Radical Prostatectomy and Pelvic Lymph Node Dissection in Kaiser Permanente Southern California: 15-Year Experience

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ABSTRACT

Introduction: Radical prostatectomy (RP) with pelvic lymph node dissection (PLND) is the standard treatment of high-risk prostate cancer. High-risk patients and those with lymph node metastasis (LNM) require further treatment. We review outcomes of RP+PLND in Kaiser Permanente Southern California (KPSC).

Methods: Patients who underwent RP+PLND in KPSC from January 1, 2001, to July 1, 2015 were included. Patient charts were retrospectively reviewed for demographic information and clinicopathologic data which were used to calculate positive surgical margin rate, LNM, adjuvant treatment, 5-year biochemical recurrence, and overall survival. Univariate and multivariate logistic regression analyses were used to identify factors associated with margin positivity.

Results: Patients (N = 1829) underwent RP+PLND (241 high-risk, 943 intermediate-risk, 645 low-risk). Positive margin rates were 17.8%, 14.8%, and 11.9% in the high, intermediate- and low-risk groups. Biochemical recurrence rates were 22% in high-risk and 12.1% in the low-risk category. Androgen deprivation use was 4.1% in the high-risk group and 0.9% in the low-risk group. Five-year overall survival was 92.5% in lymph node-positive patients and 94.9% in lymph node-negative patients (p = 0.8). On multivariate analysis, age (odds ratio [OR] = 1.02, p = 0.02), prebiopsy prostate-specific antigen (OR = 1.02, p < 0.001), and clinical T stage (OR = 1.49, p = 0.01) were associated with margin positivity.

Conclusion: In KPSC, RP+PLND was performed in patients with low-, intermediate-, and high-risk prostate cancer. Age, prebiopsy prostate-specific antigen, and clinical stage were associated with positive surgical margins in patients with LNM. Recipients of RP+PLND with LNM and positive surgical margins required adjuvant treatment.

INTRODUCTION

Prostate cancer affects 1 in 6 men, making it the most common malignancy in men worldwide.[1] Because of improvements in screening and detection of prostate cancer in the era of prostate-specific antigen (PSA) testing, various treatment modalities dependent on a patient-physician shared decision-making process have been developed. Regarding more aggressive localized prostate cancer, radical prostatectomy (RP) is becoming the most prevalent treatment modality, primarily because of its lower morbidity rates as well as improved disease-free and overall survival.[2-7]

As there continue to be more operations performed in patients with higher-risk localized prostate cancer, there has been an increasing number of cases of lymph node metastasis (LNM) discovered after RP. Optimal management of this subset of patients with high-risk prostate cancer is unknown and can be challenging to many urologists. One school of thought involves treatment of such patients with immediate androgen deprivation therapy after RP because it has an improved overall and biochemical recurrence-free survival.[8-9] The risks of androgen deprivation, however, encourage many physicians to delay its use until evidence of prostate cancer recurrence has been established. An investigation of the Surveillance, Epidemiology and End Results (SEER) Program database showed that postponing and even omitting androgen deprivation therapy in men with positive lymph nodes after RP does not significantly influence survival.[10] Other investigators have shown that positive surgical margins may guide management of these higher-risk patients.[11] Although optimal management of lymph node-positive (LNP) patients remains controversial, the patient profile and histopathologic factors such as positive margin rate can help guide therapy. With improvements in biochemical testing, imaging, and advanced therapeutics, the 5-year survival rate in such patients is as high as 85%.[12] Nonetheless, results of large multi-institutional studies investigating this population have shown a poorer prognosis relative to their LNM-free cohorts, especially in cases with positive surgical margins.[13,14] Daneshmand and colleagues[12] have shown that factors such as local tumor burden and percentage of lymph nodes involved with cancer influence disease progression. Other studies have reported a high Gleason score, seminal vesicle invasion, and positive margins as significant negative predictors of disease-free and overall survival in patients with LNM.[13-15]

To further understand the pathophysiology of LNM, many investigations of risk factors for LNM in such populations have taken place. A retrospective review of the SEER database and the National Cancer Database showed that PSA, clinical stage, and African American race were strong predictors of LNM. Several important models predicting the risk of LNM, the most well known of which was developed by Briganti and colleagues,[16] have been used to guide surgical planning and prognostication in high-risk patients. However, these predictive models are limited by their inability to predict the clinical course of patients with LNM, especially in the setting of pathologic positive surgical margins.

