difference in overall complication rates or positive surgical margins. One case required conversion to open surgery due to rectal injury.

Conclusions: Significant improvements in operative times were observed; however, complication rates and positive surgical margins did not differ significantly between groups, likely influenced by the higher proportion of high-risk patients in the second group. While these findings suggest that LRP can be performed without direct mentorship, the study's single-surgeon experience and limited sample size restrict generalizability. Longer follow-up and larger studies are needed to assess oncological and functional outcomes and to further optimize the learning curve.

Keywords: Prostate cancer, laparoscopic radical prostatectomy, learning curve, advanced laparoscopy

Introduction

According to Global Cancer Observatory 2022 data, prostate cancer is the second most common cancer and the fifth leading cause of cancer-related death among men (1). Radical prostatectomy, a definitive surgical intervention for the treatment of prostate cancer, may be performed using open, laparoscopic, and robot-assisted laparoscopic techniques. The rise of robotic-assisted radical prostatectomy (RARP) is driven by its benefits, including reduced blood loss, faster recovery, improved functional outcomes, and a shorter learning curve compared to open radical prostatectomy (ORP) and laparoscopic radical prostatectomy (LRP). Due to the high costs of robotic-assisted surgery, LRP remains a cost-effective and minimally invasive alternative in some countries (2,3).

Surgeons in high-volume prostate cancer centers around the world have transitioned from LRP to RARP over the years, as observed in the study by Sivaraman et al. (4). The reduction in the number of high-volume centers and experienced surgeons performing LRP has made it increasingly difficult for trainees to gain exposure to this technique. This decline also complicates the learning curve, particularly in the early stages, where having a mentor is critical for developing proficiency (5).

The present study was designed to evaluate the LRP learning curve of a urologist naive to LRP education who started performing LRP without a mentor-initiated approach after a two-month advanced laparoscopy observership in a high-volume center.

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Materials and Methods

Education and LRP Training

The urologist who performed the procedures in this study completed his residency in a clinic where LRP was not performed, but ORP and RARP were commonly. During his residency, the urologist assisted in numerous ORP and RARP cases and performed a limited number of ORP cases as the primary surgeon. In terms of laparoscopic surgery, the surgeon performed renal cyst excision and nephrectomies during his residency.

In the six-year period following his residency, the urologist performed renal cyst excisions, nephrectomies, ureterolithotomies, and pyelolithotomies as laparoscopic surgeries, and a small number of ORP for prostate cancer. In the sixth year after completing residency, the urologist received a two-month advanced laparoscopy observership at a high-volume center where all radical prostatectomies were performed laparoscopically, although robotic surgery was not available. During this two-month training, the urologist did not assist in or perform LRP cases but observed them externally. In his free time, the urologist extensively reviewed video archives of past surgeries from the clinic and practiced on a personal laparoscopic training box. Specifically, he worked on "laparoscopic urethrovesical anastomosis'' using a urethrovesical anastomosis model created with a condom catheter (Figure 1).

LRP Technique and Incorporation Into Home Practice

In September 2021, the urologist began performing LRP at a center where LRP had not been previously performed, without mentorship, performing all of his radical prostatectomies laparoscopically. Between September 2021 and July 2024, a total of 72 cases were performed by the same urologist in two different centrers. Each case was performed with two urology residents and one surgical nurse, without the assistance of a senior urologist or a mentor.

All LRP procedures were performed using "The Descending Technique (Clinique Saint Augustine)'' (6). According to the European Association of Urology (EAU) risk classification system, extended pelvic lymphadenectomy (eLND) was not performed on patients classified as low-risk. Additionally, intermediate-risk patients with a less than 5% predicted risk of lymph node invasion, as calculated by Briganti nomogram, were also excluded from eLND. eLND was performed on patients classified as high-risk and intermediate-risk with a greater than or equal to 5% predicted risk of lymph node invasion. Initially, the urologist opted for an extraperitoneal approach for patients undergoing LRP and a transperitoneal approach for those with eLND. However, from the 53rd case onward, all procedures were performed using the transperitoneal approach, in accordance with the surgeon's preference. The urethrovesical anastomosis was performed using the Van Velthoven et al. (7) technique with a running 2-arm 3-0, 5/8 V-Loc suture (Medtronic, Minneapolis, USA).

