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ASSESSMENT OF GLEASON SCORE CONCORDANCE BETWEEN PROSTATE BIOPSY AND RADICAL PROSTATECTOMY

PROSTAT BİYOPSİ VE RADİKAL PROSTATEKTOMİDE GLEASON SKOR KONKORDANSININ DEĞERLENDİRİLMESİ

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Abstract

Aim: Prostate cancer is being diagnosed and graded by examining needle biopsies. As needle biopsies may represent the low percentage of general tumor histology, downgrading or upgrading can cause problems in radical prostatectomy (RP) specimens. Our aim in this study was to put forth the concordance between needle biopsy and RP Gleason scores.

Methods: The biopsy pathology results, and post-RP pathology results of 112 patients diagnosed as prostate cancer and underwent RP were revised and the concordance of the biopsy and RP Gleason score was analyzed by kappa statistics in addition to percentages of downgrading or upgrading rates.

Results: The mean age, and PSA values of the patients were 64,4 (±6,2) years, and 11,7 (±9,2) ng/mL, respectively. There was a moderate agreement between biopsy and prostatectomy gleason scores(κ=0,452) and between Gleason groups

Conclusions It is important for the urologists to be aware of the variety of Gleason score between biopsy results and prostatectomy specimens as needle biopsies represent small areas of tumors.

Keywords: Radical prostatectomy, Gleason score, prostate cancer.

Öz

Amaç: Prostat kanseri, iğne biyopsileri incelenerek teşhis edilmekte ve derecelendirilmektedir. İğne biyopsileri, genel tümör histolojisinin düşük yüzdelik bir alanını temsil edebileceğinden, Gleason derecesinin düşüşü veya artışı radikal prostatektomi (RP) numunelerinde sorunlara neden olabilir. Bu çalışmadaki amacımız iğne biyopsisi ile RP Gleason skorları arasındaki uyumu ortaya koymaktır.

Yöntemler: Prostat kanseri tanısı konan ve RP uygulanan 112 hastanın biyopsi patoloji sonuçları ve RP sonrası patoloji sonuçları revize edildi ve biyopsi ve RP Gleason skorunun uyumu, derece düşüş veya artış oranlarının yüzdelerine ek olarak kappa istatistikleri ile analiz edildi.

Bulgular: Hastaların yaş ortalaması ve PSA değerleri sırasıyla 64,4 (±6,2) yıl ve 11,7 (±9,2) ng/mL idi. Biyopsi ve prostatektomi gleason skorları arasında (κ=0,452) ve Gleason grupları arasında orta derecede bir uyum vardı

Sonuç: İğne biyopsileri küçük tümör alanlarını temsil ettiğinden, ürologların biyopsi sonuçları ile prostatektomi örnekleri arasındaki Gleason skorunun çeşitliliğinin farkında olmaları önemlidir.

Anahtar Kelimeler: Radikal prostatektomi, Gleason skoru, prostat kanseri

Introduction

Prostate cancer is the most common cancer in men and also the second most common reason of cancer related deaths[1]. PSA level is most commonly used for determining patients to whom needle biopsy should be performed. Although the cut-off values of PSA may change between different centers the general approach is to biopsy patients with a minimum PSA level of 4 ng/ml[2].
Gleason grading is the most used grading system for prostate cancer which is revised by WHO in 2016 (3,4). Gleason grading system which was recently modified by WHO is a grading system used for prostate cancer. Gleason score is based on the sum of the most common primary and secondary histological patterns however the new grading system has 5 groups indicating score 3+3 as grade group1, 3+4 as grade group2, 4+3 as grade group 3, 4+4 as grade group 4, and score >8 as grade group 5[3].
As needle biopsies may represent the low percentage of general tumor histology, downgrading or upgrading can cause problems in radical prostatectomy (RP) specimens. The concordance of biopsy and RP Gleason scores (GS) has been researched by different studies with results of 41.3-63% (5-8). GS upgrading is more commonly observed than downgrading. The change of GS after RP, especially upgrading of GS, effect the treatment option, since some patients should have been avoided from surgical procedures if patients found to have high-risk adenocarcinoma at biopsy
GS is one of the most important factors in determining optimal treatment and predicting prognosis for prostate cancer. Our aim in this study was to put forth the concordance between needle biopsy and RP Gleason scores.

Materials and Methods

A total of 112 patients with a diagnosis of prostate cancer by needle biopsy and underwent RP between 2013 and 2017 in our clinic were included in the study. The demographic, pre-biopsy PSA values, biopsy pathology results, and post-RP pathology results were noted from hospital records.
The patients with elevated PSA levels over 2,5 ng/mL, and/or suspicious digital rectal examination were recommended to undergone transrectal ultrasound guided prostate biopsy. All the prostate biopsies were performed in the lateral decubitus position under local anesthesia with peri-prostatic nerve block using 1% or 2% lidocaine, and 18-gauge, 200 mm biopsy needles were used to take tissue samples. The biopsy and RP specimens were evaluated and examined by the same uropathologist. All the specimens were scored according to the 2005 and 2014 ISUP Gleason grading system.
We divided the patients according to the biopsy gleason scores in three groups: low, intermediate, and high-risk groups consisted of the patients with gleason score 6, 7, and >7, respectively.
Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) for windows (Version 18.0; SPSS Inc., Chicago, IL) software. The concordance between the biopsy and prostatectomy results was analyzed with weighted kappa method, and the chi-square test and Fisher's exact tests were used for categorical variables.