The clinical course of patients with positive surgical margins and LNM on pathologic analysis after RP and pelvic lymph node dissection (RP+PLND) can be variable and is poorly understood. Many patients have a modest 10-year disease-free

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survival, whereas others exhibit early biochemical recurrence and progression.[13-15] Although disease progression and recurrence can depend on the volume of lymph nodes involved, management after prostatectomy of patients with LNM and positive surgical margins remains an unfamiliar territory to many urologists. In this study, we review the Kaiser Permanente Southern California (KPSC) experience with RP+PLND; specifically, we investigate the risk factors, pathologic outcomes, and clinical course of patients with and without LNM to better understand their management.

METHODS

Patient Population

This retrospective study was approved by the Kaiser Permanente Los Angeles Medical Center institutional review board. Demographic, clinical, and pathologic data were collected retrospectively from the medical charts of patients treated with radical prostatectomy for prostate cancer from January 1, 2001, to July 1, 2015. Patients older than age 18 years with pathologically confirmed prostate adenocarcinoma were included in the study. Surgery was performed at 3 of 9 hospitals in the KPSC Region. Robotic surgeries were included starting in 2008. Standard PLND was performed, including removal of common iliac, external iliac, hypogastric, and obturator lymph nodes. Preoperative data collected included PSA, ultrasound-guided transrectal biopsy pathology, and clinical stage determined by an attending urologist using the most recent American Joint Committee on Cancer staging system. Pathologic assessment was performed of the prostate biopsy specimen and RP specimens, and included the number of cores sampled, the number of positive cores, and stage using the most recent American Joint Committee on Cancer staging system. Follow-up included PSA testing, clinical examination according to the most recent National Comprehensive Cancer Network guidelines, and evaluation of patient charts for assessment of survival.

Statistical Analysis

Patients were categorized into low-, intermediate-, and high-risk categories according to their D'Amico risk stratification.

Table 1. Preoperative clinical and biopsy characteristics of patients with low-, intermediate-, and high-risk prostate cancer

Characteristic	High risk (n = 241)	Intermediate risk (n = 943)	Low risk (n = 645)
Age at surgery, y			
Mean (SD)	60.9 (6.55)	59.6 (7.15)	58.2 (7.21)
Median	61.9	60.3	58
Q1, Q3	56.4, 65.7	54.6, 64.8	53.3, 64.1
Range	42.4-74.9	35.5-77.5	35.6-77.1
Clinical stage, no. (%)			
T1	161 (66.8)	668 (70.8)	557 (86.4)
T2	78 (32.4)	270 (28.6)	88 (13.6)
T3	2 (0.8)	5 (0.5)	0 (0)
Prebiopsy PSA, ng/mL			
Mean (SD)	13.3 (13.90)	11.1 (9.40)	5.5 (1.94)
Median	6.9	9.2	5.3
Q1, Q3	5.2, 22.1	5.7, 13.5	4.2, 6.7
Range	(0.5-86.8)	(1.4-121.1)	(0.3-10.0)
Biopsy Gleason score			
6, no. (%)	44 (18.3)	162 (17.2)	645 (100)
7, no. (%)	0 (0)	716 (75.9)	0 (0)
8, no. (%)	134 (55.6)	40 (4.2)	0 (0)
9, no. (%)	62 (25.7)	22 (2.3)	0 (0)
10, no. (%)	1 (0.4)	3 (0.3)	0 (0)
Mean (SD)	7.9 (1.00)	6.9 (0.58)	6.0 (0)
Median	8	7	6
Q1, Q3	8.0, 9.0	7.0, 7.0	6.0, 6.0
Range	6.0-10.0	6.0-10.0	6.0-6.0
Preoperative androgen deprivation therapy, no. (%)			
No	209 (86.7)	880 (93.3)	639 (99.1)
Yes	32 (13.3)	63 (6.7)	6 (0.9)

PSA = prostate-specific antigen; Q = quartile; SD = standard deviation.

Mean age, mean prebiopsy PSA, clinical stage distribution, Gleason score distribution, and percentage preoperative hormone use was calculated for each risk category. Positive margin rates, pathologically positive lymph node rates, pathologic stage distribution, recurrence rate, adjuvant hormone therapy use, Gleason score upstaging rate, and Gleason score downstaging rate were calculated for each risk category. Postoperative data, including positive margin rate, clinical stage distribution, recurrence rate, use of adjuvant androgen deprivation therapy, use of adjuvant radiation therapy, Gleason score upstaging rate, Gleason score downstaging rate and survival rate were compared between categories. Recurrence was defined as a biochemical recurrence (2 consecutive PSA values < 0.2 ng/mL) or radiologic evidence of metastasis within 5 years. Adjuvant androgen deprivation therapy was defined as any use of androgen deprivation therapy for prostate cancer after prostatectomy. Patient charts at 5 years after prostatectomy were reviewed, and survival rates were calculated.

