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# Laparoscopic Radical Prostatectomy Alone or With Laparoscopic Herniorrhaphy

Orcun Celik, MD, Murat Akand, MD, Gokhan Ekin, MD, Ibrahim Duman, MD, Yusuf Ozlem Ilbey, MD, Tibet Erdogru, MD

## ABSTRACT

**Background and Objectives:** Prostate cancer and inguinal hernia are common health issues in men aged more than 50 years. Recently, more data are accumulating that laparoscopic radical prostatectomy (LRP) and laparoscopic inguinal hernia repair (LIHR) can be performed in the same operation. The purpose of this study was to compare patients who underwent simultaneous extraperitoneal LRP (E-LRP) and LIHR with control patients who underwent only E-LRP in a matched-pairs design.

**Methods:** Medical records of 215 patients were evaluated, and 20 patients who underwent E-LRP+LIHR were compared with 40 patients who underwent only E-LRP in a matched-pairs analysis. Preoperative clinical parameters (age, body mass index, prostate-specific antigen, clinical stage, Gleason score of the prostate biopsy, and prostate volume) and operative data (operation time, duration of catheterization, length of hospital stay, estimated blood loss, time to perform the anastomosis and its quality, and the percentage of patients with bilateral lymphadenectomy) were evaluated, as well as postoperative parameters (pathological stage, Gleason score, specimen weight, follow-up duration, biochemical recurrence, complication rates, and duration of postoperative analgesic treatment).

**Results:** No statistically significant differences were found in the preoperative and operative parameters between the 2 study groups. Pathological parameters and the follow-up period and complication rates were similar between the 2 groups.

**Conclusion:** Performing LIHR and E-LRP during the same operation is safe and feasible in the treatment of patients with prostate cancer and inguinal hernia.

**Key Words:** Extraperitoneal radical prostatectomy, Herniorrhaphy, Inguinal hernia, Laparoscopy.

## INTRODUCTION

Prostate cancer (PCa) is a major health threat for men, being the second greatest cause of cancer deaths among men in Europe and in our country.[1,2] The incidence of PCa has a tendency to increase and to be more common in men aged more than 50 years.[1] The lifetime prevalence rate of inguinal hernia (IH) in men aged more than 45 years ranges between 28.0 and 39.7%.[3] With this high prevalence rate, it is reasonable to assume that men who have localized PCa and are candidates for radical prostatectomy (RP) have the same risk of IH as age-matched men in the general population at the time of operation.

Various IH repair (IHR) techniques have been described over time. This operation can be performed in an open or laparoscopic fashion, with or without the application of mesh.[4] Either biodegradable or synthetic mesh is preferred in IHR techniques that include placement of mesh.[5] There are 2 recognized methods of laparoscopic IHR (LIHR): total extraperitoneal repair (TEP) and transabdominal preperitoneal repair (TAPP).[4,6] The recurrence of hernia and postoperative pain tends to be less after TEP.[7]

Laparoscopic radical prostatectomy (LRP) has gained importance in the treatment of localized PCa after Guillonneau et al[8] published their technique. Over time, extraperitoneal LRP (E-LRP) has been shown to be an effective and safe method for the management of PCa, with some advantages over the transperitoneal approach.[9,10] Although both transperitoneal and extraperitoneal techniques can be combined with LIHR, E-LRP is more advantageous, as it avoids the contact of the mesh with the

Department of Urology, Tepecik Education and Research Hospital, Izmir, Turkey (Drs Celik, Ekin, and Ilbey).

Department of Urology, Selcuk University, School of Medicine, Konya, Turkey (Dr Akand).

Department of Urology, Medical Park Antalya Hospital, Antalya, Turkey (Dr Duman).

Minimally Invasive Urology and Robotics Center, Department of Urology, Memorial Atasehir Hospital, Istanbul, Turkey (Dr Erdogru).

Drs Celik and Akand contributed equally to this work and should both be considered first authors.