Data Collection

Ethics approval was obtained from the local ethical board. The study was conducted in accordance with the Declaration of Helsinki and was approved by the Institutional Review Board of University of Health Sciences Türkiye, Kartal Dr. Lütfi Kırdar City Hospital (protocol no: 2024/010.99/10/4, date: 29.11.2024). Written informed consent was obtained from all participants included in the study. Prospectively collected retrospective demographic, operative and postoperative data of 72 patients were collected. "Total operation time" was measured from the insertion of the first trocar to the removal of the last trocar. "Lymphadenectomy time" was measured from the first peritoneotomy to the placement of the lymphadenectomy specimens into a bag. "Radical prostatectomy time" was calculated by subtracting the lymphadenectomy time from the total operation time in patients who underwent lymphadenectomy. For patients without lymphadenectomy, the total operation time was considered "radical prostatectomy time". "Urethro-vesical anastomosis time" was measured from the initial grasp with the needle holder to the final knot of the anastomosis. The presence of tumor cells at the inked margin in the prostatectomy specimen is considered evidence of a positive surgical margin. Serum prostate specific antigen (PSA) levels of 0.1 ng/mL or higher were defined as persistent PSA. Serum PSA levels of 0.2 ng/mL or higher were defined as biochemical recurrence (BCR).

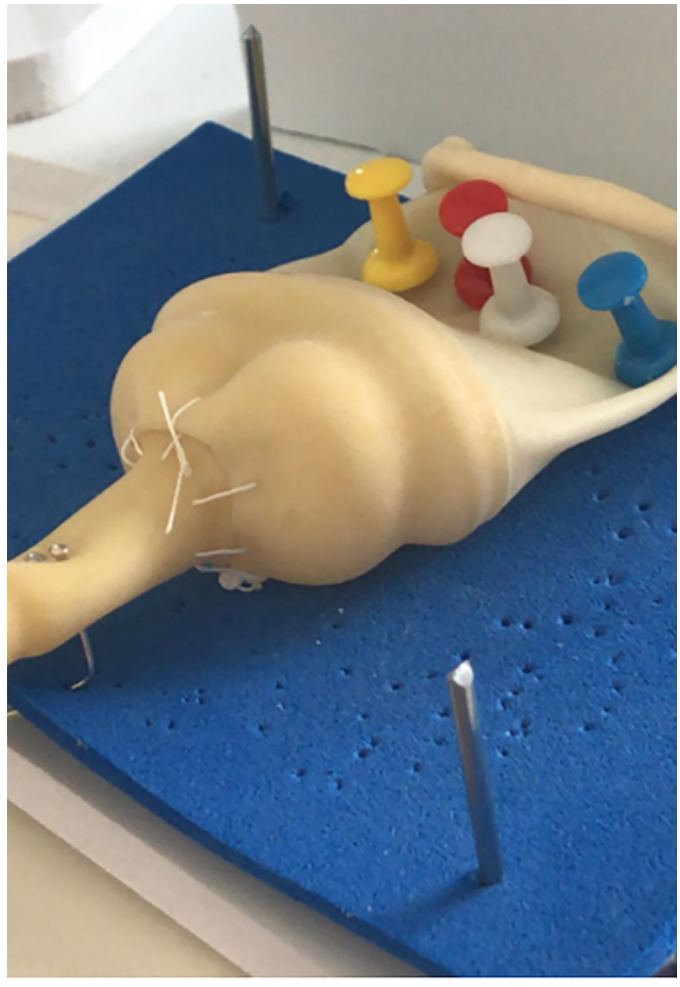

Figure 1. Urethrovesical anastomosis model created with a condom catheter

The study group of 72 patients was divided into two groups: group A comprising the first 36 patients, and group B comprising the subsequent 36 patients. The learning curve was evaluated by analyzing various parameters between these two groups, including operation time, complications, hospitalization time, and others.

