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Original article

Midterm outcomes of four-port extraperitoneal laparoscopic radical prostatectomy for high-risk prostate cancer within Asian population

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ABSTRACT

Objective: Asian patients tend to have higher stage prostate cancer at diagnosis compared with patients of other races. This article aims to investigate the use of four-port extraperitoneal laparoscopic radical prostatectomy (EPLRP) as the first step in a multimodality treatment strategy for Asian patients with high-risk prostate cancer (HRPC).

Materials and methods: A cohort of 202 patients underwent EPLRP between January 2006 to January 2016, of whom 122 (60.3%) had HRPC as defined by D'Amico classification: clinical T stage ≥ cT2c or PSA level ≥ 20 ng/mL or biopsy Gleason sum ≥ 8). All patients underwent proper preoperative staging. The median age was 68 years (48–82), PSA level 17.8 ng/mL (3.3–191.1), and biopsy Gleason sum 7 (6–10). All patients underwent pelvic lymphadenectomy, and some underwent neurovascular bundle preservation according to their risk category.

Results: Perioperative outcomes included a median operative time of 185 min (65–380), total blood loss 150 ml (30–500), postoperative hospitalization 10 days (6–25), and urethral catheterization time 7 days (4–22). No patient was converted to open surgery. Median specimen weight was 42 g (19–124), lymph node yield was 10 (0–35) with 11.5% positivity and a positive surgical resection margin rate of 28.7%. The median follow-up period was 37 months (6–129). 96.7% of patients achieved continence and 53.8% of the 39 potent patients prior to surgery maintained their sexual potency at one year after EPLRP. The 5-year cancer-specific, overall, and biochemical recurrence-free survival rates were 98.8%, 92.2%, and 68.7%, respectively.

Conclusion: Extraperitoneal laparoscopic radical prostatectomy has low morbidity, and can provide fair functional and oncological outcomes as the first step of a multimodality treatment strategy for high-risk prostate cancer in Asian.

1. Introduction

Prostate cancer is the second most common cause of death in men in Western countries,[1] and the incidence and mortality rate have been increasing in Taiwan during the past decade.[2] Although the stage and grade of prostate cancer (PC) have decreased as the result of widespread prostate-specific antigen (PSA) screening in the Western countries,[3] high-risk and later-stage disease has been investigated in Asia, including Taiwan.[4] Moreover, there is a lack of routine PSA screening for earlier detection, resulting many patients being diagnosed with advanced-stage PC, thus causing an increased mortality rate in Taiwan.[5]

In most developed countries, about 20–35% of newly diagnosed cases of PC are high-risk prostate cancer (HRPC),[6] which is defined by the D'Amico classification as a PSA level of ≥20 ng/ml or biopsy Gleason sum ≥8 or clinical stage T ≥ 2c.[7] HRPC, especially Gleason 8–10 tumor, is known to have a poor response to treatment either with radiotherapy (RT) or by radical prostatectomy (RP).[8] Therefore, a multimodal approach may be preferable. Although there is no evidence comparing the outcomes of RP with those of RT in HRPC, RP provides good local control of the disease and in addition, can provide definitive information on stage and grade.[9]

Laparoscopic RP was first performed in 1992 by Schussler et al.,[10] and extraperitoneal laparoscopic radical prostatectomy (EPLRP) was described in 1997 by Raboy et al., who reported that

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their result showed that it is an effective operative choice.[11] We used four-port technique to perform EPLRP as described previously.[12] This study aims to investigate the midterm outcome of HRPC treated with EPLRP as the first step.

2. Materials and methods

We offer RP as an option for the patient diagnosed with prostate cancer, who has at least a ten-year expected survival. If the patient can tolerate laparoscopic surgery, the standard procedure employed by our team is EPLRP. A total of 202 patients with prostate cancer underwent EPLRP at our institution, a tertiary referral center, during a 10-year period between January 2006 and January 2016. Those who were lost to follow-up within one year, who underwent neoadjuvant therapy, or who had metastatic disease were excluded from the study. One hundred and twenty-two patients in this cohort, 60.3% of the total, had disease classified as HRPC according to the D'Amico classification.[7] The demographics including age, body mass index (BMI), preoperative PSA level, biopsy Gleason sum, and clinical staging were collected retrospectively. Prior surgeries that could affect the EPLRP were also recorded, including transurethral resection of prostate, herniorrhaphy, and appendectomy. All patients were staged by cross image, mostly by magnetic resonance imaging (MRI), and isotope bone scan.

