Salvage Robotic Assisted Laparoscopic Radical Prostatectomy: A Single Institution, 5-Year Experience

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Purpose: Salvage robotic assisted laparoscopic prostatectomy is a treatment option for certain patients with recurrent prostate cancer after primary therapy. Data regarding patient selection, complication rates and cancer outcomes are scarce. We report the largest, single institution series to date, to our knowledge, of salvage robotic assisted laparoscopic prostatectomy.

Materials and Methods: We reviewed our database of 4,234 patients treated with robotic assisted laparoscopic prostatectomy at Vanderbilt University and identified 34 men who had surgery after the failure of prior definitive ablative therapy. Each patient had biopsy proven recurrent prostate cancer and no evidence of metastases. The primary outcome measure was biochemical failure.

Results: Median time from primary therapy to salvage robotic assisted laparoscopic prostatectomy was 48.5 months with a median preoperative prostate specific antigen of 3.86 ng/ml. Most patients had Gleason scores of 7 or greater on preoperative biopsy, although 12 (35%) had Gleason 8 or greater disease. After a median followup of 16 months 18% of patients had biochemical failure. The positive margin rate was 26%, of which 33% had biochemical failure after surgery. On univariable analysis there was a significant association between prostate specific antigen doubling time and biochemical failure (HR 0.77, 95% CI 0.60–0.99, p = 0.049) as well as between Gleason score at original diagnosis and biochemical failure (HR 3.49, 95% CI 1.18–10.3, p = 0.023). There were 2 Clavien II–III complications, namely a pulmonary embolism and a rectal laceration. Postoperatively 39% of patients had excellent continence.

Conclusions: Salvage robotic assisted laparoscopic prostatectomy is safe, with many favorable outcomes compared to open salvage radical prostatectomy series. Advantages include superior visualization of the posterior prostatic plane, modest blood loss, low complication rates and short length of stay.

Key Words: prostatic neoplasms, salvage therapy, robotics, prostatectomy, outcome assessment

Abbreviations and Acronyms

BCF = biochemical failure
BNC = bladder neck contracture
EBL = estimated blood loss
PSA = prostate specific antigen
PSADT = prostate specific antigen doubling time
sRALP = salvage robotic assisted laparoscopic prostatectomy
SRP = salvage radical prostatectomy
XRT = external beam radiation therapy

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PROSTATE cancer remains the most common noncutaneous malignancy in American men.[1] Rates of prostate cancer recurrence after attempted curative treatment range from 20% to 60% regardless of the mode of definitive local therapy.[2–4] It has been shown that up to 72% of patients with increasing PSA after primary XRT will have locally recurrent disease.[5] The consequence of

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this local relapse is a dramatically increased risk of distant metastasis and death.[6] Therefore, a significant number of patients with locally recurrent disease may benefit from salvage therapy.

In select patients with clinical characteristics consistent with localized relapse, open salvage radical prostatectomy has been shown to provide a biochemical recurrence-free survival rate of 48% and a metastasis-free survival rate of 83% at 5 years after SRP in a large multi-institutional study.[7] Although long-term data are limited regarding the use of cryotherapy in the salvage setting, a recent comparison revealed superior overall survival with open SRP, despite adjustments for post-radiation biopsy Gleason score and PSA.[8,9] Nonetheless, SRP is performed relatively infrequently, which can be attributed in part to the technical challenges of the procedure.[10] In addition, the historical morbidity of the procedure has been daunting, with reported rectal injury rates of more than 15% in some series.[11,12]

The rapid adoption of minimally invasive radical prostatectomy in the United States has led to the exploratory use of robotic assistance in the salvage setting at several institutions.[13–19] These series are relatively small and data regarding postoperative outcomes are limited. However, these studies suggest that salvage robotic assisted laparoscopic prostatectomy is a feasible treatment option for qualified patients with recurrent prostate cancer after primary therapy.[14–19] We report what is, to our knowledge, the largest single institution series of sRALP with 5-year data on patient selection, complication rates and cancer outcomes.

METHODS

We reviewed our database of 4,234 patients treated with robotic assisted laparoscopic prostatectomy at Vanderbilt University. From this group we identified 34 men who underwent sRALP after failure of prior definitive therapy from 2006 to mid 2011. All patients had previously undergone local treatment with curative intent for localized prostate cancer. Initial treatments included brachytherapy (13, 38%), XRT (11, 32%), combined brachytherapy/XRT (6, 18%) and high intensity focused ultrasound (4, 12%). Patients received a metastatic evaluation including bone scan and/or computerized tomography as clinically indicated. Each patient underwent biopsy to confirm recurrent prostate cancer and had no clinical evidence of metastatic disease at the time of consultation. The standard 6-port transperitoneal technique was used during sRALP and all surgeries were performed at Vanderbilt University Medical Center. Preoperative evaluation and postoperative followup were performed according to institutional protocol. There were no routine differences in preoperative patient preparation for sRALP compared to standard robotic assisted laparoscopic prostatectomy performed at our institution. The majority of sRALP in this series (28, 82%) was performed by the senior author (JAS). As cancer control was our main concern, no intended nerve sparing procedures were performed. Postoperative cystography was performed at the discretion of the provider.

An attending surgical pathologist evaluated all surgical specimens. Pathological stage was assigned according to the 2010 American Joint Committee on Cancer guidelines and Gleason score was determined if possible. Clinical, pathological and outcome data were analyzed and supplemented by medical record review and patient survey. Institutional review board approval was obtained for analysis and postoperative survey of this patient population. Patient reported outcomes were obtained by chart review or telephone survey of all patients at the time of analysis of this study.

The primary outcome measure was biochemical failure, which included PSA persistence (PSA 0.1 ng/ml or greater on initial post-sRALP PSA) and PSA recurrence (PSA 0.2 ng/ml or greater with a subsequent confirmatory PSA greater than 0.2 ng/ml) after sRALP. Duration of followup was from surgery to the date of death or last clinic visit.

We evaluated clinical variables including age, race (white vs nonwhite) and body mass index, and variables before initial treatment including PSA and Gleason sum at original diagnosis along with type of initial local treatment. Variables were also assessed after initial treatment, including PSA nadir, PSA before sRALP, biopsy Gleason sum before sRALP, clinical stage, hormone therapy status before sRALP and ASA (American Society of Anesthesiologists) Physical Status classification score. We also evaluated operative characteristics, pathological stage and Gleason sum, pathological node status, perioperative complications graded according to the Clavien system, and patient reported potency (defined as erections sufficient for intercourse) and continence measures (pads per day).[20] Due to limited information, PSADT was calculated using a previously validated 2-point method.[21]

Exploratory univariable analyses were performed using a Cox proportional hazards model to assess the correlation between clinicopathological variables and BCF. Multivariable analyses were not appropriate due to the limited number of events. All analyses were conducted with STATA® data analysis software version 11.

RESULTS

Median age of the cohort was 66.5 years (IQR 57.9–69.9) and median followup was 16.1 months after sRALP (IQR 8.4–31.8). Tables 1 and 2 provide the distribution of patients by clinical and preoperative oncologic characteristics, respectively. Median PSA at primary diagnosis of prostate cancer was 5.6 ng/ml (IQR 5.2–8.0) and the majority of men had Gleason 6 disease at the original diagnosis. Median PSA nadir after primary treatment was 0.9 ng/ml (IQR 0.5–1.4) and median time from primary therapy to sRALP was 48.5 months (IQR 28.9–70.8) with a median PSA before sRALP of 3.86 ng/ml (IQR 2.41–5.07). Median preoperative PSADT was 10.1