Is Percentage Of Cancer Positive Cores In Prostate Biopsy Useful For Predicting The Changes In Gleason Scores After Radical Prostatectomy?

Radikal Prostatektomi Sonrası Gleason Skorundaki Değişiklikleri Öngörmede Prostat Biyopsisindeki Kanser Pozitif Kor Yüzdesi Önemli midir?

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Abstract

Aim: To evaluate the relation between the percentage of positive biopsy cores (PPC) and changes in Gleason scores after radical prostatectomy (RP).

Material and Methods: Hundred and ninety-five patients who underwent RP for clinically localized prostate cancer were included in the study. The clinical and pathological data of the patients were retrospectively analyzed. Biopsy and RP Gleason scores, and related clinical data were recorded. Patients were grouped with respect to the changes in Gleason scores after RP (Downgraded, concordance and upgraded) and percentage of positive biopsy cores (≤0.20, 0.21-0.40, 0.41-0.60 and ≥0.61).

Results: Of the patients, Gleason scores increased in 47.6%, remained unchanged in 40.2% and decreased in 12.2% after RP. There was no statistically significant difference among the groups regarding age, baseline serum PSA level, prostate volume, clinical stage, number of biopsy cores, and number of positive biopsy cores (p>0.05 for all). The rate of Gleason score increase in patients with a PPC ≥0.61 was significantly higher than the ones with that of ≤ 0.20 (64.3% and 34%, respectively, p=0.03).

Conclusions: The findings of our study showed that almost half of the patients experience an increase in Gleason score after RP and that this change is significantly associated with PPC.

Keywords: Prostate cancer, Gleason score, percent positive cores

Özet

Amaç: Pozitif biyopsi kor yüzdesi (PKY) ve radikal prostatektomi (RP) sonrası Gleason skoru değişiklikleri arasındaki ilişkiyi değerlendirmek.

Yöntem ve Gereçler: Klinik lokalize prostat kanseri öntanısı ile RP yapılan 195 hasta çalışmaya dahil edildi. Hastaların klinik ve patolojik verileri retrospektif olarak incelendi. Biyopsideki ve RP materyalindeki Gleason skorları ve ilişkili klinik veriler kaydedildi. Hastalar, RP sonrası Gleason skorundaki değişikliğe (düşük evre, aynı, yüksek evre) ve pozitif biyopsi kor yüzdesine (≤0.20, 0.21-0.40, 0.41-0.60 and ≥0.61) göre gruplandırıldı.

Bulgular: Radikal Prostatektomi sonrası Gleason skoru değerleri, öncekine göre hastaların % 47,6' sında artmış, % 40,2' sinde aynı, % 12,2' sinde ise azalmış olarak saptandı. Gruplar arasında yaş, bazal serum PSA düzeyi, prostat ağırlığı, klinik evre, biyopsi kor sayısı ve pozitif biyopsi kor yüzdesi açısından istatistiksel olarak anlamlı fark yoktu (hepsi için p>0,05). Pozitif biyopsi kor yüzdesi ≥0.61 olanlardaki Gleason skoru artışı (% 64,3), PKY ≤ 0.20 olanlardaki artışa göre anlamlı olarak daha fazla saptandı (% 34) (p=0.03).

Sonuç: Çalışmamızın sonucu göstermektedir ki neredeyse hastaların yarısında RP sonrasında Gleason skorunda artış saptanmaktadır ve bu değişiklik de anlamlı olarak PKY ile ilişkilidir.

Anahtar Kelimeler: Prostat kanseri, Gleason skoru, pozitif kor yüzdesi.