Address correspondence to: Murat Akand, MD, Selçuk Üniversitesi, Alaeddin Keykubat Kampüsü, Tıp Fakültesi Hastanesi, E-Blok, Kat:1, Üroloji Polikliniği, Kampüs-Selçuklu/Konya/Türkiye. Telephone: +90-532-743-83-33, Fax: +90-332-241-21-84. E-mail: drmuratakand@yahoo.com

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bowel, thus markedly reducing the risk of adhesions. We regard the TEP+E-LRP combination as preferable in patients with an IH and localized PCa.

We used a matched-pairs design to compare results in patients who underwent simultaneous E-LRP and LIHR (E-LRP+LIHR) with those in a control group who underwent only E-LRP.

## MATERIALS AND METHODS

From March 2004 through November 2013, 340 patients underwent LRP by the same surgeon (T.E.). Of these patients, 85 had transperitoneal LRP (T-LRP) and 255 had E-LRP. After excluding the first 40 cases of E-LRP as constituting the learning curve, we evaluated 215 patients who underwent the procedure. A further 20 patients who underwent E-LRP+LIHR were evaluated and compared with 40 who underwent only E-LRP, in a matched-pairs analysis.

In the preoperative evaluation, the inguinal canals were examined by the same surgeon (T.E.) in patients maintained in the upright position during a Valsalva maneuver. For the patients with reducible IHs, regardless of defect size, TEP hernia repair was performed after RP was completed. Irreducible IHs were not managed with LIHR.

The technique used for E-LRP has been published.[11] After a transverse incision 1 cm below the umbilicus and a sharp incision of the rectus fascia, the Retzius space was accessed with blunt digital dissection between the rectus muscle and the posterior sheath of its fascia. Located 10 cm lateral to the infraumbilical incision, both medial 10-mm trocars were inserted into the preperitoneal space under digital control. After a 12-mm trocar was inserted into the infraumbilical incision, all trocars were fixed, and the wounds were closed with interrupted sutures. The lateral fusion of the fascia transversalis was incised below the epigastric arteries to reach Borgros' space, and 2 additional 5-mm trocars were inserted laterally under laparoscopic control. After high transection of the urachus and division of both lateral umbilical ligaments, the sixth trocar was placed in the right lower abdomen after the Retzius space was dissected completely. When indicated, a bilateral lymphadenectomy consisting of the obturator and internal and external iliac lymph nodes was performed.

After the endopelvic fascia was incised on both sides, the deep dorsal vein complex was controlled with sutures and divided. The prostatic apex was dissected meticulously, and the neurovascular bundles were preserved in the patients, as indicated. The division of the urethra was followed by the posterior dissection of the prostate and the seminal vesicles and vas deferens. The prostate was completely freed by division of the cranial pedicles and inserted into an organ bag. A vesicourethral anastomosis was created with running sutures and checked for watertightness.

The hernia sac was mobilized and dissected from the spermatic cord structures (**Figure 1**). The defect in the IH area was measured with a flexible plastic tape, a portion of polypropylene mesh with approximate dimensions of 8–10 × 10–12 cm was prepared, and a 6-cm vertical cut was made in the mesh extracorporeally to accommodate the spermatic cord (**Figure 2**). To facilitate placement, the mesh was rolled up and introduced through a 12-mm trocar. The unfolded mesh was positioned around the spermatic structures to cover the visible defect and anchored to the abdominal wall with 4 sutures on each corner (**Figure 3** and **4**).

Operation time, duration of catheterization, length of hospital stay, preoperative and postoperative hemoglobin values, estimated blood loss (EBL), time to perform the anastomosis and its quality, percentage of patients who underwent bilateral lymphadenectomy, and duration of analgesic treatment were recorded. The soundness of the anastomosis was evaluated by infusing 200 mL saline into the bladder through a urethral catheter after the vesicourethral anastomosis was completed and was classified into 4 groups: no leak, mild leak, moderate leak, and severe leak. Postoperative parameters were evaluated, including

