

# Biochemical recurrence after prostatectomy according to nadir prostate specific antigen value

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## Introduction

The hypersensitive prostate specific antigen (PSA) test can be measured in 0.01 ng/mL units, and its efficacy for screening after radical prostatectomy (RP) has been reported.

We assessed the patients who underwent RP to evaluate whether the nadir value affects biochemical recurrence (BCR).

## Patients and methods

From 1995 to 2012

The patients who had N0, negative resection margin and nadir PSA of less than 0.2 ng/mL were evaluated, retrospectively.

The characteristics, pathological outcomes, PSA after RP and BCR were assessed.

## Exclusion

Nadir value was not less than 0.2 ng/mL

Surgical margin involvement

Patients without BCR had a follow-up period less than 36 months

## Outcomes

Baseline characteristics

age, body mass index, hypertension (HTN), diabetes mellitus (DM), serum PSA, prostate volume, PSA density (PSAD), results of pre-operative biopsy (including Gleason score, positive core percentage, tumor volume percentage), and clinical stage

Peri- and post-operative outcomes

Operative times, estimated blood loss, operation type, pathological outcomes, pathologic stage, nadir PSA value, time to nadir (TTN), and follow-up periods

## Results

Table 1 Baseline characteristics between biochemical recurrence group and no recurrence group

	Biochemical recurrence (n = 323)	no recurrence (n = 1160)	p-value
Age, years	63.86±7.31	64.06±6.82	0.645
BMI, kg/m <sup>2</sup>	24.63±2.64	24.64±4.80	0.941
HTN, n (%)	89 (27.55)	376 (32.41)	0.019
DM, n (%)	29 (8.98)	105 (9.05)	0.751
PSA, ng/ml	9.75±6.92	6.71±5.19	<0.001
Prostate volume, mL	31.17±14.31	34.14±15.51	0.002
PSA density, ng/mL <sup>2</sup>	0.35±0.26	0.23±0.21	<0.001
Gleason score, primary	3.52±0.57	3.16±0.43	<0.001
Gleason score, secondary	3.58±0.60	3.32±0.54	<0.001
Gleason score	7.07±0.95	6.51±0.84	<0.001
Positive core, %	40.45±22.35	26.47±20.15	<0.001
Tumor volume, %	48.73±28.73	32.86±26.25	<0.001
Clinical T stage, n (%)			
T1	28 (8.67)	126 (10.86)	0.014
T2	191 (59.13)	762 (65.69)	
T3a	82 (25.39)	219 (18.88)	
T3b	22 (6.81)	53 (4.57)	
Clinical N stage, n (%)			
N0	303 (93.81)	1118 (96.38)	0.025
N1	4 (1.24)	16 (1.38)	
Nx	16 (4.95)	25 (2.16)	

BMI body mass index, HTN hypertension, DM diabetes mellitus, PSA prostate specific antigen, ASA American Society of Anesthesiologists

Table 2 Operative outcomes between the biochemical recurrence group and no recurrence group

