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Comparison of Open and Laparoscopic Simple Prostatectomy Outcomes: Experiences of a Single Surgeon

Açık ve Laparoskopik Basit Prostatektomi Sonuçlarının Karşılaştırılması: Tek Cerrah Deneyimi

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Abstract

Objective: To compare the open simple prostatectomy (OSP) and laparoscopic simple prostatectomy (LSP) performed due to benign prostatic enlargement greater than 80 cc.
Materials and Methods: Between January 2015 and July 2021, patients who underwent OSP and LSP were retrospectively screened. The patients' demographic, preoperative, perioperative, and postoperative data were noted and compared.
Results: The data of a total of 90 patients, including 55 (61.1%) cases in the OSP and 35 cases (38.9%) in the LSP group were analyzed. Age, comorbidity rates, and body mass index scores of the patients were comparable. There was also no significant difference in the preoperatively calculated mean prostate volume, and Qmax of the cases. The mean operative time was significantly longer for LSP ($p<0.0001$). The median blood loss was 368 cc (250) and 80 cc (35) in the OSP and LSP groups, respectively, indicating significantly higher values in the OSP group ($p<0.0001$). The mean hospital stay was statistically significantly higher in the OSP group (8.1±4.3 days) compared to the LSP group (3.6±1 days) ($p<0.0001$). Minor complications were observed in 21 (38.2%) patients in the OSP and five (14.2%) patients in the LSP group with a significant intergroup difference ($p=0.007$).
Conclusion: Laparoscopic technique is a safe and effective procedure for large prostatic adenomas. Compared to open surgery, LSP has a longer operative time but is associated with greater patient comfort and lower complication rates.

Keywords: open simple prostatectomy, laparoscopic simple prostatectomy, benign prostatic enlargement, bladder outlet obstruction

Öz

Amaç: Bu çalışmada >80 cc üzeri benign prostat büyümesi sebebiyle açık basit prostatektomi (ABP) ve laparoskopik basit prostatektomi (LBP) yapılan hastaların verilerini karşılaştırmayı hedefledik.
Gereçler ve Yöntemler: Ocak 2015-Temmuz 2021 tarihleri arasında ABP ve LBP uygulanan hastalar geriye dönük olarak tarandı. Hastalara ait demografik veriler, preoperatif, peroperatif ve postoperatif döneme ait veriler not edildi ve karşılaştırıldı.
Bulgular: ABP grubunda 55 (%61,1) hasta, LBP grubunda 35 (%38,9) hasta olmak üzere toplam 90 hastanın verileri incelendi. İki grup arasında yaş, komorbidite oranları ve vücut kitle indeksi arasında anlamlı fark izlenmedi. Gruplar arasında preoperatif prostat hacmi, IPSS ve Qmax değerleri arasında anlamlı fark izlenmedi. LBP grubunda anlamlı yüksek operasyon süresi izlendi ($p<0,0001$). ABP grubunda median kan kaybı 368 cc (250) ve LBP'de median 80 cc (35) olarak hesaplandı ve ABP'de anlamlı yüksek değerler saptandı ($p<0,0001$). Hastanede kalış süreleri ABP grubunda ortalama 8,1 ± 4,3 gün ve LBP grubunda 3,6 ± 1 gün olarak saptandı ve ABP için anlamlı yüksek olarak saptandı ($p <0,0001$). ABP grubunda 21 (%38,2) hastada, LBP grubunda 5 (%14,2) hastada minör komplikasyon izlendi ve iki grup arasında anlamlı fark izlendi ($p=0,007$).
Sonuç: Büyük prostat adenomlarına yönelik olarak uygulanan simple prostatektomi operasyonu laparoskopik olarak güvenli ve efektif olarak uygulanabilir. Açık cerrahiye oranla LBP, daha uzun operasyon süresine sahip olmakla birlikte, daha belirgin hasta konforu ve daha düşük komplikasyon oranları ile ilişkilidir.

Anahtar kelimeler: açık basit prostatektomi, laparoskopik basit prostatektomi, iyi huylu prostat büyümesi, mesane çıkım tıkanıklığı

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Introduction

Bladder outlet obstruction (BOO) due to benign prostatic hyperplasia (BPH) is one of the most common causes of lower urinary tract symptoms (LUTS) in men. Transurethral resection of the prostate (TUR-P) is the standard surgical technique to be applied in patients with a prostate volume of 30-80 cc [1]. According to the current guidelines, open simple prostatectomy (OSP), holmium laser enucleation of the prostate (HoLEP), and bipolar enucleation are recommended techniques in the presence of enlarged adenoma tissue (>80 cc), and short-term and long-term functional outcomes of these methods are reported to be comparable [2].