Statistical Analysis

All statistical analyses were performed using SPSS version 21.0 (IBM Corp., Armonk, NY, USA). The data were divided into 2 groups, each containing 36 patients. Normality of continuous variables was assessed using the Shapiro-Wilk test. Variables that followed a normal distribution were analyzed using the Student's t-test, while variables that did not follow a normal distribution were analyzed using the Mann-Whitney U test. Categorical variables were compared using the chi-square test. When the expected frequency in any cell was less than 5, Fisher's exact test was used to ensure the accuracy of the results. A p-value of less than 0.05 was considered statistically significant.

Results

The mean age of all patients was 63.72±6.08. The mean PSA value was 8.24±4.65. Patient characteristics, peroperative, and postoperative data are presented in Table 1. There were no significant differences among the groups in age, PSA and PSA density (p>0.05, all). Patient characteristics, and peroperative and postoperative data of the two groups are presented in Table 2 and Table 3.

There was a statistically significant difference in total operation time, lymphadenectomy time, radical prostatectomy time, and urethro-vesical anastomosis time (p-values, respectively: 0.008, 0.001, <0.001, <0.001). All of these operative times were shorter in group B.

Table 1. Patient characteristics, perioperative and postoperative data of all patients

	N	Mean	SD
Age (years)	72	63.72	6.08
PSA (prostate spesific antigen - ng/mL)	72	8.24	4.65
Prostate weight (g)	72	56.25	35.49
PSA density	72	0.219	0.233
Total operation time (min)	72	212.42	53.91
Lymphadenectomy time (min)	26	81.92	21.74
Radical prostatectomy time (min)	71*	183.31	44.24
Urethro-vesical anastomosis time (min)	71*	33.34	14.34
Hematocrit drop	72	6.54	316
Hospitalization time (day)	72	5.06	4.41
Urinary cathater time (day)	72	15.53	13.93
Removed lymph node count	26	16.62	6.89

*: One patient's surgery converted to open after rectal injury and urethro-vesical anastomosis was not performed laparoscopicaly. This patient excluded from "radical prostatectomy time" and "urethro-vesical anastomosis time"
PSA: Prostate specific antigen, SD: Standard deviation

There was a statistically significant difference in hospitalization time and urinary catheter time (p-values, respectively: 0.012 for urinary catheter time). But hospitalization time and urinary catheter time were shorter in group A. One patient in group B, who suffered a rectal injury, had an extended hospitalization time of 38 days and a urinary catheter time of 130 days due to complications, which significantly influenced the statistical analysis. Upon excluding these outliers, the median values were recalculated, and a statistically significant difference between the two groups remained (p-values: 0.029 and 0.019, respectively).

There was a statistically significant difference in prostate biopsy Gleason grades and EAU risk groups (p-values: 0.012 and 0.019, respectively). There were more low-risk patients in group A and more high-risk patients in group B. As a result, there were statistically significant differences in nerve-sparing surgery, bilateral pelvic eLND, pathological lymph node involvement, radical prostatectomy pathology, and radical prostatectomy Gleason grades (p-values, respectively: 0.009, 0.049, 0.011, 0.031, and 0.022).

Nerve-sparing status, complications, and additional intervention data of all patients are in Table 4. Nerve-sparing surgery was performed on 35 of our patients (48.6%), and non-nerve-sparing surgery was performed on 37 patients (51.4%). Only one patient required a general surgery consultation following a rectal injury, and conversion to open surgery was performed. This was based on the general surgeon's decision for rectal repair and indwelling colostomy. No other patient in the series required conversion from laparoscopy to open surgery. The overall complication rate was 26.4% (19 out of 72 patients). Among these, only 3 patients (4.1%) experienced grade 3 complications according to the Dindo et al. (8) classification. Due to early postoperative spontaneous urethral catheter removal, cystourethroscopy for urethral catheter placement over a guidewire under local anesthesia, (grade 3A) was performed in two patients. In one patient, a lymphocele required drainage under local anesthesia (grade 3A), and the same patient underwent perineal rectourethral fistula repair with a gracilis muscle flap under general anesthesia (grade 3B). The remaining complications were classified as grade 1 and grade 2.