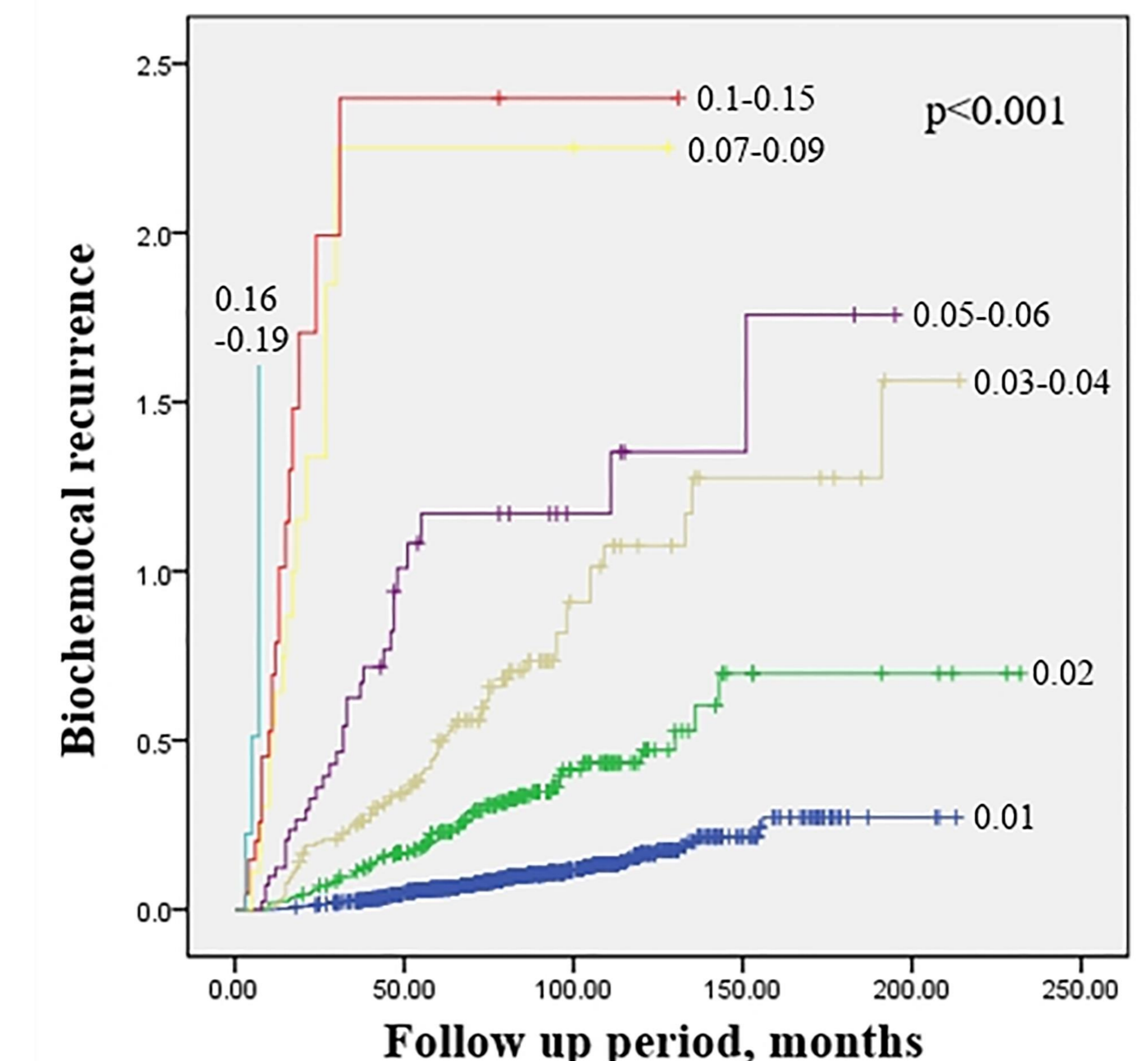
	Biochemical recurrence (n = 323)	no recurrence (n = 1160)	p-value
Operation time, mins	247.03±95.78	252.06±101.35	0.418
Estimated blood loss, mL	534.86±556.82	427.42±538.39	0.002
Operation type, n (%)			
RPP	113 (34.98)	298 (25.69)	<0.001
RRP	66 (20.43)	159 (13.71)	
LRP	16 (4.95)	106 (9.14)	
RALP	128 (39.63)	597 (51.47)	
Nerve-sparing, n (%)			
None	162 (50.15)	383 (33.02)	<0.001
Unilateral	79 (24.46)	286 (24.66)	
Bilateral	74 (22.91)	485 (41.81)	
Gleason score, primary	3.50±0.54	3.17±0.42	<0.001
Gleason score, secondary	3.76±0.69	3.63±0.60	0.002
Gleason score	7.26±0.87	6.81±0.77	<0.001
T stage, n (%)			
T0	1 (0.31)	8 (0.69)	<0.001
T2a	34 (10.53)	258 (22.24)	
T2b	7 (2.17)	12 (1.03)	
T2c	142 (43.96)	676 (58.28)	
T3a	108 (33.44)	184 (15.86)	
T3b	31 (9.60)	22 (1.90)	
N stage, n (%)			
Nx	259	1056	<0.001
N0	64	104	
Nadir PSA, ng/mL	0.035±0.034	0.014±0.009	<0.001
Time to nadir, months	4.64±7.65	7.43±12.46	<0.001
Follow up, months	109.10±47.21	86.73±33.78	<0.001

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Table 3 Multivariable Cox regression analyses for biochemical recurrence

	Univariable			Multivariable		
	HR	95% CI	p-value	HR	95% CI	p-value
Age	0.996	0.978-1.014	0.645			
BMI	0.999	0.971-1.028	0.957			
HTN	0.713	0.536-0.947	0.019	0.887	0.551-1.428	0.622
DM	0.932	0.603-1.440	0.751			
PSA	1.085	1.062-1.109	<0.001	1.058	0.979-1.145	0.156
Prostate volume	0.986	0.976-0.995	0.003	0.991	0.971-1.011	0.375
PSA density	8.56	4.831-15.168	<0.001	0.524	0.060-4.593	0.559
Biopsy Gleason score	2.016	1.749-2.325	<0.001	1.414	1.078-1.856	0.012
Positive core, %	1.028	1.022-1.034	<0.001	1.017	1.006-1.028	0.002
Tumor volume, %	1.02	1.016-1.025	<0.001	1.002	0.994-1.011	0.592
Clinical stage						
T1	1	reference	-			
T2	1.128	0.727-1.750	0.591			
T3a	1.685	1.041-2.728	0.034	1.131	0.500-2.556	0.768
T3b	1.868	0.981-3.557	0.057	1.26	0.416-3.811	0.683
Operation type						
Open	1	reference	-			
MIS	0.523	0.408-0.671	<0.001	0.491	0.314-0.767	0.002
Nerve-sparing						
None	1	reference	-			
Unilateral	0.653	0.479-0.890	0.007	0.859	0.519-1.422	0.555
Bilateral	0.361	0.266-0.490	<0.001	0.667	0.406-1.094	0.667
Pathology Gleason score	1.755	1.530-2.014	<0.001	1.391	1.020-1.897	0.037
Pathologic stage						
T0	1	reference	-			
T2a	1.054	0.128-8.690	0.961			
T2b	4.667	0.478-45.546	0.185			
T2c	1.68	0.209-13.542	0.626			
T3a	4.696	0.579-38.055	0.147			
T3b	11.273	1.314-96.722	0.027	1.283	1.052-1.566	0.014
Nadir PSA, ng/mL	3.877	3.446-4.363	<0.001	1.254	1.199-1.311	<0.001
Time to nadir, months	0.955	0.934-0.976	<0.001	0.917	0.882-0.953	<0.001

BMI body mass index, HTN hypertension, DM diabetes mellitus, PSA prostate specific antigen, ASA American Society of Anesthesiologists, MIS minimal invasive surgery.



## Conclusion

- High PSA nadir value and short TTN may predict the risk of BCR after successful RP.
- This may identify candidates for adjuvant therapies after RP.