Chi-squared analyses were performed to compare categorical variables, and *t*-tests were conducted to compare continuous variables. Univariate and multivariate models were used to determine factors associated with positive margins. Stata data analysis software (StataCorp LLC, College Station, TX) was used for statistical analysis.

RESULTS

A total of 1829 patients underwent radical prostatectomy in KPSC from January 1, 2001, to July 1, 2015. Among the patients, 241 were high risk, 943 were intermediate risk, and 645 were low risk according to D'Amico risk stratification. A

total of 783 patients underwent robot-assisted RP (42.8%), 567 patients underwent laparoscopic RP (31%), and 479 patients underwent open RP (26.2%). Preoperative characteristics are displayed in Table 1. The average age at surgery was 60.9 years for high-risk patients, 59.6 years for intermediate-risk patients, and 58.2 years for low-risk patients. Among the high-risk patients, tumors in 161 were cT1 (66.8%), in 78 were cT2 (32.4%), and in 2 were cT3 (0.8%). Of the intermediate-risk patients, 668 had cT1 (70.8%), 270 had cT2 (28.6%), and 5 had cT3 (0.5%) tumors. There were 557 patients with cT1 disease (86.4%) and 88 patients with cT2 disease (13.6%) in the low-risk group. The mean prebiopsy PSA value was 13.3 ng/mL, 11.1 ng/mL, and 5.5 ng/mL in the high-, intermediate-, and low-risk groups, respectively. The mean prebiopsy Gleason score was 8, 7, and 6 in the high-, intermediate-, and low-risk groups, respectively. A total of 13.3% of high-risk patients (n = 32), 6.7% (n = 63) of intermediate-risk patients, and 0.9% (n = 6) of low-risk patients received presurgical androgen deprivation therapy.

Histopathologic data can be seen in Table 2. Positive margin rates were 17.8%, 14.8%, and 11.9% in the high-, intermediate-, and low-risk groups. The rate of pathologic lymph node positivity was 14.9%, 9.8%, and 0.9% in the high-, intermediate-, and low-risk groups. In the high-risk group, 115 patients (47.8%) had pT2 tumors, 125 had pT3 tumors (51.8%) and 1 patient had a pT4 tumor (0.4%). Of the intermediate-risk group, 585 patients (62%) were in the pT2 category, 356 were in the pT3 category (37.7%), and none were in the pT4 category. There were 577 patients with pT2 tumors (89.4%) and 68 with pT3 tumors (10.5%) in the preoperative low-risk group. Gleason score upstaging was highest in low-risk (31.9%) relative to intermediate (17.3%) and high-risk (25.3%) patients. Interestingly, Gleason score downstaging was highest in high-risk (36.1%) relative to low-risk (0%) and intermediate-risk (9.3%) groups.

Table 3 shows 5-year recurrence rates, use of adjuvant androgen deprivation therapy, and adjuvant radiation therapy use in each risk category. The recurrence rate was highest in the high-risk category (22%) and lowest in the low-risk category (12.1%). Adjuvant androgen deprivation use was also highest in the high-risk group (4.1%) and lowest in the low-risk group (0.9%). Patients with intermediate-risk prostate cancer had the highest rate of adjuvant radiation therapy (2.7%) relative to the low-risk (1.9%) and high-risk (2.5%) groups.

Preoperative characteristics for patients with pathologic positive lymph nodes can be seen in Table 4. Of the 1829 patients, 134 (7.3%) were LNP, and 1693 (92.6%) were lymph node negative (LNN). Patients with LNP were not significantly older than patients with LNN (60.7 vs 59.6 years, respectively). There were a larger number of patients with T2 and T3 disease in the LNP group (38.8% and 3.7%, respectively) relative to the LNN group (22.7% and 0.1%, respectively). Median PSA and Gleason score were significantly higher in the LNP group than in the LNN group (PSA, 10.5 ng/μL vs 6.5 ng/μL, $p < 0.001$; Gleason score, 7.3 vs 6.7, $p < 0.001$). There was a significantly larger percentage of patients with elevated Gleason scores in the LNP group (Table 4). Further, a larger proportion of LNP patients received preoperative androgen deprivation therapy compared with LNN patients (11.2% vs 5.1%, respectively).

