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ORIGINAL ARTICLE

Comparison of antegrade and retrograde laparoscopic radical prostatectomy techniques

Volkan Tugcu, Selcuk Sahin*, Berkan Resorlu, Ismail Yigitbasi, Abdullah H. Yavuzsan, Ali I. Tasci

Department of Urology, Bakirkoy Dr. Sadi Konuk Training and Research Hospital, Istanbul, Turkey

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Abstract We evaluated the effect of antegrade and retrograde approaches on functional recovery and surgical outcomes of extraperitoneal laparoscopic radical prostatectomy (LRP). We analyzed 135 patients who underwent extraperitoneal LRP, with the retrograde technique performed on 42 (31%; Group 1) and the antegrade technique on 93 (69%; Group 2). Both groups were statistically similar with respect to age, clinical stage, preoperative prostate-specific antigen (PSA) and American Society of Anesthesiologists (ASA) scores, prostate volume, and previous surgical history. Mean operative time was significantly longer in Group 1 (244 ± 18.3 vs. 203.3 ± 18.4 min, $p < 0.001$), whereas mean anastomosis times for both groups were similar (35.8 ± 7.2 vs. 34.7 ± 5.8 min, $p = 0.155$). Estimated blood loss and transfusion rates were significantly lower in Group 2. A significant difference was observed for both hospitalization (6.79 ± 3.3 vs. 5.46 ± 3.08 days, respectively; $p = 0.026$) and catheterization times (12.24 ± 2.1 vs. 11 ± 1.08 days, respectively; $p = 0.001$) for Group 2. The total complication rate was 47.6% in Group 1, and 11.8% in Group 2 ($p < 0.01$). Rates of positive surgical margins were 14.2% and 15% for Groups 1 and 2, respectively. At the 12-month interval from operation, similar recoveries in urinary continence were obtained for both groups (81% in Group 1; 91% in Group 2). Upon comparison of the two LRP techniques, we found that both were effective; however, the latter resulted in lower minor complication rate, lower blood loss, shorter operation time, and shorter length of hospital stay.

Conflicts of interest: All authors declare no conflicts of interest.

* Corresponding author. Department of Urology, Bakirkoy Dr. Sadi Konuk Training and Research Hospital, Tevfik Saglam Cad, No: 11, Zuhuratbaba, Bakirkoy, Istanbul, Turkey.
E-mail address: urosahin@gmail.com (S. Sahin).

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Introduction

Radical prostatectomy is the first-line treatment option for patients with clinically localized prostate cancer [1]. Over the last decade, laparoscopic radical prostatectomy (LRP) has become increasingly used in the surgical management of prostate cancer [1,2]. Functional results of LRP have been at least comparable to those of open radical prostatectomy, but have the advantages of superior cosmesis, lower blood loss, and reduced morbidity [3].

Among the available LRP approaches are transperitoneal and extraperitoneal methods. Both techniques can be performed from the prostate apex to the base (retrograde or ascending technique) or from the base to the apex (antegrade or descending technique) [4]. Although many teams have published various series of transperitoneal or extraperitoneal laparoscopic prostatectomies, only one study comparing the functional and surgical outcomes of antegrade and retrograde LRP techniques has been reported [3–6]. In this study, we evaluated the effect of antegrade and retrograde approaches on the functional recovery and surgical outcomes of extraperitoneal LRP technique.

Materials and methods

Patients

We analyzed 135 patients who underwent extraperitoneal LRP, with the retrograde technique performed on 42 patients (31%; Group 1) and antegrade technique performed on 93 (69%; (Group 2), as described below. The data were prospectively collected and retrospectively analyzed. The treatment method was chosen by taking into account patient preference after the advantages and disadvantages of the techniques had been discussed with the patients. Operation was performed by the same surgeon in the same institution. We included the cases that were performed after an experience of >50 cases for both techniques. The study protocol was approved by the institutional ethical board at Bakirkoy Hospital, and written informed consent was provided by all patients.

Indications for LRP were generally the same as those for open prostatectomy. Patients with clinical stage T1c-2c prostate cancer with a life expectancy of >10 years were candidates for LRP. Preoperative, operative, and postoperative data were compared between the two techniques. These include data for age, preoperative prostate-specific antigen (PSA), body mass index, previous history of abdominal surgery, patient American Society of Anesthesiologists (ASA) score, clinical stage, Gleason score, operative time, estimated blood loss, transfusion rate, length of hospital stay, bladder catheterization, and analgesic requirement, as well as histopathologic findings such as surgical margin status, TNM stage, and Gleason score. To categorize the complications, the recently updated Clavien classification system was used [7].

Surgical procedures

All retrograde and antegrade LRPs were performed through the Heilbronn technique and modified Brussels technique, respectively [8,9]. The former technique includes an ascending part, with early division of the urethra and posterolateral dissection of the prostate, followed by incision of the bladder neck and dissection of the seminal vesicles and vas deferens [8]. In the Brussels technique, includes an descending part which is the first step is the dissection of the bladder neck. Then the vas deferens and seminal vesicles are dissected followed by ligation of the dorsal vein complex and division of the urethra. An interrupted figure "X" UV anastomosis was performed [9].

Regardless of the approach, pelvic lymphadenectomy was performed when the PSA level was >10 ng/mL or when the Gleason score was 7 or greater. Unilateral or bilateral nerve-sparing procedure was performed in all potent patients with a PSA of <10 ng/mL and a Gleason score <7 and without any palpable nodule.

Follow up

Pre- and post-operative evaluation of continence and potency for all patients was performed by using the pad test and the Sexual Health Inventory for Men questionnaire. Patients not requiring any pads or those who did require one pad for safety were defined as continent. The use of one to two pads daily and normal physical activity (such as walking) was defined as mild incontinence. Severely incontinent patients used more than two pads per day. Functional results were recorded at 3, 6, and 12 months after operation.

Statistical analysis

All analysis was performed by using SPSS version 15.0 (SPSS Inc., Chicago, IL). Numerical parameters between both groups were compared using Student's t test. The chi-square test was used for comparison of descriptive data. Statistical significance was considered at $p < 0.05$.

Results

The mean age was 62.8 ± 6.2 years for patients in Group 1 and 63.5 ± 5.3 years in Group 2 ($p = 0.212$). Both groups were statistically similar with respect to age, clinical stage, preoperative PSA, ASA score, prostate volume, and previous abdominal/pelvic surgical history. The patient demographic characteristics for both groups are compared in Table 1.

Intraoperative and postoperative data are shown in Table 2. Mean operative time was significantly longer in Group 1 (244 ± 18.3 vs. 203.3 ± 18.4 min, $p < 0.001$), whereas mean anastomosis times were similar in both groups (35.8 ± 7.2 vs. 34.7 ± 5.8 min, $p = 0.155$). No statistical difference in terms of nerve-sparing procedures or lymph node dissections performed was found between the two groups. Estimated blood loss and transfusion rates were significantly lower in Group 2 ($p < 0.05$ for both). Furthermore, a statistically significant difference was observed for both hospitalization (6.79 ± 3.3 vs. 5.46 ± 3.08 days, respectively; $p = 0.026$) and catheterization times (12.24 ± 2.1 vs. 11 ± 1.08 days, respectively; $p = 0.001$) for Group 2. The total complication rate was 47.6% in Group 1, and 11.8% in Group 2 ($p < 0.01$). We observed five grade III