The main limitations of OSP are its relatively higher morbidity and blood transfusion rates (7-14%) [3,4], while those of the HoLEP technique is its longer learning curve, unavailability in some centers [5]. The bipolar enucleation technique shows a similar safety profile to HoLEP [6,7]. In addition to these techniques, Mariano et al. described the laparoscopic simple prostatectomy (LSP) in 2002 and Sotelo et al. described robot-assisted simple prostatectomy (RASP) in 2008 [8,9]. LSP and RASP, which are classified as minimally invasive simple prostatectomy (MISP) techniques, have been found to provide similar functional outcomes, as well as having common advantages compared to the open surgery in terms of blood loss and hospital stay. LSP is one of the main alternatives to OSP, but it has some disadvantages such as its higher cost, requirement of special equipment, and their inapplicability in every clinic [10].

This study aims to compare the perioperative and postoperative results and long-term functional outcomes of the OSP and LSP operations performed by a single surgeon in our clinic.

Materials and Methods

On receiving the ethics committee approval (Umraniye Training and Research Hospital Ethics Committee, approval date and number 2022/37); patients who underwent OSP or LSP performed by a single surgeon between January 2015 and July 2021 were retrospectively screened. Patients operated at the beginning of the learning curve for LSP were not included in the study. Patients with a prostate volume of <80 cc, missing data, history of previous prostatic or urethral surgery or urethral stenosis, neurovesical dysfunction and/or prostate cancer, and those with a postoperative follow-up period of fewer than six months were excluded from the study. Among the patients with significant LUTS and a prostate volume greater than 80 cc, surgical treatment was recommended for those with a preoperative International Prostate Symptom Score (IPSS) of ≥12 and/or Quality of Life (QoL) score of ≥4 and/or post-void residual (PVR) urine of >50 ml if they were unresponsive to medical treatment and/or upon patient request [11].

Surgical Technique

For OSP, preoperative cystourethroscopy was performed. Through Pfannenstiel incision the Retzius space was reached. Two sutures were placed on the bladder. The bladder was opened, and the prostate gland was released with cautery. Subsequently, digital enucleation of the prostate from its capsule was performed. Hemostatic sutures were placed on the bladder neck at the 5, 7, 1, and 11 o'clock positions. The bladder wall was closed in two layers. A drain was placed in the Retzius space. The abdominal wall was closed in layers.

LSP was performed under general anesthesia with the patient in the supine position. Prophylactic antithrombotic agents and antibiotics were administered. A two-way 18-Fr Foley catheter was introduced transurethrally into the bladder. A 2-cm midline skin incision was made immediately below the umbilicus. Following the incision of the rectus fascia, the rectus muscles were dissected bluntly to enter into the extraperitoneal space. A minimal area was created with finger dissection and using a balloon trocar (Spacemaker™ Pro Access & Dissector System Covidien, Dublin, Ireland), Retzius space sufficient for surgical manipulations was exposed under direct vision. One 10-mm trocar was inserted as the camera port, and three 5-mm trocars as the working ports. Working trocars were placed 2 cm lateral to the anterior iliac crest on the right and left sides, and the other 5-mm trocar was placed lateral to the rectus sheath on the right. After the excision of periprostatic fatty tissue, an incision was made into the prostate capsule until adenoma tissue was reached without descending to the lateral of the capsule. After adenoma tissue was identified, the entire adenoma tissue was dissected sharply or bluntly using harmonic (HARMONIC® Ethicon, Raritan, New Jersey, USA) or monopolar scissors. Hemostasis was achieved in case of need, with bipolar or harmonic scissors. In patients with an enlarged prostate, the incision was extended laterally if necessary. Adenoma tissue was removed and taken into an endobag. The bladder neck mucosa and posterior prostatic capsule were trigonized with 3/0 polyglactin sutures. A three-way Foley catheter was inserted transurethrally into the bladder. The prostatic capsule was sutured continuously with 2/0 polyglactin sutures. After confirming that there was no leakage, a drain was placed in the Retzius space, and the bladder was continuously irrigated with saline solution. The specimen was morcellated with scissors until it could be drawn out through the skin incision and taken into the bag. In cases with bladder stones, the stones were extracted through the capsular incision. Any bladder diverticulum was also simultaneously resected.