A comparison of postoperative data between LNP and LNN patients is seen in Table 5. The positive margin rate was significantly higher in LNP patients than in LNN patients (23.1% vs 13.5%). Five-year overall survival was 86.9% in patients with positive surgical margins and 92.2% in patients with negative surgical margins. There was an increased prevalence of pathologic T3 disease in LNP patients (88.8% vs 25.4%, $p < 0.001$). Of note, 1 patient was noted to have T4 disease but did not have lymph node invasion. Gleason score upstaging was higher in LNP patients (35.1% vs 22.6%, $p < 0.001$). Gleason score downstaging was also higher in LNP patients;

Table 2. Histopathologic characteristic of patients with low-, intermediate-, and high-risk prostate cancer

Characteristic	High risk (n = 241)	Intermediate risk (n = 943)	Low risk (n = 645)
Positive margins, no. (%)	43 (17.8)	140 (14.8)	77 (11.9)
Lymph node positivity, no. (%)	36 (14.9)	92 (9.8)	6 (0.9)
T stage, no. (%)			
T0	1 (0.4)	0 (0)	0 (0)
T2	5 (2.1)	20 (2.1)	46 (7.1)
T2a	13 (5.4)	60 (6.4)	99 (15.3)
T2b	24 (10)	104 (11)	152 (23.6)
T2c	72 (29.9)	401 (42.5)	280 (43.4)
T3a	67 (27.8)	217 (23)	48 (7.4)
T3b	56 (23.2)	138 (14.6)	20 (3.1)
T3c	1 (0.4)	1 (0.1)	0 (0)
T3s	1 (0.4)	0 (0)	0 (0)
T4	1 (0.4)	0 (0)	0 (0)
Stage N1, no. (%)	36 (14.9)	92 (9.8)	6 (0.9)
Gleason score upstage, no. (%)	61 (25.3)	163 (17.3)	206 (31.9)
Gleason score downstage, no. (%)	87 (36.1)	88 (9.3)	0 (0)

Table 3. Postoperative outcomes of patients with low-, intermediate-, and high-risk prostate cancer

Outcome	High risk (n = 241)	Intermediate risk (n = 943)	Low risk (n = 645)
Biochemical recurrence rate (5 year), no. (%)	53 (22)	181 (19.2)	78 (12.1)
Adjuvant androgen deprivation therapy use, no. (%)	10 (4.1)	11 (1.2)	6 (0.9)
Adjuvant radiation therapy use, no. (%)	6 (2.5)	25 (2.7)	12 (1.9)

however, this was not statistically significant (p < 0.9). Recurrence rate and adjuvant androgen deprivation therapy use were both higher in LNP patients than in LNN patients (recurrence, 26.1% vs 16.4%, p < 0.05; androgen deprivation, 5.2% vs 1.2%, p = 0.02). Use of adjuvant radiation therapy was not significantly higher in LNN patients (2.5% vs 0.7%, p < 0.9). Compared with LNN patients, LNP patients did not have a significantly lower 5-year overall survival rate (92.5% vs 94.9%, p < 0.9).

Univariate and multivariate analyses were used to identify factors associated with margin positivity in both LNP and LNN groups. Age (odds ratio [OR] = 1.02, p = 0.02), prebiopsy PSA (OR = 1.02, p < 0.001) and clinical T stage (OR = 1.58, p = 0.03) were all independently associated with margin positivity (Table 6). On multivariate analysis, age (OR = 1.02, p = 0.02), prebiopsy PSA (OR = 1.02, p < 0.001) and clinical T stage (OR = 1.49, p = 0.01) remained significant predictors of margin positivity.

DISCUSSION

This study represents the largest retrospective prostatectomy cohort in KPSC. The study summarizes the preoperative and postoperative characteristics of patients who underwent RP+PLND for prostate cancer.

Of the patients who underwent RP, 13% were high risk, 51% were intermediate risk, and 35% were low risk. The percentage in each risk category is consistent with other prostate cancer databases.[11] The average prebiopsy PSA in the high-risk category was 13.3 ng/μL. In a recent study evaluating oncologic outcome in high-risk patients, the prebiopsy PSA was slightly higher at 15.9 ng/μL.[17] This difference may be attributable to aggressive PSA screening and shorter time to surgery caused by in-network care within a managed care system.