Introduction

Radical prostatectomy (RP), remains to be the treatment of choice for the patients with clinically localized prostate cancer and a life-expectancy of at least 10 years, due to its continously refined surgical outcomes and decreasing morbidity and mortality rates. Local recurrence-free survival rates of 83% and 75% were reported after RP for 10 and 15 years, respectively (1). Prognostic factors after RP include baseline PSA level, clinical stage, biopsy Gleason score, postoperative Gleason score and pathological stage (2-4). It has been demonstrated in various studies that prostatectomy Gleason score is the most important prognostic factor for biochemical recurrence after RP (5, 6). Higher prostatectomy gleason score is associated with higher postoperative biochemical recurrence and low cancer-specific survival rates(7). On the other hand, it was reported that although the biopsy Gleason score remained unchanged after RP in 31-63% of the patients, it increased in 35 to 44% of them (8-10). These findings suggest that a pre-operative low-risk patient for biochemical failure and cancer-specific survival according to biopsy Gleason score may be in fact, a high-risk patient with respect to the RP gleason score. Considering the points mentioned above, preoperative prediction of the patients who are at the risk of Gleason score increase after RP may contribute the overall outcome of the definitive therapy.

The association between the Gleason score increase after RP and percentage of positive biopsy cores was evaluated in this study.

Material and Methods

One hundred and ninety-five patients who underwent RP for clinically localized prostate cancer between January 1997 and may 2008 were included in the study. Clinical and pathological records of the patients were evaluated retrospectively. Patients with a history of previous radiation or hormonal therapy (n=7), with <6 biopsy cores (n=26) and insufficient data (n=5) were exluded. The analyzed preoperative data regarding the remaining 164 patients included detailed medical history, digital rectal examination (DRE), transrectal ultrasound (TRUS), serum PSA, routine blood tests, urinanalysis, chest X-ray, pelvic computed-tomography and bone-scan.

TRUS was performed with Hitachi brand EUB-400 model ultrasound and biplanar transrectal probe. Biopsy of the prostate was performed in presence of an abnormal DRE and/or PSA level >4ng/ml . PPC was obtained by dividing the number of cancer positive cores to the total number of biopsy cores. The total and free PSA levels were measured with monoclonal tandem assays using various kits in time.

Histological grading of biopsy and RP specimens were made according to the Gleason grading system (11). Gleason score increase and decrease were defined as "higher" and "lower than biopsy" RP scores, respectively. Clinical and pathological staging were performed according to the 2002 TNM classification.

Patients were followed every 3 months first year, every 6 months for the next 5 years and annually afterwards, with DRE, PSA and/or bone scan. Two consecutive PSA levels ≥0.2ng/ml were defined as biochemical failure.

Data were analyzed using SPSS software v11.5. Cathegorical data were presented as the number and percentage of the patients whereas continous variables were expressed as mean±standard deviation. The differences between independent groups regarding continous variables were evaluated by Kruskal-Wallis test. For categorical comparisons Chi-square test was used. P values lower than 0.05 were considered as statistically significant.

Results

The mean age and mean baseline PSA values of the patients were 62.9±5.9 years and 11.4±9.6ng/ml, respectively. Preoperative clinical and pathological data of the patients are

Table 1: Preoperative clinical and pathological data

Mean Age (Years)	62.9±5.9	
Mean Baseline PSA (ng/ml)	11.4±9.6	
Baseline PSA	**n**	**%**
<10 ng/ml	92	56.1
10–15 ng/ml	41	25.0
>15 ng/ml	31	18.9
Mean Prostate Volume (ml)	46.9±23.7	
Mean biopsy Gleason score	5.3±1.6	
Biopsy Gleason score	**n**	**%**
2-4	44	26.8
5-7	109	66.5
8-10	11	6.7
Clinical stage	**n**	**%**
T1a	3	1.8
T1b	15	9.1
T1c	71	43.3
T2a	37	22.6
T2b	29	17.7
T2c	9	5.5
Mean Number of biopsy cores	9.3±1.3	
Mean Number of positive biopsy cores	3.5±2.3	
Mean percentage of positive biopsy cores	0.38±0.25	
Percentage of positive biopsy cores	**n**	**%**
≤0.20	47	32.2
0.21-0.40	46	31.5
0.41-0.60	25	17.1
≥0.61	28	19.2

shown in table1. Postoperative pathology revealed organ-confined disease (T2a and T2b in table 2) in 66% (n=108), positive surgical margins in 18.3% (n=30), seminal vesicle invasion (T3b) in 12.1% (n=20) and lymph node involvement in 2.4% (n=4) of the patients (table2).