Descriptive and Perioperative Analyses

Preoperatively, age, body mass index (BMI), medical history, serum PSA, routine biochemistry and coagulation parameters, presence of indwelling bladder catheter, maximum urinary flow (Qmax) and uroflowmetry parameters, IPSS, IPSS-QoL Index, International Index of Erectile Function-5 (IIEF-5) scores were recorded. Prostate dimensions were measured using transrectal ultrasonography (TRUS). In the presence of suspected prostate cancer, a TRUS-guided biopsy was performed preoperatively. Operative time and intraoperative blood loss were evaluated as perioperative parameters and duration of catheterization, length of hospital stay, drain dwell times, and decrease in hemogram as postoperative parameters. Complications were classified according to the Clavien-Dindo classification system and

divided into early and late stages according to their occurrence before or after the first postoperative 30 days [12].

To evaluate functional outcomes, uroflowmetry parameters, IPSS, IPSS-QoL index, and IIEF-5 scores were evaluated at postoperative six months. The pad test was used to evaluate the status of urinary continence. Continence was defined as the absence of any pad use due to urinary leakage. In addition, the development of urethral stricture, bladder outlet obstruction, residual adenoma tissue, and postoperative acute urinary retention was noted.

Statistical Analysis

Categorical data were presented as numbers and percentages. Mean and standard deviation values were calculated for numerical data. The Kolmogorov-Smirnov test was used to test the normality of the distribution of numerical data. The Student's t-test was used to compare normally distributed numerical data. The Mann-Whitney U test was performed to compare the mean values of data without normal distribution. The frequencies of categorical variables were compared with the Pearson chi-square and Fisher's exact tests. A p-value below 0.05 was considered statistically significant. Statistical analyses were undertaken using the Statistical Package of Social Sciences version 21 (IBM SPSS Statistics; IBM Corp., Armonk, NY).

Results

The data of a total of 90 patients, including 55 (61.1%) cases in the OSP and 35 (38.9%) cases in the LSP group, were analyzed. The mean age of the whole patient group was 68 ± 6.5 years. The age, comorbidity rates, BMI, and the American Society of Anesthesiologists (ASA) scores the proportion of patients with preoperative catheters and concurrent bladder stones, preoperatively measured PSA values and the number of TRUS-guided biopsies performed were comparable. The mean prostate volume was 153.5 ± 55.2 cc in the OSP group and 148.2 ± 39.4 cc in the LSP group, indicating lack of any significant intergroup difference. Both groups also did not significantly differ in terms of the preoperatively measured bladder capacity and PVR values. The number of median lobes and bladder diverticula were also comparable between groups. Lastly, no significant intergroup differences were detected in terms of the preoperative Qmax, IPSS-QoL, and IIEF-5 values.

Considering perioperative parameters, the mean operative time was 107.8 ± 19 minutes in the OSP group and 152.1 ± 42.6 minutes in the LSP group, revealing a significant intergroup difference ($p<0.0001$). The median blood loss was 368 cc (250) and 80 cc (35) for the OSP and LSP groups, respectively, indicating a significantly higher blood loss in the OSP group ($p<0.0001$). When the transfusion rates in the perioperative and postoperative periods were compared between both groups,