In our study, 17.8% of the high-risk, 14.8% of intermediate-risk, and 11.9% of low-risk patients had positive surgical margins after RP. Large RP series have reported a mean positive surgical margin rate ranging from 2% to 31%.[18-21] The positive surgical margin rates are overall consistent with the literature. The slightly higher positive surgical margin rate in low-risk patients in our series may be because of more aggressive nerve-sparing practices in this subset of patients. Differences in risk stratification between studies may also contribute to differences in positive surgical margin rates. Furthermore, LNP was 14.9% in high-risk, 9.8% in intermediate-risk, and 0.9% in low-risk RP recipients. Large multi-institutional studies have reported LNP ranging from 12.3% to 14% in high-risk patients, consistent with our findings.[18,21-23]

Of interest, our study showed a 5-year overall survival of 92.5% in high-risk patients with LNM. Five-year overall survival was 86.9% in patients with positive surgical margins and 92.2% in patients with negative surgical margins. Qin and colleagues[9] showed a cancer-specific survival of 96% in patients with LNM undergoing RP+PLND. Interestingly, all patients in the study received adjuvant androgen deprivation therapy, whereas only 5.2% of high-risk patients with LNM in our cohort underwent adjuvant androgen deprivation therapy. Additionally, 1.2% of patients without LNM received adjuvant androgen deprivation therapy (ADT). Although the influence of adjuvant ADT on survival was not particularly investigated in this study, it is noteworthy that there was no significant difference in 5-year overall survival given the pattern of adjuvant ADT use in patients with intermediate-risk and high-risk prostate cancer. Ideally, prospective randomized long-term studies with standardized criteria for adjuvant ADT would be necessary to investigate its influence on survival. It is clear that in our health care network, adjuvant ADT was administered on a case-by-case basis, taking into consideration margin positivity, LNM, timing and burden of disease recurrence, and patient-specific factors.

Table 4. Preoperative demographic and clinical characteristics of patients with pathologic positive lymph nodes

Lymph node involvement	Lymph node negative (n = 1693)	Lymph node positive (n = 134)	p value
Age, y			
Mean (SD)	59.2 (7.14)	59.9 (7.26)	0.30
Median	59.6	60.7	
Q1, Q3	54.3, 64.6	54.9, 65.7	
Range	35.5-77.5	40.8-77.0	
Clinical stage, no. (%)			
T1	1307 (77.2)	77 (57.5)	0.01
T2	384 (22.7)	52 (38.8)	
T3	2 (0.1)	5 (3.7)	
Prebiopsy PSA			
Mean PSA (SD)	8.9 (8.40)	15.5 (13.17)	0.01
Median PSA	6.5	10.5	
Q1, Q3	4.8, 10.2	7.6, 19.2	
Range	(0.3-121.1)	(2.3-73.0)	
Biopsy Gleason score			
Mean (SD)	6.7 (0.81)	7.3 (0.87)	0.01
Median	7	7	
Q1, Q3	6.0, 7.0	7.0, 8.0	
Range	6.0-10.0)	6.0-9.0	
6, no. (%)	834 (49.3)	17 (12.7)	
7, no. (%)	641 (37.9)	73 (54.5)	
8, no. (%)	148 (8.7)	26 (19.4)	
9, no. (%)	66 (3.9)	18 (13.4)	
10, no. (%)	4 (0.2)	0 (0)	
Preoperative androgen deprivation therapy, no. (%)	86 (5.1)	15 (11.2)	0.01

PSA = prostate-specific antigen; Q = quartile; SD = standard deviation.

Patients with positive surgical margins in the setting of LNM after RP+PLND require more aggressive follow-up and management. In our cohort, age, prebiopsy PSA and clinical T stage were factors associated with positive surgical margins in patients with LNP disease. Similar factors have been seen in other studies.[24] Although it is well known that patients with LNM and positive surgical margins have a worse prognosis, we investigated the factors influencing biochemical recurrence in this subset of patients. Age, biopsy Gleason score, Gleason score upstaging, and positive margins influenced biochemical recurrence (Table 7). Of note, positive margin status was the most significant factor for biochemical recurrence (OR = 9.23, p < 0.001). Other investigations corroborated positive surgical margins as a strong factor of biochemical recurrence in prostatectomy recipients.[25-27]

In the KPSC system, RP+PLND has been a standard of care for higher-risk prostate cancer patients. In our 15-year experience, patients with LNM have had more positive surgical margins, higher biochemical recurrence rates, and Gleason score upstaging. Although positive surgical margin was the most significant predictor of biochemical recurrence, it did not significantly influence 5-year survival. Our practice pattern in terms of how to manage patients with LNM and positive surgical margins has not been standardized and occurs on a case-by-case basis with multiple adjuvant treatments, including antiandrogen and radiation therapy.