Table 2: Pathological data regarding the RP specimens of the patients

Postoperative Gleason score	5.9±1.3	
Pathological stage	**n**	**%**
T2a*	49	29.9
T2b*	59	36.0
T3a	36	22.0
T3b**	20	12.1
Positive surgical margin	30	18.3
Lymph node involvement	4	2.4

*:Organ-confined disease, **: Seminal vesicle invasion

The mean follow-up after RP was 17.1±9.6 months and biochemical recurrence was observed in 18.9% of the patients (n=28).

Gleason scores increased in 47.6%, decresed in 12.2% and remained unchanged in 40.2% of the patients after RP. The concordance rate of pre-and-post operative Gleason scores was significantly higher in the patients with a preoperative Gleason score 5-7 when compared to the ones with scores 2-4 and 8-10 (54.1%, 11.9% and 33.9%, respectively,Table3).

The groups were similar with respect to age (p=0.73), baseline serum PSA (0.07), prostate volume (p=0.58), clinical stage (p=0.10), number of biopsy cores (p=0.11) and number of positive biopsy cores (p=0.12). The rate of Gleason score increase after RP was significantly higher in patients with a PPC ≥0.61 than that of the ones with a PPC≤0.20 (64.3% vs 34%, p=0.03, Table4).

Table 3: Relations between preoperative and postoperative Gleason scores

	Biopsy Gleason Score				
	2-4 n (%)	5-7 n (%)	8-10 n (%)	Total n (%)	p*
Decreased	2 (4.5)	13 (11.9)	5 (45.5)	20 (12.2)	
Same	4 (9.1)	59 (54.1)	3 (27.3)	66 (40.2)	
Increased	38 (86.4)	37 (33.9)	3 (27.3)	78 (47.6)	
Total n	44	109	11	164	0.001
* Chi-square test					

Table 4: Association between gleason score change and percentage of positive biopsy cores

Gleason score Change	Percentage of positive cores					p*
	≤0.20 n (%)	0.21-0.40 n (%)	0.41-0.60 n (%)	≥0.61 n (%)	Total n (%)	
Decrease	12 (25.5)	4 (8.7)	1 (4.0)	3 (10.7)	20 (13.7)	
Same	19 (40.4)	21 (45.7)	9 (36.0)	7 (25.0)	56 (38.4)	
Increase	16 (34.0)	21 (45.7)	15 (60.0)	18 (64.3)	70 (47.9)	
Total n	47	46	25	28	146	0.03
* Chi-square test						

Discussion

RP Gleason score is associated with postoperative biochemical recurrence and prostate-cancer specific survival rates (7, 12, 13). Unfortunately, biopsy and RP Gleason scores only match in 51% of cases (14). This wide variation may be due to pathologist-related or technical reasons, some of which are the level of clinical expertise and unavoidable interobserver and intraobserver variability, the needle size and the number of biopsy cores (8).

Previous studies reported increased Gleason scores in 29-54% of the patients after RP (10, 15). In our study, this ratio was 47.6%. Biopsy score increase was well demonstrated to be associated with worse pathological characteristics and higher biochemical recurrence rates (16, 17). Previous studies linked Gleason score increase after RP with preoperative gleason score, prostate volume, number of positive cores, number of biopsy cores, obesity and high baseline PSA level (15, 18-20). Freedland et al reported a

score increase rate of 21% and number of positive cores, high baseline PSA and obesity as the associated factors, while Turley et al reported a rate of 44% and associted factors as number of biopsy cores and prostate volume (19). Higher score increase rates were reported for the patients with lower preoperative Gleason scores. Likewise, in our study, the Gleason score increase was significantly more common in patients with a biopsy score of 2-4 when compared to the ones with 8-10 (86.4% vs 27.3%).

We found that the only factor associated with Gleason score increase was PPC. The Gleason score increase was significantly more common in patients with a PPC≥0.61 than the ones with a PPC≤0.20 (64.3% vs 34%).

Conclusions

The findings of our study showed that biopsy Gleason score increased in almost half of the patients who underwent RP for clinically localized prostate cancer, and this score shift was associated with positive biopsy core percentage. These results should be verified with prospective studies including larger number of patients.

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