1. Preoperative, peroperative and postoperative datas

Parameters (mean ± SD)	**Total n=90**	**Group 1 55 (61,1)**	**Group 2 35 (38,9)**	**p**
Age (years)	68 ± 6,5	68,4 ± 6,4	67,3 ± 6,7	0,429
BMI (kg/m^2)	25,6 ± 2	25,7 ± 1,8	26,1 ± 1,3	0,367
PSA (ng/ml)	8 ± 4,8	8 ± 5	8,1 ± 4,6	0,963
Preop Hct (%)	41 ± 3,9	41,3 ± 4	40,5 ± 3,8	0,322
Prostate volume (cc)	151,4 ± 49,5	153,5 ± 55,2	148,2 ± 39,4	0,623
Preop. bladder capacity (cc)	136 ± 55,5	135 ± 54,3	137,6 ± 58,1	0,833
Preop. PVR$^+$ (cc)	167,5 (148,7)	180 (156)	155 (100)	0,788$^{\&}$
Preop. Qmax (mL/sc)	6,6 ± 2,8	6,7 ± 2,9	6,5 ± 2,5	0,806
Preop. IPSS	32,4 ± 2,1	32,2 ± 2,2	32,6 ± 2	0,429
Preop. IPSS- QoL Index	5,5 ± 0,5	5,4 ± 0,5	5,6 ± 0,4	0,090
Preop. IIEF-5	18 ± 2,5	17,8 ± 2,5	18,4 ± 2,7	0,265
Operation time (min)	125,1 ± 37,2	107,8 ± 19	152,1 ± 42,6	**<0,0001**
Peroperative blood loss$^+$ (cc)	290 (365)	368 (250)	80 (35)	**<0,0001$^{\&}$**
Htc decrease	8,5 ± 4,7	10,8 ± 4,5	5 ± 2	**<0,0001**
Drain time (day)	3,8 ± 2,4	5 ± 2,3	1,8 ± 0,4	**<0,0001**
Foley cathater (day)	6,2 ± 3,1	7,6 ± 3,3	4 ± 0,5	**<0,0001**
Hospital stay (day)	6,3 ± 4,1	8,1 ± 4,3	3,6 ± 1	**<0,0001**
Follow up (month)	11,5 ± 3,8	11,3 ± 2,7	11,8 ± 4,3	0,239

BMI: body mass index; Hct: hematocrit; PVR: post voiding residual urine; IPSS: international prostate symptom score; QoL: quality of life; IIEF-5: international index of erectile function & Mann-Whitney U Test + Presented as median (IQR)

significantly higher values were found in the OSP group ($p<0.0001$). The mean duration of follow-up with a drain was 5 ± 2.3 days in the OSP group and 1.8 ± 0.4 days in the LSP group, with a significantly longer follow-up period for the OSP group ($p<0.0001$). The duration of follow-up with a Foley catheter in the postoperative period was also found to be significantly longer in the OSP group ($p<0.0001$). The mean length of hospital stay was significantly higher in the OSP group (8.1 ± 4.3 days) compared to the LSP group (3.6 ± 1 days) ($p<0.0001$). Preoperative, perioperative, and postoperative data are shown in **Table 1**.

As a result of the pathological evaluation, BPH was detected in 72 (80%), chronic prostatitis in 15 (16.6%), and Gleason 3+3 prostate adenocarcinoma in three (3.3%) patients. Patients with prostate cancer were included in the active surveillance protocol, and any increase in PSA levels was not observed during their follow-up. The distribution of pathological data was similar.

Complications were observed in 31 (34.4%) patients in the perioperative and early postoperative periods including 26 (28.8) minor (Clavien Grade 1-2) and five (5.5%) major (Clavien Grade 3-4) complications. Minor complications were observed in 21 (38.2%) patients in the OSP and five (14.2%) patients in the LSP group, with a statistically significant intergroup difference ($p=0.007$). Major complications were observed in four patients (7.2%) in the OSP and one (2.8%) patient in the LSP group, indicating lack of any intergroup significant difference. The patients with a fever, wound infection, and subileus were followed up conservatively, while those who developed urinary retention after catheter removal were followed up with an intraurethral Foley catheter for three days. In case of the obstruction of the catheter due to a clot, irrigation was applied. Endoscopic operations were performed on the patients who could not be treated with irrigation. Reoperation was required in one (1.1%) patient in the OSP group due to bleeding. Sepsis was observed in two (2.2%) patients in the OSP group, who were then referred to the intensive care unit. Complications are presented in **Table 2**.

In the late postoperative period, incontinence was observed in three (5.4%) patients and stricture development in one (1.8%) patient in the OSP group without any intergroup difference. The patients who developed incontinence were given medical treatment, and those who developed stenosis were treated with the appropriate surgical method.

The parameters of functional outcomes evaluated at the preoperative and postoperative six months revealed that the increase in the bladder capacity was significantly higher in the LSP group than in the OSP group ($p<0.0001$). While no significant difference was observed between the two groups regarding the changes in the PVR and IIEF-5 parameters, the changes in the Qmax, IPSS, and IPSS-QoL Index parameters were significantly higher in the LSP group ($p<0.0001$ for all) (**Table 3**).

Discussion

Among the operations performed for enlarged prostate tissue, the OSP technique is applied as the first choice in many centers, despite all other recent developments [13]. In a study conducted in the United States of America between 2002 and 2012, Pariser et al., reported an annual decrease of 145 cases undergoing OSP, while there was a gradual increase in the use of minimally invasive techniques [14]. In a meta-analysis undertaken in 2021 comparing different operations performed on prostates with a volume of over 60 cc, HoLEP, enucleation of the prostate with a diode laser, bipolar energy, and LSP were found to be superior to OSP and monopolar TURP [15].

