

Initial Experience and Assessment of Surgical Margins after Robotic Assisted Radical Prostatectomy at a Mexican University General Hospital

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Abstract

Background: Prostate Cancer (PC) is the most common malignant neoplasm in men and it's the second cause of cancer specific mortality. The finding of Positive Surgical Margins (PSMs) after Radical Prostatectomy (RP) is an important predictive variable for Biochemical Recurrence (BR). Predictive variables are necessary to discriminate those prone to develop BR and therefore would benefit from adjuvant therapy from those that can safely be surveilled.

Objective: To identify patients with PSMs after Robotic-Assisted Radical Prostatectomy (RARP) at our urology department.

Materials and Methods: Observational, descriptive, transversal and retrospective study. Between December 2014 and December 2017, 68 patients with PC underwent RARP by a single surgeon. We assessed multiple variables to identify the ones associated with increased PSMs. Variables included: age, Prostate Specific Antigen (PSA), T clinical stage, biopsy's Gleason score, and number of positive fragments, perineural invasion, lymphovascular invasion, surgical specimen's Gleason score, and pathologic stage. For statistical analysis we used SPSS v23.0.

Results: 40/68 (58.8%) patients had PSMs, of them: 19/40 (47.5%) had a Gleason score 3+3=6, 7/40 (17.5%) had lymphovascular invasion, the region with greater PSMs was the prostate apex (70%), mean age was 64.2 years (SD 7.03 years), and mean PSA 12.59 ng/mL (SD 12.12 ng/mL). Pathologic stage ($p=0.04$), PSA ($p=0.021$), and perineural invasion ($p=0.0003$) were statistically significant. 22 patients underwent surveillance, 2 Androgen Deprivation Therapy (ADT), 9 radiotherapy, and 7 radiotherapy+ADT.

Conclusion: It is of utmost importance to consider preoperative PSA as a predictive factor for PSMs and to correlate it with RARP's pathology report. These factors should guide treatment election and the need for closer postoperative follow-up.

Background

Prostate Cancer (PC) is the most common malign neoplasm in elderly men. Radical Prostatectomy (RP) has been able to provide favorable oncologic control and a prolonged survival for localized PC by reducing the risk of metastasis and local tumor progression [1].

Robotic-assisted surgery continues moving forward and promises to play a major role in the field of urology.

Advantages of this resource

Low blood loss, low postoperative pain, short hospital stay, and speedy patient recovery, have made Robotic-Assisted Radical Prostatectomy (RARP) more common in the treatment armamentarium for PC [2].

After RP, pathologic assessment of tumor's cellular differentiation (Gleason score) and pathologic stage, with preoperative PSA,

can be used for staging patients in risk groups, predict outcomes (such as Biochemical Recurrence (BR) risk) and guide immediate treatment [3].

Avoiding Positive Surgical Margins (PSMs) after RP depicts the most important oncologic factor associated with the surgical procedure of RP for PC. Despite the debate of the influence of PSMs on long-term outcome, patients with PSMs have an increased risk for BR when compared to patients with Negative Surgical Margins (NSMs) [4].

Only a few studies (multi-institutional or meta-analysis) have shown a benefit of RARP *versus* Open Radical Prostatectomy (ORP) in reducing the rate of PSMs [5].

A series of patients without adjuvant treatment showed that those with PSMs have a 57.5% disease-free survival at 5 years [6]. However, disease-free survival at 10 years for those with focal

PSMs and extensive PSMs varies significantly between 64% to 38%, respectively [7].

Materials and Methods

An observational, descriptive, transversal, retrospective study was carried out. A review of clinical records from patients with diagnosis of PC that underwent RARP between December 2014 to December 2017 at our urology department was performed. The following variables were analyzed: age, PSA value, T clinical stage, biopsy's Gleason score, perineural invasion, lymphovascular invasion, surgical specimen's Gleason score, pathologic stage, and biochemical recurrence, with the aim of identifying the variables associated with PSMs. Continuous variables with normal distribution are expressed as mean and Standard Deviation (SD), otherwise they are expressed as median and range. Categorical variables are expressed as an absolute value and percentages. For the statistical analysis we used the Chi-squared test and SPSS v.23.0. Results were considered statistically significant if p value was <0.05.