Among 72 patients, 20 had positive surgical margins. The sites of positive surgical margins were as follows: 1 at the base, 4 at the apex, 12 at the posterolateral, 1 at both the base and the posterolateral, 1 at both the apex and the posterolateral, and 1 at both the apex and the base. Importantly, none of our patients had intraprostatic incision on pathology reports and of these 20 patients with positive margins, 6 had 1 mm Gleason grade 3 at the margin, and 3 had 1 mm Gleason grade 4 at the margin. Additionally, 4 patients had pathological lymph node involvement in this surgical margin positive group, of which 3 experienced persistent PSA and 2 developed metastatic disease as confirmed by postoperative prostate-specific membrane antigen positron emission tomography/computed tomography. With the exception of the patients exhibiting persistent PSA levels, none of the other patients has yet developed BCR. However, the follow-up periods for these patients were as follows: 6 patients with 1 year of follow-up, 2 patients with 9 months of follow-up, 4 patients with 6 months of follow-up, and 5 patients with 3 months of follow-up.

Table 2. Comparison of group A and group B's patient characteristics, perioperative and postoperative data					
	Group	**N**	**Mean**	**SD**	**p-value**
Age (years)	Group A	36	63.64	6.366	0.908**
	Group B	36	63.81	5.879	
PSA (prostate spesific antigen - ng/dL)	Group A	36	7.4225	3.31286	0.195***
	Group B	36	9.0586	5.62605	
PSA density	Group A	36	0.17647	0.116065	0.146***
	Group B	36	0.2625	0.30601	
Total operation time (min)	Group A	36	229.03	55.541	**0.008****
	Group B	36	195.81	47.362	
Lymphadenectomy time (min)	Group A	9	102.56	19.957	**0.001*****
	Group B	17	71	13.177	
Radical prostatectomy time (min)	Group A	36	203.39	45.797	**<0.001****
	Group B	35*	162.66	31.713	
Urethro-vesical anastomosis time (min)	Group A	36	38.33	13.506	**<0.001*****
	Group B	35*	28.2	13.497	
Hematocrit drop	Group A	36	6.0111	3.44448	0.157**
	Group B	36	7.0722	2.81736	
Hospitalization time (day)	Group A	36	4.22	1.791	**0.019*****
	Group B	36	5.89	5.908	**[ı]0.029*****
Urinary cathater time (day)	Group A	36	13.08	2.687	**0.012*****
	Group B	36	17.97 ([ı]14.76)	19.346	**[ı]0.019*****
Removed lymph node count	Group A	9	17.11	5.231	0.344***
	Group B	17	16.35	7.77	

*: One patient's surgery converted to open after rectal injury and urethro-vesical anastomosis was not performed laparoscopicaly. This patient excluded from "radical prostatectomy time" and "urethro-vesical anastomosis time"
**: Independent Samples t-test was used for normally distributed variables
***: Mann-Whitney U test was applied for variables that did not follow normal distribution
[ı]: One patient in group 2 had an extended hospitalization time of 38 days and a urinary cathater time of 130 days due to complications (rectal injury patient), which significantly influenced the statistical analysis. Upon excluding these outliers, the mean and the median values were recalculated, and a statistically significant difference between the two groups remained
PSA: Prostate specific antigen, SD: Standard deviation

Discussion

"The time to achieve skills necessary to satisfactorily perform a surgical procedure'' is defined as completion of the learning curve by many authors. Based on this definition, it is expected that operation time, complication rates, and oncological and functional outcomes will improve over time, and there will be a statistically significant difference between the patients operated on at the beginning of the learning curve and those operated on later as experience increases (9). In the study by Bollens et al. (10), it is evident that significant improvements in the learning curve of LRP were observed even when the early learning curve was divided into groups of ten cases. This finding demonstrates that significant progress can be made in the learning curve of LRP with relatively few cases in the early stages of the learning curve.

LRP remains a challenging procedure, especially when performing without the guidance of a mentor. In our study, we evaluated the learning curve by dividing 72 patients into two groups. In our study, we observed a statistically significant improvement in operation times (total operation, lymphadenectomy, radical prostatectomy, urethrovesical anastomosis). However, no statistically significant difference was found between the two groups regarding complications (general, intraoperative, and early) and positive surgical margins. On the other hand, contrary to expectations, we observed a statistically significant difference in hospitalization time and urinary catheter time, with longer times in group B.