In 2012, Asimakopoulos et al., conducted a systemic review of existing literature concerning LSP and reported that LSP provided lesser blood loss, shorter postoperative catheterization time, and hospital stay compared to open surgery. In that review, longer operative time was noted as the only disadvantage of LSP [16]. In another study on this subject, Autorino et al. stated that extirpative and reconstructive parts were the challenging steps that complicated MISP [17].

Porpiglia et al. reported that the operative times of the OSP and LSP techniques were similar [18]. However, Garcia-Segui and Gascon-Mir determined the operative time as 101.2 minutes for OSP and 135.2 minutes for LSP and noted a significant intergroup difference [19]. In a meta-analysis conducted in 2019, it was stated that MISP techniques had longer operative times compared to OSP [20]. In this study, the operative time was 107.8 ± 19 minutes for OSP and 152.1 ± 42.6 minutes for LSP, with a significantly longer operative time for LSP ($p<0.0001$). We consider that these differences in operative times reported in the literature may be related to differences in prostate volumes, surgical experience, and anatomical variations. Although our study was not aimed at this, we think that operative times may be shortened with the increase in surgical experience.

In our study, the median blood loss was 368 cc (250) in the OSP and 80 cc (35) in the LSP group, indicating a significantly higher blood loss in the OSP group ($p<0.0001$). Similarly, in previous studies, significantly lower amounts of bleeding were detected in patients who underwent LSP [18,19]. A meta-analysis determined that MISP techniques provided lower bleeding rates compared to OSP [20]. It is considered that the ability of MISP techniques to enlarge images through advanced imaging methods facilitated more effective hemostasis of the vessels of proliferative prostate tissue and associated bleeding thus resulting in lower bleeding rates [21].

In this study, significantly lower hematocrit levels, higher transfusion and catheter irrigation rates, longer catheter dwell times, delayed drain and Foley catheter withdrawal times, and prolonged hospital stay were observed in the OSP group in the early postoperative period. In previous studies, the catheter dwell times were similarly found to be significantly higher in the OSP group [8,19,22]. In contrast, Porpiglia et al., did not detect a significant difference between the catheter dwell times of the surgical groups [18]. In the current study, the length of hospital stay was determined as 8.1 ± 4.3 days for the OSP group and 3.6 ± 1 days for the LSP group ($p<0.0001$), which is in agreement with many studies in the literature [19,22]. However, there are also studies suggesting that there is no significant difference in the length of hospital stay between the two techniques [18,19]. In a meta-analysis, a significant difference was found in favor of LSP in terms of catheter dwell times and length of hospital stay [20]. We consider that the reason for these contradictory findings

Table 2. Early and late complications

Early Complication	**Total n=90**	**Group 1 55 (61,1)**	**Group 2 35 (38,9)**	**p**
Minor Complications				**0,007**
Grade 1				
Fever	5 (5,5)	4 (7,2)	1 (2,8)	
Wound site infection	3 (3,3)	3 (5,4)	0 (0)	
Ileus	1 (1,1)	0 (0)	1 (2,8)	
Grade 2				
Transfusion	12 (13,3)	11 (20)	1 (2,8)	
Urinary retention after catheter removal	3 (3,3)	2 (3,6)	1 (2,8)	
Clot retention (need irrigation)	2 (2,2)	1 (1,8)	1 (2,8)	
Major Complications				0,385
Grade 3b				
Endoscopic clot removal	1 (1,1)	1 (1,8)	0	
Reintervention	1 (1,1)	1 (1,8)	0	
Open conversion	1 (1,1)	-	1 (2,8)	
Grade 4				
Sepsis	2 (2,2)	2 (3,6)	0 (0)	
Late Complications				
Incontinence (n; %)	3 (3,3)	3 (5,4)	0 (0)	0,079[!]
Stricture (n; %)	1 (1,1)	1 (1,8)	0 (0)	0,611[!]