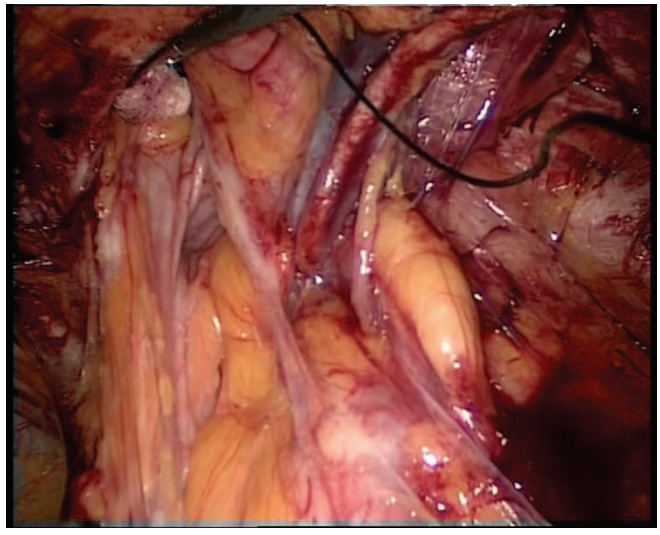

**Figure 1.** Dissection of the hernia sac with a laparoscopic peanut.

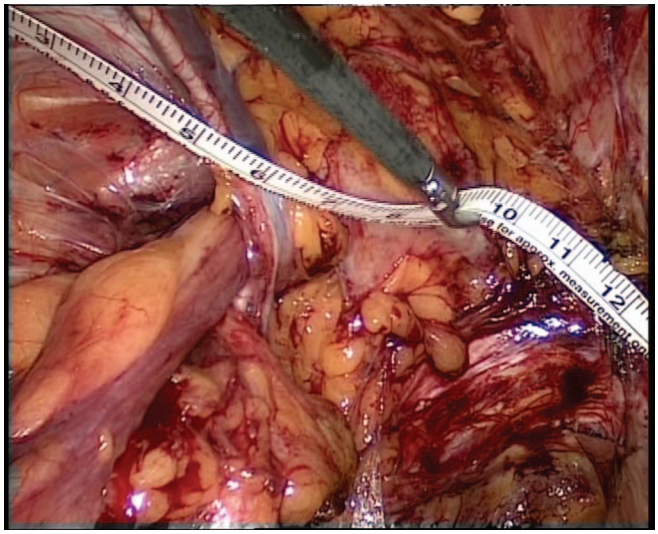

**Figure 2.** Measurement of the hernia defect with a flexible plastic ruler.

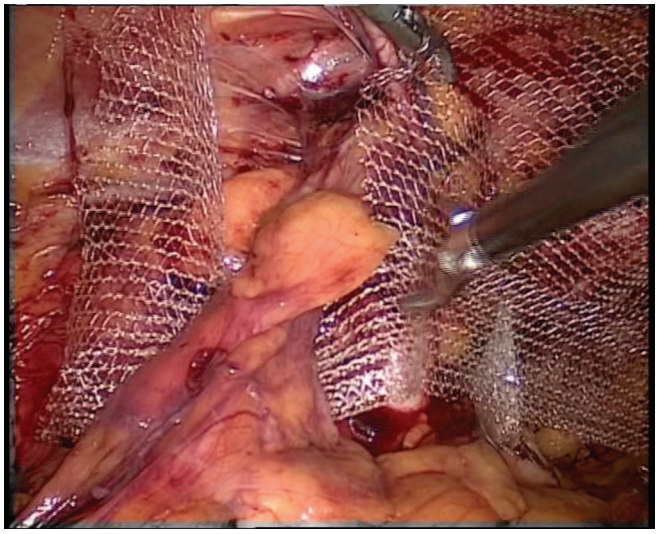

**Figure 3.** The polypropylene mesh prepared in accordance with the defect is placed around the cord.

pathologic stage and Gleason score, specimen volume, follow-up duration, and biochemical recurrence rates. Perioperative complications were collected and classified according to the modified Clavien-Dindo system.[12]

All patients had given written informed consent before the surgery for the use of the collected data at any time. The principles of the Declaration of Helsinki for research involving human subjects were followed during the study, and the confidentiality of the patients' data was guaranteed. The Institutional Ethics Committee approved the study.

