Risk of biochemical recurrence based on extent and location of positive surgical margins after Robotic Assisted Laparoscopic Radical Prostatectomy (RALP) at minimum follow-up of 5 years

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Background

- The impact of location and extent of positive surgical margins (PSM) on Biochemical Recurrence (BCR) remains highly controversial.
- Some found apical PSM increase BCR(1) while others did not(2,3).
- A recent meta-analysis emphasized that BCR is particularly associated with the extent of PSM(4).

Purpose

(i) To report extent and location of PSM following Robotic Assisted Laparoscopic Radical Prostatectomy (RALP) over time.

(ii) To determine whether BCR at >5 years is associated with location and extent of PSM, involvement of lymph nodes, pathologic tumor stage, and Gleason score.

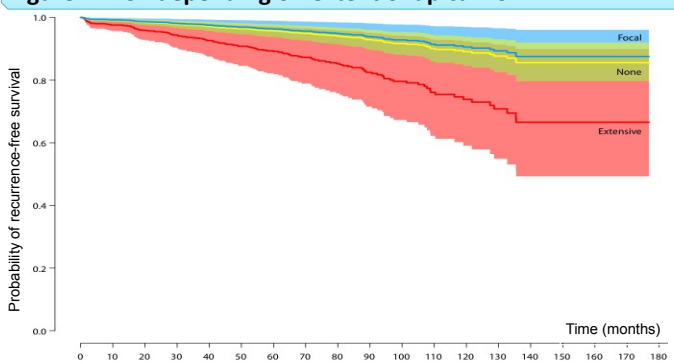
Table 1: Demographics, preoperative and pathologic data

	Recurrence-free n = 315	Biochemical Recurrence n = 138	Total n = 530
Preoperative data			
Age - *median (IQR)*	63.0 (58.0 - 68.0)	64.0 (59.0 - 69.0)	63.0 (40.0 - 79.0)
Preoperative PSA - *median (IQR)*	6.0 (4.5 - 8.0)	8.0 (5.9 - 10.9)	6.4 (0.6 - 123.0)
Pathological results			
Pathological Gleason Score			
≤6	150 (48%)	21 (15%)	171 (32%)
3+4	113 (36%)	46 (33%)	159 (30%)
4+3	33 (10%)	31 (22%)	64 (12%)
≥8	19 (6%)	36 (26%)	55 (10%)
unknown	0 (0%)	3 (2%)	3 (1%)
pT stage			
pT2	259 (82%)	62 (45%)	321 (61%)
pT3a	40 (13%)	35 (25%)	75 (14%)
pT3b & pT4	16 (5%)	38 (28%)	54 (10%)
unknown	0 (0%)	3 (2%)	3 (1%)
Involvment of lymph nodes	2 (1%)	10 (7%)	12 (2%)
Positive surgical margins			
Apical			
focal	29 (9%)	14 (10%)	43 (8%)
extensive	6 (2%)	13 (9%)	19 (4%)
Posterolateral			
focal	18 (6%)	21 (15%)	39 (7%)
extensive	7 (2%)	11 (8%)	18 (3%)
Base			
focal	11 (3%)	11 (8%)	22 (4%)
extensive	4 (1%)	3 (2%)	7 (1%)
Bladder neck			
focal	1 (0%)	1 (1%)	2 (0%)
extensive	0 (0%)	0 (0%)	0 (0%)

Table 2: Univariable and multivariable analyses

	Uni-variable			Multi-variable		
	HR	95% CI	p-value	HR	95% CI	p-value
Age	1.03	(1.01 - 1.06)	0.015			
Preop PSA	1.02	(1.01 - 1.03)	<0.001			
Pathological Gleason Score						
≤ 6	REF			REF		
3+4	3.36	(2.00 - 5.64)	<0.001	2.86	(1.68 - 4.88)	<0.001
4+3	7.21	(4.13 - 12.60)	<0.001	3.88	(2.12 - 7.07)	<0.001
≥ 8	13.75	(7.96 - 23.74)	<0.001	7.97	(4.38 - 14.51)	<0.001
Stage pT						
pT2	REF			REF		
pT3a	3.12	(2.06 - 4.73)	<0.001	2.28	(1.48 - 3.52)	<0.001
pT3b & pT4	7.37	(4.89 - 11.12)	<0.001	3.07	(1.93 - 4.90)	<0.001
Involvment of lymph nodes	8.84	(4.57 - 17.12)	<0.001	3.42	(1.70 - 6.91)	<0.001
Apical margins						
focal	1.10	(0.63 - 1.92)	0.742	0.86	(0.49 - 1.50)	0.586
extensive	3.80	(2.13 - 6.77)	<0.001	2.62	(1.40 - 4.90)	0.003
Posterolateral margins						
focal	2.59	(1.62 - 4.14)	<0.001			
extensive	2.73	(1.46 - 5.08)	0.002			
Base margins						
focal	2.60	(1.40 - 4.84)	0.003			
extensive[1] (only 7 events)	1.45	(0.46 - 4.58)	0.525			
Neck margins						
focal	1.55	(0.21 - 10.98)	0.670			
extensive[2] (no events)						