!: Fisher Exact Test

Table 3. Functional outcomes

Parameters (mean ± SD)	**Total n=90**	**Group 1 55 (61,1)**	**Group 2 35 (38,9)**	**p**
Increase of bladder capacity (cc)	209,1 ± 116,8	168 ± 103,3	273,7 ± 108,3	**<0,0001**
Decrease of PVR (cc)	130,7 ± 79,7	128,1 ± 77,4	134,8 ± 84,2	0,702
Increase of Qmax (mL/sc)	18,1 ± 9,4	13,9 ± 6,3	24,8 ± 9,7	**<0,0001**
Change of IPSS	29 ± 2,6	28,1 ± 2,5	30,3 ± 2,2	**<0,0001**
Change of IPSS- QoL index	4,7 ± 0,9	4,3 ± 0,8	5,2 ± 0,6	**<0,0001**
Decrease of IIEF-5	0,9 ± 0,4	0,9 ± 0,3	0,9 ± 05	0,387

PVR: post voiding residual urine; IPSS: international prostate symptom score; QoL: quality of life; IIEF-5: international index of erectile function

in the literature is that parameters such as drain, and catheter withdrawal times, and hospital stay may vary depending on surgical and clinical preferences.

In a study undertaken by Manfredi et al., the rates of intraoperative, and early postoperative complications during the one-year follow-up period were reported as 2%, and 14%, respectively, while the complication rate was 5% in the late postoperative period [23]. In another study comparing the RASP and LSP techniques, Pavan et al., detected 3.1% minor and 2.1% major complication rates in the LSP group in the postoperative period, which were significantly lower compared to the RASP group [24]. Pariser et al. reviewed the national inpatient sample data of 35,000 patients who underwent simple prostatectomy over 10 years, and determined that minimally invasive techniques were associated with fewer complications [14]. When the total complication rates were evaluated in a meta-analysis, significantly lower complication rates were noted for the MISP group compared to the OSP group [20]. In our study, complications were observed in 34.4% of the patients in the perioperative and early postoperative periods.

After any surgery performed with the indications of BOO/BPH, questionnaires such as IPSS and IPSS-QoL, and parameters such as Qmax, bladder capacity, and PVR are important measures for monitoring the efficacy of treatment. Manfredi et al. investigated the long-term results of patients who underwent LSP, and showed that the Qmax values significantly increased in the early postoperative period, and maintained in the long term. In the same study, significant improvements were found in the IPSS and IPSS-QoL index scores in the early postoperative period, while no significant change was found concerning the IIEF-5 scores [23]. In a study comparing the RASP and LSP techniques, Pavan et al., reported significant improvements in all functional parameters in the postoperative period for both techniques. The authors also stated that the techniques applied did not have any effect on sexual function [24]. A meta-analysis could not demonstrate any difference between OSP and MISP in terms of functional outcomes [20].

In our study, as a result of the comparison of functional outcomes measured at the postoperative sixth month, LSP provided significant improvements in bladder capacity, Qmax value, and IPSS and IPSS-QoL index scores. Compared to open surgery, laparoscopic surgery has the advantage of obtaining a clearer image by providing a larger bleeding-free environment thanks to improved optical magnification and intra-abdominal pressure created. We believe that subcapsular dissection of the enlarged prostate in the bleeding-free environment is achieved more easily and bleeding control is realized with fewer sutures thanks to these advantages. We believe that the significant difference obtained in parameters such as IPSS and Qmax, which we think is related to QoL, is achieved thanks to such advantages offered by LSP.

Thanks to relatively lower amount of blood loss achieved in laparoscopic operations compared to open surgery, the need for transfusion is lowered with decreased complication rates. In addition, LSP has other advantages. Indeed, it is less painful and analgesic requirement is lesser in the early postoperative period with shorter hospital stay, and catheter dwell time. The advantages of the minimally invasive nature of laparoscopic surgery were also demonstrated in our study, as has been generally shown in the literature in studies comparing the laparoscopic and open techniques.

Although the data were collected prospectively, the retrospective nature of the analysis and the small number of patients were the limitations. In addition, presenting the data of a single surgeon who had completed the learning curve and the experiences of a single center has created an obstacle to the generalizability of the findings. It should also be kept in mind that similar results may not be obtained in less experienced centers. There is also a need for further studies with longer follow-up periods.

Conclusion

Laparoscopic technique is a safe and effective procedure for large prostatic adenomas. Compared to open surgery, LSP has a longer operative time but is associated with greater patient comfort and lower complication rates.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of University of Health Science, Umraniye Training and Research Hospital (Approval date and number: 10/02/2022-37).
Informed Consent: Written informed consent was obtained from patients who participated in this study.
Publication: The results of the study were not published in full or in part in form of abstracts.
Peer-review: Externally peer-reviewed.
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