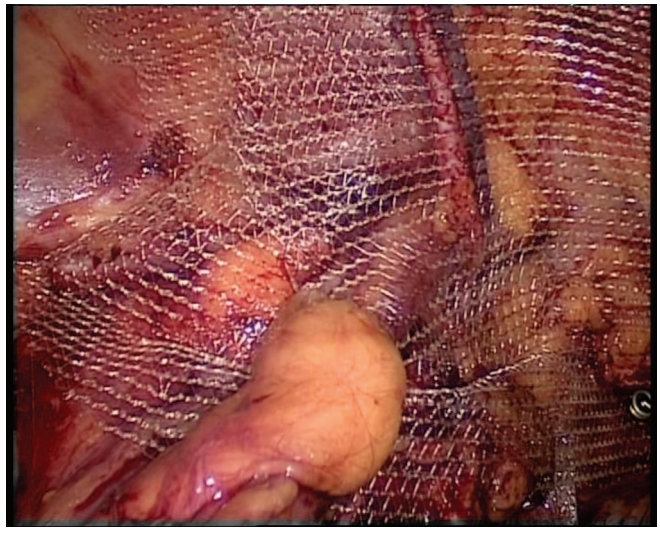

**Figure 4.** Final appearance of the properly placed mesh around the cord structures.

Numeric data were compared by independent *t* test, and the $\chi^2$ test was used for the comparison of the nonnumeric outcomes. $P < 0.05$ was considered statistically significant. All statistical analyses were performed with the IBM Statistical Package for Social Sciences (SPSS) Software, version 22 (Armonk, New York, USA).

## RESULTS

The patients' demographics and the operative and pathology results are presented in **Table 1**. No statistically significant difference was determined for age, body mass index (BMI), preoperative prostate-specific antigen (PSA) level, transrectal ultrasonography–determined prostate weight, and clinical stage between the 2 groups. Regarding the pathology findings (**Table 1**), Gleason score sums of the preoperative prostate biopsy and the specimen after prostatectomy, pathological stage, and specimen weights were not significantly different among the groups. Operation time, preoperative and postoperative hemoglobin values, EBL, duration of catheterization, hospital length of stay, time to perform the anastomosis and its quality classification, percentage of patients with bilateral lymphadenectomy, and duration of analgesic treatment were also similar between the 2 groups.

Perioperative complications according to the Clavien-Dindo classification (minor: grades 1 and 2; major: grades 3, 4, and 5)[12] are shown in **Table 2**. No lymphoceles were observed in either group. All patients in both groups had similar follow-up duration and biochemical recurrence rate during this period. None of the patients in the

**Table 1.**
Demographic, Operative, and Pathologic Results of E-LRP and E-LRP+LIHR

| | E-LRP+LIHR (n = 20) | E-LRP Only (n = 40) | *P* |
|---|---|---|---|
| Age (years) | 65.3 ± 3.8 | 65.1 ± 3.7 | .846 |
| BMI (kg/m$^2$) | 27.25 ± 3.84 | 27.32 ± 3.09 | .938 |
| PSA (ng/mL) | 8.95 ± 4.50 | 9.36 ± 6.49 | .800 |
| TRUS prostate weight (g) | 52.2 ± 14.4 | 53.1 ± 13.8 | .823 |
| Clinical stage | | | .327 |
| T1 | 16 (80) | 29 (72.5) | |
| T2 | 4 (20) | 11 (27.5) | |
| Biopsy GS | 6.35 | 6.48 | .867 |
| Operation time (minutes) | 195.9 ± 35.6 | 176.4 ± 69.9 | .157 |
| Catheterization time (days) | 7.1 ± 1.1 | 7.9 ± 2.8 | .141 |
| Hospitalization time (days) | 2.7 ± 0.9 | 3.3 ± 2.1 | .176 |
| Duration of analgesic treatment (days) | | | |
| Narcotic | 1.4 ± 0.4 | 1.2 ± 0.3 | .723 |
| Nonnarcotic | 1.9 ± 0.6 | 1.6 ± 0.7 | .691 |
| EBL (mL) | 265.3 ± 133.8 | 275.8 ± 129.2 | .707 |
| Preoperative Hb (g/dL) | 14.3 ± 1.4 | 14.0 ± 1.0 | .394 |
| Postoperative Hb (g/dL) | 12.1 ± 3.8 | 11.9 ± 1.1 | .744 |
| Delta Hb (g/dL) | 2.1 ± 1.1 | 2.0 ± 1.2 | .616 |
| Anastomosis time (minutes) | 25.7 ± 3.8 | 26.3 ± 4.1 | .592 |
| Anastomosis quality | | | .103 |
| No leak | 17 (85) | 36 (90) | |
| Mild leak | 3 (15) | 2 (5) | |
| Moderate leak | 0 (0) | 1 (2.5) | |
| Severe leak | 0 (0) | 1 (2.5) | |
| Pathological stage | | | .401 |
| T2 | 14 (70) | 32 (80) | |
| T3 | 6 (30) | 8 (20) | |
| Pathologic GS | 6.57 | 6.78 | .812 |
| Specimen weight (g) | 49.2 ± 10.4 | 52.4 ± 12.9 | .903 |
| Bilateral lymphadenectomy | 11 (55) | 16 (40) | .271 |