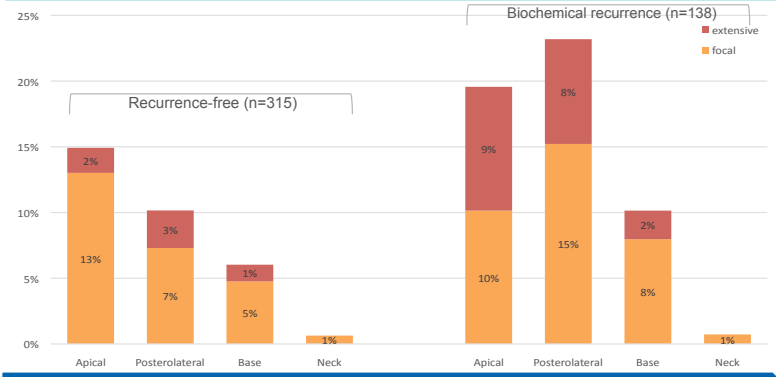
Figure 1: BCR depending on extent of apical PSM



Patients & Methods

- Retrospective, single center study from January 2003 to April 2012.
- 530 RALP for prostate cancer (cT1 to cT3).
- Database recorded PSM location (apex, posterolateral, base and bladder neck) and extent (focal, ≤3mm; or extensive, >3mm).
- BCR was defined by PSA >0.2 ng/mL at any point during follow-up (**Table 1**).
- Kaplan-Meier survival and Cox regressions were performed (**Figure 1**).

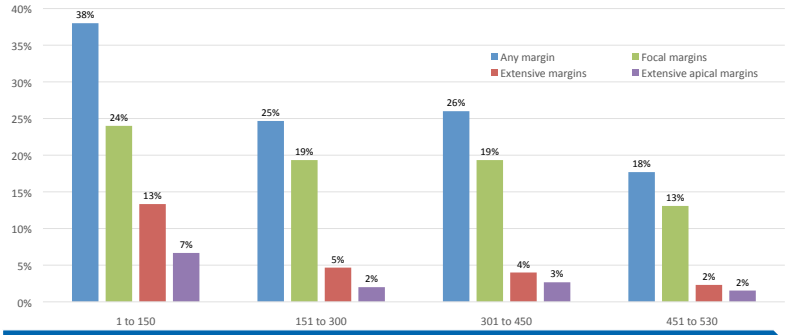
Figure 2: Incidence of Positive Surgical Margins



Results

- From the 530 patients operated, 156 (29%) had PSM (138 single, 18 multiple).
- PSM were apical in 75 (14%) patients, posterolateral in 64 (12%), at the base in 34 (7%) and at the bladder neck in 3 (1%).
- 453 (86%) patients were evaluated at >60 months (median, 92; IQR, 87–99), of which 138 (30%) had BCR, 10 (2%) died of causes related to cancer, and 23 (5%) died from unrelated causes.
- 77 (14%) patients were lost to FU, but compared to patients evaluated, they comprised fewer:
  (a) high-risk tumors (16% vs. 19%) (p=0.005)
  (b) tumors at pT stage ≥3 (12% vs. 28%) (p=0.004)
  (c) extensive apical PSM (0% vs 4%) (p=0.054)
- Multivariable regression revealed that BCR was associated with: Gleason score (p<0.001), pT stage (p<0.001), involvement of lymph nodes (p<0.001), in addition to ***extensive*** apical PSM (p<0.001), but not ***focal*** apical PSM (p=0.586) (**Table 2**, **Figure 2**).
- The incidence of PSM decreased over the inclusion period (**Figure 3**).

Figure 3: Reduction in incidence of PSM over the inclusion period



Conclusion

The risk of BCR after RALP increased with extensive apical PSM independently from pathological Gleason score, pT stage or involvement of lymph nodes. The presence of focal PSM at the apex was not associated with an increased risk of BCR. The incidence of PSM decreased over the inclusion period.

References & Acknowledgements

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