In our study, we observed a statistically significant reduction in total operative time, lymphadenectomy time, radical prostatectomy time, and urethrovesical anastomosis time. In the studies by Fabrizio et al. (5) and Skrekas et al. (11), patients were divided into three groups: the first group was operated on with the mentor as primary surgeon and the trainee assisting, the second group was operated on by the trainee with the mentor assisting, and the third group was operated on by the trainee with residents assisting. In these studies, no improvement in operative time was observed between the 2nd and 3rd groups. In Fabrizio et al. (5) study, the median operative time for group 3's 20 cases (the trainee with residents assisting) was 313 minutes, whereas in our study, this value was 247 minutes for the first 20 cases. In Skrekas et al. (11) study, the mean operative time for group 3's 16 cases (the trainee with residents assisting) was 248 minutes, whereas in our study, the mean operative time

Table 3. Comparison of group A and group B's peroperative and postoperative data				
		Group A n (%)	**Group B n (%)**	**p-value**
Prostate biopsy Gleason grades	Gleason 6	25 (69.4%)	12 (33.3%)	**0.012****
	Gleason 7	9 (25.0%)	18 (50.0%)	
	≥ Gleason 8	2 (5.6%)	6 (16.7%)	
EAU risk groups	Low-risk	17 (47.2%)	9 (25%)	**0.019***
	Intermediate-risk	16 (44.4%)	15 (41.7%)	
	High-risk	3 (8.3%)	12 (33.3%)	
Transperitoneal vs extraperitoneal	Transperitoneal	9 (25.0%)	29 (80.6%)	**<0.001***
	Extraperitoneal	27 (75.0%)	7 (19.4%)	
Bilateral pelvic eLND	No	27 (75.0%)	19 (52.8%)	**0.049***
	Yes	9 (25.0%)	17 (47.2%)	
Nerve-sparing surgery (Any type of nerve-sparing)	No	13 (36.1%)	24 (66.7%)	**0.009***
	Yes	23 (63.9%)	12 (33.3%)	
General complications (Intraoperative + early, per patients)	No	29 (80.6%)	24 (66.7%)	0.181*
	Yes	7 (19.4%)	12 (33.3%)	
Intraoperative complications (Per patients)	No	34 (94.4%)	31 (86.1%)	0.233**
	Yes	2 (5.6%)	5 (13.9%)	
Early postoperative complications (per patients)	No	30 (83.3%)	28 (77.8%)	0.551*
	Yes	6 (16.7%)	8 (22.2%)	
Blood transfusion	No	35 (97.2%)	32 (88.9%)	0.164**
	Yes	1 (2.8%)	4 (11.1%)	
Additional intervention	No	35 (97.2%)	33 (91.7%)	0.614**
	Yes	1 (2.8%)	3 (8.3%)	
Seminal vesicle invasion	No	33 (91.7%)	29 (80.6%)	0.173*
	Yes	3 (8.3%)	7 (19.4%)	
Extraprostatic extension	No	26 (72.2%)	18 (50.0%)	0.053*
	Yes	10 (27.8%)	18 (50.0%)	
Surgical margin positivity	No	27 (75.0%)	25 (69.4%)	0.599*
	Yes	9 (25.0%)	11 (30.6%)	
Pathological lymph node involvement	No	36 (100.0%)	30 (83.3%)	**0.011***
	Yes	0 (0.0%)	6 (16.7%)	
Radical prostatectomy pathology	T2	26 (72.2%)	17 (47.2%)	**0.031***
	≥ T3	10 (27.8%)	19 (52.8%)	
Radical prostatectomy gleason grades	Gleason 6	13 (36.1%)	7 (19.4%)	**0.022****
	Gleason 7	22 (61.1%)	21 (58.3%)	
	≥ Gleason 8	1 (2.8%)	8 (22.3)	
Postoperative PSA (3rd month)	Nadir	36 (100%)	33 (91.7%)	**0.239****
	Persistent	0 (0.0%)	3 (8.3%)	

