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Prostate Cancer

Oncologic Outcome after Extraperitoneal Laparoscopic Radical Prostatectomy: Midterm Follow-up of 1115 Procedures

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Abstract

Background: Although the first laparoscopic radical prostatectomy was performed in 1997, few midterm oncologic data have been published for the extraperitoneal procedure.
Objective: To determine the oncologic outcome of extraperitoneal laparoscopic radical prostatectomy (ELRP).
Design, setting, and participants: From 2000 to 2007, 1115 consecutive patients underwent ELRP for a localized prostate cancer at our department. Follow-up was scheduled and standardized for all patients and recorded into a prospective database. Median postoperative follow-up was 35.6 mo.
Intervention: All ELRP were performed by three surgeons at the Department of Urology, Hospital Henri Mondor, Créteil, France.
Measurements: Biochemical recurrence was defined by prostate-specific antigen level $\geq$0.2 ng/ml.
Results and limitations: In pN0/pNx cancers, postoperative stage was pT2 in 664 patients (59.5%), pT3 in 350 patients (31.4%), and pT4 in 77 patients (6.9%). Positive lymph nodes were reported in 24 patients (2.2%). Margins were positive in 16.1% and 34.6% of pT2 and pT3 cancers, respectively. Final Gleason score was $<$7 in 288 men (25.8%), =7 in 701 men (62.9%), and $>$7 in 126 men (11.3%). Overall prostate-specific antigen (PSA) recurrence-free survival was 83% at 5 yr. The 5-yr progression-free survival rates were 93.4% for pT2, 74.5% for pT3a, and 55.0% for pT3b tumors, respectively. Multivariate Cox model showed that PSA, Gleason score, pT category, nodal status, and surgical margins were significant independent predictors of biochemical recurrence-free survival.
Conclusions: This assessment of oncologic results demonstrates that ELRP is a safe and effective procedure. On the basis of midterm follow-up data, the prognostic factors of PSA after ELRP failure are the same as those described previously in transperitoneal or open retropubic approaches. The oncologic results of ELRP also are in line with those reported with the use of the retropubic or the transperitoneal laparoscopic approaches.

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1. Introduction

Radical prostatectomy is a standard treatment for localized prostate cancer. The first laparoscopic radical prostatectomy (LRP) was performed in 1997 and was thought not to be feasible because of excessive operative time [1]. However, in the following years, the development of minimally invasive surgery was driven in Europe by some centers able to report considerable experience and to standardize the technique [2–4]. Laparoscopic procedure is a validated treatment modality for localized prostate cancer. Experienced surgeons have described various advantages of laparoscopy [5,6]. Lower blood loss and transfusion rates have been demonstrated to be the main advantages of laparoscopic surgery. Improved cosmesis and shorter convalescence may also be factors in increasing patient acceptance of the surgical procedure and its resultant side effects. Functional results on continence and potency appear comparable to those obtained by open approach [7]. These benefits seem to occur without sacrificing the oncologic standards established by the open approach [8–11]. Globally, laparoscopy has proven to be equivalent to open procedure in radical prostatectomy. However, most published laparoscopy studies fail to address high-volume experience and long-term follow-up. Moreover, larger LRP series reported oncologic results of transperitoneal LRP. Although the first extraperitoneal LRPs (ELRP) were reported in 1997, few midterm oncologic data have been published for the extraperitoneal procedure [12].

Since 2000, ELRP has become the standard surgical technique for localized prostate cancer at our institution. The goal of this study was to evaluate the prostate-specific antigen (PSA) outcomes of ELRP in order to determine the midterm oncologic safety of this procedure, and to assess these oncologic results with respect to the established predictors of biochemical recurrence after radical prostatectomy. To our knowledge, no study of ELRP experience has addressed the biochemical recurrence-free survival according to histoprognostic parameters.

2. Patients and methods

2.1. Patient selection

Between January 2000 and December 2007, 1115 consecutive men underwent ELRP for localized prostate cancer at the Department of Urology, Hospital Henri Mondor, Créteil, France. All prostatectomies at our institution were treated by ELRP and were performed by three surgeons (CCA, ADLT, LS). Patients who had received neoadjuvant therapy or adjuvant therapy before PSA relapse were excluded from analyses. A history of previous abdominal surgery, transurethral prostate resection, or hernia repair were not contraindications. All patients were followed at our institution and medical visits were scheduled at 1, 3, and 6 mo and then within a 6-mo interval after ELRP. The hospital's ethics committee approved the study and the good clinical practice criteria were respected.

2.2. Surgical procedure

The surgical technique and the different steps of the surgery were previously described [13]. Lymphadenectomy was performed prior to the completion of the vesicourethral anastomosis in case of Gleason score >6 and/or PSA level >10 ng/ml. Low-risk patients (primary Gleason grade of 3, clinical T1c stage, PSA level <10 ng/ml) underwent conventional nerve-sparing procedure. Standard lymphadenectomy (external iliac artery area) was performed in 464 patients. A median of 3.5 lymph nodes per side was sampled. In patients who did not undergo lymph node dissection, cancer was classified as pNx. Of the 907 patients who underwent a nerve-sparing surgery, 702 had bilateral preservations and 205 had unilateral preservations.

2.3. Database and statistical analysis

Data were collected prospectively into a database, including preoperative clinical and biological characteristics, patient demographics, surgical data, and postoperative parameters. Pathologic Gleason score, surgical margin (SM) status, presence of extracapsular extension (ECE), seminal vesicle invasion (SVI), and pelvic lymph node positivity were recorded. All pathologic specimens were reviewed by a single senior uropathologist with criteria clearly defined at the beginning of the study. Positive margins were defined as the presence of tumor tissue on the inked surface of the specimen. Pathologic Gleason score was divided as follows: Gleason score <7, =7, or >7. PSA level was considered a qualitative variable as follows: PSA <10 ng/ml, between 10 and 20 ng/ml, and ≥20 ng/ml. Biochemical recurrence was defined as any detectable serum PSA (>0.2 ng/ml) in at least two consecutive measurements. The biochemical recurrence-free survival was estimated using the Kaplan-Meier method. Survival curves were stratified by PSA level and pathologic features, and compared using the log-rank test. The multivariate Cox proportional hazard regression model was used to determine factors influencing PSA-free survival. A double-sided p value <0.05 was considered statistically significant. All data were analyzed using SPSS v.16.0 software (SPSS, Chicago, Illinois, USA).

3. Results

Characteristics of patients are listed in Table 1. Mean specimen weight was 53.4 g. Postoperative stage was pT2 in 667 patients (pT2a: 126; pT2b, 30; pT2c, 511), pT3a in 255 patients, pT3b in 110 patients, and pT4 in 83 patients. Among the 83 pT4 tumors, 80 were defined as pT4 by microscopic bladder neck invasion. Final Gleason score was <7 in 288 men (25.8%), =7 in 701 men (62.9%), and >7 in 126 men (11.3%). Positive lymph nodes were noted in 24 patients. Overall positive surgical margin (PSM) rate was 26%. Margins were positive in 16.1% and 34.6% of pT2 and pT3 cancers, respectively ($p < 0.001$). Margins were positive in 5.5% of

Table 1 – Preoperative patient characteristics

No. of patients	1115
Mean age, yr (range)	62.5 (42–81)
Clinical stage (%)	
T1a-b	18 (1.6)
T1c	894 (80.2)
T2	193 (17.3)
T3	10 (0.9)
Mean PSA (ng/ml)	9.8 (0.8–99)
Gleason score (%)	
<7	739 (66)
=7	326 (29)
>7	50 (5)

PSA = prostate-specific antigen.