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ORIGINAL ARTICLE

Effect of positive surgical margins on biochemical failure, biochemical recurrence-free survival, and overall survival after radical prostatectomy: Median long-term results

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Abstract The aim of this study was to investigate the median long-term effects of positive surgical margin (PSM) and other prognostic factors on biochemical recurrence-free survival, overall survival, and biochemical failure in patients who underwent radical prostatectomy. Our study included 121 patients with pT2-3N0 disease treated between March 2006 and August 2012. The patients were divided into two groups: those with PSM and those with negative surgical margin (NSM). We analyzed the age, clinical and pathological stages, preoperative and postoperative Gleason scores, duration of the follow-up, adjuvant chemo-/radiotherapy, biochemical failure, biochemical recurrence-free survival, and overall survival in these patients. PSM was found in 25 (20%) patients, whereas 96 patients had NSM. The median follow-up time was 46.6 months (range 12–72 months) for the PSM group and 48.3 months (range 7–149 months) for the NSM group. The biochemical failure rate was 24% in the PSM group and 8.3% in the NSM group ($p = 0.029$). The biochemical recurrence-free survival was found as 76% in the PSM group and 91.7% in the NSM group. The difference between the groups was not statistically significant ($p = 0.06$). The overall survival was 100% in both groups. The surgical margins of the radical prostatectomy material is an important pathological indicator for biochemical failure at mid long-term follow-up. We did not find any effect of PSM on overall survival or biochemical recurrence-free survival.

Conflicts of interest: The authors declare no conflicts of interest.

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Introduction

Radical prostatectomy (RP) provides perfect disease control in the majority of patients with clinically localized prostate cancer (CaP). However, about half of the patients eventually experience serum prostate-specific antigen (PSA) elevations without any clinical or radiological evidence of disease metastasis after RP [1]. The actual incidence, clinical significance, and natural history of biochemical failure (BF) remain unclear. A number of factors have been reported to be associated with BF after RP, such as positive surgical margins (PSMs) [2,3]. The rates of PSM have been reported between 14% and 46% in the literature [4–6].

Recently, PSA, pathological Gleason score, and PSM have been reported as the best prognostic factors that predict the recurrence risk after curative RP [7]. A number of studies have shown that PSM is a poor prognostic factor after RP [1,8–10], whereas others claim the opposite [7,11].

In this study, our aim was to investigate the median long-term effects of PSM and other prognostic factors on biochemical recurrence-free survival, overall survival, and BF in patients who underwent RP.

Methods

After obtaining Institutional Review Board approval (date: March 8, 2006; August 3, 2012, Number 417), we retrospectively evaluated the data of 186 patients who had RP in our clinic due to clinically localized CaP between March 2006 and August 2012. The patients were evaluated in the outpatient clinic of Ankara Training and Research Hospital, Department of Urology. A total of 65 patients who were lost from the follow-up or with missing data were excluded. The remaining 121 patients were included in the study.

The diagnosis was achieved by prostate biopsies [performed because of elevated PSA levels (>4 ng/mL) and/or abnormal digital rectal examination findings]. The preferred surgical technique was open retropubic nerve-sparing RP. The patients were divided into two groups: those with PSM and those with negative surgical margin (NSM).

We analyzed the age, clinical and pathological stages, pre- and postoperative Gleason scores, duration of the follow-up, adjuvant chemo/radiotherapy, BF, biochemical recurrence-free survival, and overall survival in these patients. The overall survival was calculated by subtracting the date of diagnosis from the time of death due to any cause.

Biopsy and surgical Gleason scores were determined. The clinical stage was determined using the 2002 TNM staging systems. PSM was defined as the presence of any neoplastic cells at the surgical margins, and observation of cancer cells outside the prostatic capsule was defined as the extracapsular spread.

According to the international consensus, recurrent cancer may be defined after two consecutive PSA values of $\geq$0.2 ng/dL following radical retropubic prostatectomy [8,12]. Therefore, we accepted a PSA value $\geq$0.2 ng/mL for the presence of the biochemical recurrence.

The follow-up visits were done at postoperative 3rd month, 6th month, and 12th month, and every 6 months thereafter until postoperative Year 3 is completed. Then, digital rectal examination was performed annually together with serum PSA and/or bone scan.

The data were analyzed using SPSS version 15 (SPSS Inc., Chicago, IL, USA). The differences between independent groups regarding continuous variables were evaluated using the Mann–Whitney *U* test. For categorical comparisons, Chi-square or Fisher's exact test were used whenever convenient. Biochemical recurrence-free survival was calculated using Kaplan–Meier analysis. The statistical significance was set at $p < 0.05$.

Results

PSM was found in 25 (20%) patients, whereas 96 patients had NSM. The median ages of the patients in PSM and NSM groups were 67 years (58–79 years) and 69 years (54–79 years), respectively ($p = 0.89$). The median follow-up time was 46.6 months (range 12–72 months) for the PSM group and 48.3 months (range 7–149 months) for the NSM group, without any statistically significant difference in between ($p = 0.59$). The comparative data of the groups are presented in Table 1.

The BF rate was 24% in the PSM group and 8.3% in the NSM group ($p = 0.029$; Table 2). The biochemical recurrence-free survival was found as 76% for the PSM group and 91.7% for the NSM group. The difference between the groups was not statistically significant ($p = 0.06$; Fig. 1). The overall survival was 100% in both groups.

Postoperative pathological stage was T3 in 11 (44%) patients with PSMs and in eight (8.3%) patients with NSMs. According to these data, PSM is related to postoperative pathological stage ($p < 0.01$; Table 1). The BF rates according to clinical and pathological stages are presented in Table 3.

Table 1 Comparison of age, preoperative PSA, follow-up time, and clinical and pathological stages between the groups.

	PSM ($n = 25$)	NSM ($n = 96$)	p
Age (y)	67 (58–79)	69 (54–79)	0.89
Preoperative PSA	10.5 (3.2–39)	8.3 (1,1–41)	0.045
Follow-up time (mo)	46.6 (12–72)	48.3 (7–149)	0.59
cT1c	12 (48)	67 (69.8)	0.05*
cT2a	10 (40)	21 (21.9)	
cT2b	3 (12)	8 (8.3)	
pT2a	2 (8)	42 (43.8)	0.0001*
pT2b	3 (12)	38 (39.6)	
pT2c	9 (36)	8 (8.3)	
pT3a	8 (32)	7 (7.2)	
pT3b	3 (12)	1 (1)	

Data are presented as *n* (%) or *n* (range).
NSM = negative surgical margins; PSA = prostate-specific antigen; PSM = positive surgical margins.
*Statistically significant.