*: Chi-square test, **: Fisher's exact test
EAU: European Association of Urology, eLND: Extended pelvic lymphadenectomy, PSA: Prostate specific antigen

was also 248 minutes for the first 16 cases. Similar to our study, Di Gioia et al. (12) and Mitre et al. (13), in their single-surgeon series, also divided their cohorts of 165 and 240 patients into three groups and observed a statistically significant reduction in operative times as the series progressed. In Çelen et al. (14) study, which evaluated the first 80 LRP cases divided into four groups following a 2-year modular mentored training (first-hand assistant in the first 50 LRP cases and surgeon in 20 LRP

Table 4. Nerve-sparing status, complications and additional intervention data of all patients		
	Frequency	**Percent (%)**
Nerve-sparing procedure		
-Bilateral intrafascial	15	20.8
-Unilateral intrafascial	7	9.7
-Bilateral interfascial	7	9.7
-Unilateral interfascial	2	2.8
-Unilateral intrafascial, unilateral interfascial	4	5.6
-Non-nerve sparing	37	51.4
Intraoperative complications*		
-Bleeding requiring blood transfusion	5	6.9
-Rectal injury	1	1.4
- Spontaneous urethral catheter removal after anastomosis	1	1.4
Early Postoperative complications*		
-Lymphatic leakage	5	6.9
-Urinary leakage	3	4.2
-Spontaneous urethral catheter removal	2	2.8
-Fewer and an infection requiring IV antibiotics (pneumonia, urinary tract infection, epididymo-orchitis)	3	4.2
-Wound infection	1	1.4
-Lymphocele requiring drain placement	1	1.4
-Rectourethral fistula	1	1.4
Additional intervention		
-Cystourethroscopy for urethral catheter placement over a guide wire (under local anesthesia)	2	2.8
-Cystourethroscopy for urethral catheter placement over a guide wire (at the end of the procedure with same anesthesia)	1	1.4
-Perineal rectourethral fistula repair with gracilis muscle (under general anesthesia)	1	1.4
*: Some patients experienced multiple complications. For example, one of our patients had an intraoperative rectal injury, and in the early postoperative period, a rectourethral fistula, urinary tract infection requiring IV antibiotics, and lymphocele requiring drain placement developed		

cases with the assistance of an experienced LRP surgeon,) during residency, a statistically significant decrease in operative times was observed. In this study, the mean operation time in the first group of 20 patients was 177 minutes, while in the fourth group, it decreased to 126 minutes, and the mean operation time of all 80 patients was 156 minutes (14). In both Çelen et al. (14) study and the present study, the training center was the same. Compared with the 2-month observership training, it be considered that the a 2-year modular mentored training during residency had an impact on operative times from the beginning of the learning curve.

In our study, we did not observe a statistically significant difference in complications. In the studies by Di Gioia et al. (12) and Mitre et al. (13), a statistically significant reduction in complications was observed between the groups. We believe that the primary reason for not achieving a reduction in complications is that group B consisted of a higher number of high-risk patients according to the EAU risk groups, which also led to more lymphadenectomies being performed in this group. An analysis of complications related to lymphadenectomy in group B, including a rectal injury in a patient with locally advanced prostate cancer, showed no statistically significant difference in complications compared to group A. Unlike the present study, in Mitre et al. (13) study, there were fewer pathological T3 or higher prostate cancers in the second and third groups. In the present study, the transperitoneal approach was statistically significantly more common in group B; however, no cases of bowel injury or ileus occurred in any of the patients. As the learning curve for LRP progresses, many series, including Mitre et al. (13) study, have demonstrated a decrease in blood transfusion rates. However, in the present study, no statistically significant difference was detected; in fact, an increase in blood transfusion rates was observed in group B. Similarly, in Skrekas et al. (11) study, the transfusion rate was found to be higher in group 1, where the mentor acted as the primary surgeon and the trainee assisted, compared to other groups (13). In the present study, one patient experienced a rectal injury, and despite repair and colostomy, a rectourethral fistula developed. At postoperative month 4, perineal rectourethral fistula repair was performed using a gracilis flap, and the colostomy was closed in the following months. When comparing similar series, Brown and Sajadi (15) reported one case of rectal injury in a series of 32 patients, Mitre et al. (13) reported three cases in a series of 55 patients, and Jakóbczyk et al. (16) reported three cases in a

series of 30 patients. However, in Çelen et al. (14) study, which involved 80 cases following a 2-year modular mentored training during residency, no rectal injuries were observed.