Our study has several important limitations. First, this was a retrospective cohort study examining all patients who underwent RP for prostate cancer. Although the study is retrospective, the data on high-risk patients with LNM is valuable because randomized controlled trials are limited given the lower contemporary incidence of LNP disease with RP. Although it is limited in its design, the study does include pathologic data and 5-year follow-up with regard to adjuvant treatments and oncologic outcomes. We acknowledge that patient follow-up and data on recurrence rates and survival were limited to 5 years. Longer-term follow-up on overall survival, biochemical recurrence-free survival, and metastasis-free survival would add more value to modifying practice patterns at our institution. Lastly, data on patients who received preoperative or postoperative androgen deprivation therapy and adjuvant radiation therapy was not standardized. Despite this limitation, the influence of postoperative androgen deprivation on survival in high-risk patients with positive lymph nodes in this study remains consistent with the findings of large multi-institutional studies.

Table 5. Postoperative characteristics of patients with lymph node-positive and lymph node-negative cancers

Characteristic	Lymph node negative, no. (%)	Lymph node positive, no. (%)	p value
Positive margin rate	228 (13.5)	31 (23.1)	0.03
Pathologic T stage			
T0	1 (0.1)	0 (0)	0.01
T2	1261 (74.5)	15 (11.2)	
T3	430 (25.4)	119 (88.8)	
T4	1 (0.1)	0 (0)	
Other factors			
Biochemical recurrence rate (5 year)	277 (16.4)	35 (26.1)	0.05
Adjuvant androgen deprivation therapy	20 (1.2)	7 (5.2)	0.02
Adjuvant radiation therapy	42 (2.5)	1 (0.7)	0.98
Gleason score upstage	383 (22.6)	47 (35.1)	0.02
Gleason score downstage	160 (9.5)	14 (10.4)	0.8
Overall survival (5 year)	1606 (94.9)	124 (92.5)	0.7

Table 6. Factors influencing surgical margin positivity in lymph node-positive patients

Factor	Odds ratio (95% CI)	p value
Univariate analysis		
Age	1.02 (1.00-1.02)	0.01
Biopsy Gleason score	1.06 (0.91-1.24)	0.45
Prebiopsy PSA	1.02 (1.01-1.03)	0.01
Clinical stage	1.58 (1.18-2.10)	0.01
Preoperative androgen deprivation therapy	0.89 (0.49-1.62)	0.70
Multivariate analysis		
Age	1.02 (1.00-1.04)	0.02
Prebiopsy PSA	1.02 (1.01-1.03)	0.01
Clinical stage	1.49 (1.11-2.00)	0.01

CI = confidence interval; PSA = prostate-specific antigen.

Table 7. Factors influencing biochemical recurrence within 5 years, multivariate analysis

Factor	Odds ratio (95% CI)	p value
Age	1.03 (1.01-1.05)	0.01
Positive margin rate	9.23 (6.87-12.43)	0.01
Gleason score upstaging	1.81 (1.32-2.46)	0.01
Biopsy Gleason score	1.29 (1.10-1.52)	0.01

CI = confidence interval.

CONCLUSION

To our knowledge, this study is the largest retrospective prostatectomy cohort summarizing preoperative and postoperative characteristics of patients with prostate cancer undergoing RP+PLND. Positive margin rates were 17.8%, 14.8%, and 11.9% in the high-, intermediate-, and low-risk groups. In multivariate analysis, age, prebiopsy PSA, and clinical stage were predictive of positive margins in patients with LNP disease. Furthermore,

age, margin status, biopsy Gleason score, and Gleason score upstaging were factors for biochemical recurrence. Positive surgical margin was the factor most responsible for biochemical recurrence. Our study demonstrates our experience with RP+PLND and practice patterns after surgery with regard to adjuvant treatment and oncologic outcomes in aggressive disease. Although management of patients with LNM and positive surgical margins involves androgen deprivation and radiation therapy at our institution, further investigations are needed to determine optimal management of this patient population undergoing RP. ❖

Disclosure Statement

The author(s) have no conflicts of interest to disclose.

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