All procedures were performed or supervised by a single surgeon (V. Lin). We performed the EPLRP with four-port technique, and used a fascia needle to enhance bladder neck dissection, which was described in detail in a previous article.[12] Briefly, we performed bladder neck dissection after removal of periprostatic fat. The dorsal venous complex was controlled by suture. Neurovascular bundle (NVB) preservation with antegrade technique was carried out to as great an extent as possible when oncological outcomes would not be compromised. This procedure is performed when there is no evidence of tumor invasion under laparoscopic visualization or on the cross image. Vesicourethral anastomosis was performed with 3–0 Vicryl interrupted suture. Careful dissection is essential for finding any tumor invasion, especially when carrying out NVB preservation. Whenever there was a lesion suspicious for tumor invasion, we sent a specimen for frozen section to make sure the surgical margin was negative for tumor. Pelvic lymphadenectomy was performed with the standard procedure, including dissection of external iliac, internal iliac, and obturator nodes. Extended dissection as far as the bifurcation of the common iliac artery is performed in some patients at high risk for metastasis.

Positive surgical margin (PSM) was defined as tumor tissue identified on the stained surface of the specimen. Other pathologic measures included specimen weight, Gleason sum, stage and lymph node yield (LNY). We routinely allowed patients to begin enteral nutrition on postoperative day two, which was delayed only when enteral nutrition was not tolerated due to ileus. Postoperative indwelling catheter was used for 6–8 days in most cases, and patients were discharged to home when comfortable. We did not perform cystography routinely, but only when intraoperative reconstruction was difficult. The Clavien-Dindo scoring system was used to classify perioperative complications.[13]

Patients were followed in the clinic, and PSA level was checked at one month and thereafter every three months after EPLRP for two years, and then every six months. Continence was defined as being pad-free during daily activity. Potency was defined as the ability to achieve and maintain erection to complete sexual intercourse with or without either oral phosphodiesterase type 5 inhibitor or prostaglandin injection. Both continence and potency were recorded according to patient's report. Biochemical recurrence was defined as two consecutive PSA levels of >0.2 ng/ml after EPLRP. Treatment strategy was developed according to the stage, risk stratification, and postoperative PSA level, and then adjuvant radiation therapy or hormone therapy was offered.

Overall, cancer-specific and biochemical recurrence-free survival rates were analyzed using the Kaplan–Meier method. All analyses were performed with Statistical Package for the Social Science software (SPSS version 18.0, Chicago, IL, USA).

3. Results

A total 122 patients with HRPC were included in the present study. Demographic characteristics are listed in Table 1. The median Gleason sum was 7 (range 6–10) and the preoperative PSA level was 17.8 ng/ml (range 3.3–191.1). Clinical stage was cT1 in 14.8%, cT2 a and b in 8.2%, cT2c in 55.7%, cT3 in 18.0%, cT4 in 3.3%, and suspicious node positive in 3.3%. The prior related surgery was transurethral resection of the prostate in 9.0%, herniorrhaphy in 11.4%, and appendectomy in 13.9%.

The median operative time was 185 min (range 65–380) with blood loss 150 ml (range 30–500), and three patients received a blood transfusion during the operation. Thirty-three patients underwent unilateral and 58 patients underwent bilateral NVB preservation. The median time prior to initiation of enteral nutrition was 2 days (range 1–6), and the median catheterization period was 7 days (range 4–22). Patients stayed at hospital for a median 10 days (range 6–25) postoperatively. Perioperative complications were all classified as Clavien-Dindo grade 1–2, and are summarized in Table 2, including other perioperative outcomes. Three patients received a blood transfusion during surgery, three had acute urinary retention after removal of the Foley catheter, five had a urinary tract infection controlled by intravenous antibiotics, one had an ileus, and one developed a gastric ulcer which was treated with a Proton-pump inhibitor. Eighteen patients had urinary leakage diagnosed by cystography, the management of which was to delay the removal of the catheter for two to five days, although no patient presented clinical symptoms of leakage. Deep vein thrombosis developed in two patients, and was managed with heparin.

Median prostate mass was 42 g (range 19–124). Pathological stage was pT2 in 54.1%, pT3 in 41.0%, and pT4 in 4.9%. The postoperative Gleason score was <7 in 11.5%, 7 in 65.6%, and >7 in 22.9% of patients. The median LNY was 10 (range 0–35) with the overall

Table 1
Demographics of patients undergoing extraperitoneal laparoscopic radical prostatectomy for high-risk prostate cancer.

Total number of patients	122	
Median (range)		
Age, years	68	(48–82)
BMI, kg/m^2	25.3	(18.0–32.0)
PSA level, ng/ml	17.8	(3.3–191.1)
Biopsy Gleason sum	7	(6–10)
Biopsy Gleason score, n (%)		
6	35	(28.7)
7 (3 + 4)	27	(22.1)
7 (4 + 3)	23	(18.9)
8	26	(21.3)
9	8	(6.6)
10	3	(2.5)
Clinical stage, n (%)		
cT1	18	(14.8)
cT2a/b	10	(8.2)
cT2c	68	(55.7)
cT3	22	(18.0)
cT4	4	(3.3)
cN1-2	4	(3.3)
Prior related surgery, n (%)		
Transurethral resection of prostate	11	(9.0)
Herniorrhaphy	14	(11.4)
Appendectomy	17	(13.9)