In the literature, as seen in studies by Skrekas et al. (11), Fabrizio et al. (5) and Çelen et al. (14) no statistically significant changes in hospitalization time have been observed. In contrast, in the present study, hospitalization time increased statistically significantly. This is likely due to the significantly higher rate of lymphadenectomy performed in group B, resulting in longer hospital stays for these patients. Similarly, in the present study, we observed a statistically significant increase in urinary catheter time in group 2. We believe this is because, in the first 17 patients of the series, catheter removal was performed between 7-10 days after performing cystograms and there was one patient in group 2 with a urinary catheter duration of 130 days. After the first 17 cases, as we no longer had the option to routinely perform cystograms the urinary catheter was kept for 14 days based on the surgeon's preference.

As the learning curve in LRP progresses, the rate of positive surgical margins, which is an important criterion for evaluating the oncological outcomes of the surgery, begins to decrease and eventually reaches a plateau (9). In the present study, we did not observe a statistically significant difference in terms of positive surgical margins between the two groups, similar to Çelen et al. (14) study, which also did not find a statistically significant difference across four groups. In fact, the rate of positive surgical margins was 25% in group A, while it was 30.6% in group B. In fact, the expected outcome is a decrease in the rate of positive surgical margins as experience increases, similar to Mitre et al (13) study, where the rates of positive surgical margins were 29.1% in group A, 21.8% in group B, and 5.5% in group C. An even more interesting finding is that, although no statistically significant difference was detected in Skrekas et al. (11) study, the rate of positive surgical margins (43.8%) in group 1, which consisted of patients operated on by a mentor with prior experience of over 200 LRP cases, was higher than in the other groups, which were operated on by a trainee. At this point, it is important to consider also pathological stage T3 and above, which is one of the most significant factors influencing positive surgical margins. In many studies, the rate of positive surgical margins for pathological T3 and higher disease is around 50% (15,17). In the present study, group B had a significantly higher number of patients with pathological stage T3 and above.

Study Limitations

This study has several limitations that should be acknowledged. First, as the data were collected prospectively but analyzed retrospectively, potential biases may have affected the interpretation of outcomes. Additionally, the follow-up period for the patients in this study was relatively short, especially concerning long-term cancer control measures such as BCR-free survival, progression-free survival, and overall survival, which were not assessed, and long-term functional outcomes such as urinary continence and erectile function. These outcomes were not included in the analysis due to incomplete data. Another limitation is the uneven distribution of high-risk patients between two groups, which may have affected the evaluation of complications, operation times, and oncological outcomes. This study reflects the experience of a single surgeon, which may limit the generalizability of the findings to other surgeons with different training backgrounds or institutional settings. The results may not be directly applicable to surgeons with varying levels of prior laparoscopic experience. Lastly, the relatively small sample size of 72 patients, divided into two groups, limits the generalizability of the findings to larger patient populations and other surgical settings.

Conclusion

This study evaluated the learning curve of a single urologist performing 72 LRP cases, without mentor guidance after a 2-month advanced laparoscopy observership. Significant improvements were observed in operative times; however, no statistically significant difference was found in complication rates or positive surgical margins between the two groups. The higher proportion of high-risk patients in the second group may have influenced this outcome.

While these findings indicate that LRP can be performed without direct mentorship, they should be interpreted with caution due to the study's limitations, including its single-surgeon experience and relatively small sample size. The results may not be generalizable to surgeons with varying levels of laparoscopic training or to different institutional settings. Additionally, the lack of long-term follow-up prevents a comprehensive assessment of oncological and functional outcomes. Future studies with larger cohorts and standardized training protocols could provide more definitive insights into optimizing the learning curve and improving surgical outcomes.

Ethics

Ethics Committee Approval: The study was conducted in accordance with the Declaration of Helsinki and was approved by the Institutional Review Board of University of Health Sciences Türkiye, Kartal Dr. Lütfi Kırdar City Hospital (protocol no: 2024/010.99/10/4, date: 29.11.2024).

Informed Consent: Written informed consent was obtained from all participants included in the study.

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