Results

Patient demographics are shown in table 1 and 2. On statistical analysis, PSA level in patients with PSMs was higher than in patients with NSMs, having a significant correlation (p=0.021). When assessing the most frequent regions of PSMs, it was found that the most common site was the apex, followed by the posterior part of the prostate (Graph 1).

Table 1: Association between individual categorical variables with PSMs: univariate analysis.

	NSM	PSM	P value
Clinical Stage (cT)			
T1c	8	10	0.29
T2a	13	15	
T2b	1	6	
T2c	5	6	
T3a	0	3	
T3b	1	0	
Gleason score (biopsy)			
3+3=6	14	19	0.59
3+4=7	4	5	
4+3=7	4	10	
4+4=8	4	5	
4+5=9	1	0	
5+4=9	0	1	
5+5=10	1	0	
Gleason score after RARP			
3+3=6	8	19	0.57
3+4=7	7	5	
4+3=7	8	10	
4+4=8	1	5	
4+5=9	2	1	
5+4=9	2	0	
5+5=10	0	0	
Lymphovascular invasion			
Yes	3	7	0.5
No	25	33	

Table 2: Patient demographics.

Mean PSA(SD)	12.59 (12.13)
Mean age (SD)	64.2 (7.03)
Clinical stage (cT) (%)	
T1c	18 (26.4)
T2a	28 (41.1)
T2b	7 (10.2)
T2c	11 (16.1)
T3a	3 (4.4)
T3b	1 (1.4)
Gleason score (biopsy) (%)	
3+3=6	33 (48.5)
3+4=7	9 (13.2)
4+3=7	14 (20.5)
4+4=8	9 (13.2)
4+5=9	1 (1.4)
5+4=9	1 (1.4)
5+5=10	1 (1.4)
NCCN Risk group (%)	
Very low	3 (4.4)
Low	20 (29.4)
Favorable intermediate	17 (25)
Unfavorable intermediate	18 (26.4)
High	10 (14.7)
Gleason score after RARP (%)	
3+3=6	27 (39.7)
3+4=7	12 (17.6)
4+3=7	18 (26.4)
4+4=8	6 (8.8)
4+5=9	3 (4.4)
5+4=9	1 (1.4)
5+5=10	1 (1.4)
Pathologic stage (pT) (%)	
T2a	3 (4.4)
T2b	1 (1.4)
T2c	34 (50)
T3a	19 (27.9)
T3b	11 (16.1)
Surgical margins (%)	
Positive	40 (58.8)
Negative	28 (41.2)
PSMs site	
Prostate apex	28
Posterior	17
Anterior	7
Lateral	5
Prostate base	11

Table 3: Association between PSA value and positive surgical margins (P=0.021).

		Surgical Margins		Total
		Negative	Positive	
PSA Value	<10 ng/mL	16	24	40
	>10<20 ng/mL	11	13	24
	>20 ng/mL	1	3	4
Total		28	40	68

Table 4: Association between perineural invasion and positive surgical margins (P=0.04).

		Margins		Total
		Negative	Positive	
Perineural Invasion	No	14	2	16
	Yes	14	38	52
Total		28	40	68

being able to establish an association with PSMs, we will have to do a long-term follow-up to assess the behavior of BR in these patients.

Studies that directly compare the effect of PSMs with metastasis-free survival and mortality are less conclusive. One of the largest studies, out of a registry of 65,633 patients, demonstrated a significant effect of PSMs on cancer-specific mortality (OR: 1,70, [1.32-2.18]) [21].

It seems that experience and careful attention to the surgical procedure also play an important role in decreasing the incidence of PSMs. Sooriakumaran P, et al. [22] reported a significant correlation between surgeon's experience and PSMs rate [22]. Ahlering TE, et al. [23] also reported a significant improvement in the PSMs rate associated with extensive surgical experience [23].

Limitations of the present study include its retrospective nature and the relatively small sample size. Furthermore, clinical examinations and surgical samples assessment were not performed by the same clinicians or pathologists. However, the initial experience of our urology department is reported.

Conclusions

It is important to consider preoperative PSA as a predictive factor for PSMs and correlate it with the pathologic result of the surgical specimen, these should guide treatment election and the necessity for closer postoperative follow-up.

Prospective studies with larger sample size should be encouraged. Furthermore, because the RARP learning curve may differ by surgeon, studies involving multiple surgeons are still necessary.

Conflict of Interest

None declared

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