Data are expressed as the mean ± SD or n (%). Delta Hb: decrease in hemoglobin; GS, Gleason score; PSA, prostate-specific antigen; TRUS, transrectal ultrasonography.

E-LRP+LIHR group had a recurrence of IH during the follow-up time.

## DISCUSSION

RP is the treatment of choice with curative intent in PCa, and the use of LRP has gradually risen after Guillonneau et al[8] standardized the technique. Although the laparoscopic procedure carries a steep learning curve and a large number of operations is necessary to gain enough experience, experienced surgeons have reported promising results, with oncological and functional outcomes that are comparable with those of open surgery.[10] Although E-LRP is somewhat disadvantageous because of its narrower working space, it has gained acceptance among some sur-

**Table 2.**
Perioperative Complications According to the Clavien-Dindo Classification[12]

| | E-LRP+LIHR (n = 20) | E-LRP Only (n = 40 ) | P |
|---|---|---|---|
| Minor complications, Grades 1–2 | 6 (30) | 14 (35) | .893 |
| Grade 1, n | 4 | 9 | |
| Grade 2, n | 2 | 5 | |
| Major complications, Grades 3–5 | 0 (0) | 1 (2.5) | .658 |
| Grade 3a | 0 | 1 | |
| Follow-up duration (months) | 40.6 ± 11.5 | 48.2 ± 12.8 | .153 |
| Biochemical recurrence | 1 (5) | 3 (7.5) | .264 |
| Recurrence of inguinal hernia | 0 (0) | N/A | N/A |

Data were collected at the follow-up of patients in the E-LRP and E-LRP+LIHR groups and are expressed as the mean ± SD or n (%). N/A, not applicable.

geons, as it involves no contact with the bowel. E-LRP can be performed efficaciously and safely without a significant difference noted in the oncological results when compared with those of T-LRP.[11]

IH is a common problem in men aged more than 50 years, and IHR is the most frequently performed operation in general surgery. The incidence of subclinical IH was reported between 10 and 33%, whereas it was found to be 20% in autopsy studies.[13,14] The chance that a man will undergo an IHR during his life is 27%.[15] In a recent study evaluating 5870 men in Rotterdam, the 20-year cumulative incidence of having an IH was 14%.[16] When the probability of coexistence of these 2 common conditions is combined with the common observation that RP becomes more difficult after IHR, some surgeons recommend screening for PCa in all men who must undergo an IHR and vice versa.[17]

The potential risk factors including older age, lower BMI, bladder neck contracture, and a history of IH have been reported to be associated with IH after RP.[18,19] Several studies have shown that the incidence of IH increases in men who have undergone RP.[15,18,20–22] Sekita et al[15] found that the incidence of IH is higher after open simple prostatectomy and retropubic RP (RRP) when compared with that occurring after transurethral resection of the prostate (TURP). Although some researchers have stated that there is no difference in the incidence of IH between RRP and LRP,[19,21] in a recent study, Nilsson et al[22] reported that the incidence is increased in RRP versus that in minimally invasive RP (traditional LRP and robot-assisted LRP). Yoshimine et al[23] concluded that the incidence of IH is higher in E-LRP than in T-LRP.

Although there are conflicting conclusions about the feasibility of performing RRP and LRP after IHR, Katz et al[24] and Erdogru et al[25] showed that both operations can be performed successfully but pose increased complexity. Peeters et al[26] observed that RRP after preperitoneal IHR is more difficult to perform and is associated with a longer duration of hospitalization and less adequate lymphadenectomy for intermediate- and high-risk PCa. In their recent meta-analysis of 7497 patients from 11 studies, Picozzi et al[27] concluded that previous LIHR with mesh placement can complicate subsequent RP, regardless of the technique (open vs laparoscopic vs robotic), in terms of bleeding, catheterization time, and extent of pelvic lymphadenectomy. On the contrary, Spernat et al[28] reported that RP (open, laparoscopic, or robotic) is not contraindicated and can be performed safely after LIHR; however, lymph node dissection cannot be performed in 50% of patients because of adhesions, and this possibility may lead to inadequate staging and treatment.

There are several studies in the literature emphasizing that simultaneous repair of IHs detected during LRP is easy, and therefore, an HR should not be postponed. In their series consisting of 93 cases of preperitoneal IHRs performed during endoscopic extraperitoneal RP, Do et al[29] concluded that neither the complication rates nor the oncological and functional outcomes were influenced by the simultaneous performance of the procedures.

Teber et al[30] established that a simultaneous LIHR with prosthetic mesh during LRP results in a statistically significant increase in the duration of the operation and the need for analgesics, although no significant differences were recorded in complication rates and positive surgical

margins. On the other hand, Gözen et al[31] found that simultaneous LIHR does not affect the duration of the operation or complication rates and pain levels after E-LRP.

In the present study, we recorded a mean operative time of 195 and 176 minutes for groups with and without a simultaneous LIHR, respectively, although this 19-minute increase in favor of the repair group was not statistically significant. There are 2 possible explanations for this result. We can conclude that simultaneous LIHRs can be performed by an experienced surgeon without a significant increase in operation time. On the other hand, these results may be due to the small sample size. No statistically significant difference was observed in any of the other parameters between the 2 groups, which appears to be consistent with data reported in the literature. Our results for complication rates and duration of the operation were similar to those of Gözen et al.[31] Although lymphadenectomy during E-LRP has a tendency to cause more lymphoceles than the transperitoneal approach, we did not observe this complication in either study group. Development of a lymphocele can also affect the rate of other complications (eg, mesh-related infection).

Performing an LIHR with prosthetic mesh during an LRP raises concerns about infection due to urine leakage from the vesicourethral anastomosis. LIHR has a significantly lower incidence of infection and inguinal hematoma when compared to open surgery. The incidence of mesh-associated infection in LIHR is very low (range, 0–0.17%), perhaps because the contact of mesh with the skin is prevented when the mesh passes through the trocar.[4,29,31] Our mesh-related infection incidence of 0% is consistent with that reported in the literature.

This study has some limitations that should be noted. First, a relatively small number of patients was evaluated in each group, which may affect the reliability of the statistical analysis. We think that using a matched-pairs analysis compensated for this deficit to some degree. Second, a retrospective study instead of a prospective randomized one provides a lower level of evidence. A prospective randomized study with a high case volume would prevent selection bias and provide much more accurate results. Third, no information was available on the dose of the analgesic medications (narcotic or nonnarcotic) used in each group. As the study was retrospective, only data about the duration of analgesic treatment could be gathered from the progress notes. Although a slightly increased analgesic dose was observed in the E-LRP+LIHR group (data not shown), it was not clear why nor was the information suitable for statistical analysis, as data were missing in some patients' charts. Another limitation is the absence of data about the number of lymph nodes removed. It was not possible to make a comparison between the groups, as the data were not reported for every patient. The lack of centralized evaluation by a single pathologist may have contributed to this problem.

## CONCLUSION

Evaluating patients with PCa who will undergo E-LRP is important, as an IH can be efficiently and safely treated by simultaneous LIHR. Thus, the need for an extra operation with an additional financial burden on the health system can be avoided.

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