Results

A total of 112 patients were included in the study. The mean age, and PSA values of the patients were 64.4 (±6.2) years, and 11.7 (±9.2) ng/mL, respectively.
Based on the biopsy results; gleason score was <7 for 57 (50.9%) of the patients, 7 for 44 (39.3%) patients, and >7 for 11 (9.8%) of the patients. On the other hand, gleason score was <7 for 42(37.5%) patients, 7 for 60 (53.8%) patients, and >7 for 10(8.9%) of the patients according to prostatectomy reports. (Table 1).

Table 1. Biopsy/Radical prostatectomy total Gleason score

Gleason score	Number of cases (n)	Percentage (%)
6	57 / 42	50,9 / 37,5
7	44 / 60	39,3 / 53,6
8	6 / 4	5,4 / 3,6
9	5 / 6	4,5 / 5,4
Total	112/112	100,0 /100,0

Table 2. Biopsy/Radical prostatectomy Gleason Grade Groups

Gleason grade group	Number of cases (n)	Percentage (%)
1	57 /42	50,9 / 37,5
2	34 /46	30,4 / 41,1
3	9 /14	8,0 / 12,5
4	7 /4	6,3 / 3,6
5	5 /6	4,5 / 5,4
Total	112/112	100,0/100,0

Gleason score 3+3 was the most common result with 50.9%, and 3+4 was the second most common with 30.5% according to biopsy. In contrast, gleason score 4+3 was the most common result with 41.1%, and 3+3 was the second most common with 37.5% in the prostatectomy reports. (Table 2)

While 13 (11.6%) patients' score were downgraded, 70 (62.5%) of the patients remained within the same gleason score, and 29 (25.9%) of them were upgraded.

We divided the patients according to the biopsy gleason scores in to three groups: low, intermediate, and high-risk groups consisted of the patients with gleason score 6. 7, and >7, respectively. 32(72.7%) of the patients within the intermediate group stayed in the same group, and that ratio was the highest amongst the three groups (Table 3). The difference between the groups were statistically significant (p=0.00). Also, there was a moderate agreement between biopsy and prostatectomy gleason scores(κ=0.452) and between Gleason groups (κ=0.437).

Discussion

The most used grading system for prostate cancer is the Gleason scoring system, which was recently revised to grade grouping[3,4]. GS is also one of the most important prognostic indicators of prognosis. However, GS may vary between needle biopsy and RP specimens. Various researches focused on the possibility of discordance of GS after RP compared with biopsy[9,10].

The discordance between GS of biopsies and RP specimens has been the focus of numerous studies with different results in the literature. San Francisco et al reported a concordance rate of 67% with a downgrading and upgrading percentages of 11% and 22%, respectively[11]. However, the discordance rate changes study to study. Cookson et al found concordance rate as 31% in their study and upgrading rate was 54% whilst downgrading rate was 15%[12].

Upgrading was more common than downgrading according to many studies. Tilki et al., reported that GS upgrades in approximately one third of patients at RP than at biopsy[13]. Kuroiwa et al. and Reis et al. reported upgrading and downgrading rates as 21.9 and 47.4%; 5-20.7%, respectively[6,7]. In one of the most recent studies, Öztürk et al. has reported the concordance, upgrading and downgrading rates as 64.2%, 26.9% and 8.8% respectively[14]. We found our rates were similar with the literature. The agreement rate was lower and upgrading rate was 94.2% in patients with low Gleason scores[15]. In the study of D'elia et al. the agreement rate between biopsy and RP scores was 58% in patients with high GS (GS 9 and 10)[18]. In the study of Öztürk et al. nearly half of the patients with high biopsy GS (>7) were downgraded whereas the other half had compatible results[14]. Many reasons and potential predictors were blamed for upgrading phenomenon such as age, intraabdominal obesity, serum PSA level, number or percentage of positive cores, maximum percentage of cancer per

Table 3. Gleason score difference between biopsy and RP

			Biopsy Gleason D'amico Group			
			Low	Intermediate	High	Total
Gleason score difference between biopsy and RP	Same	Count	33	32	5	70
		% Within biopsy Gleason D'amico Grubu	57,9%	72,7%	45,5%	62,5%
	Downgrade	Count	0	8	5	13
		% Within biopsy Gleason D'amico Grubu	0,0%	18,2%	45,5%	11,6%
	Upgrade	Count	24	4	1	29
		% Within biopsy Gleason D'amico Grubu	42,1%	9,1%	9,1%	25,9%
Total		Count	57	44	11	112
		% Within biopsy Gleason D'amicoGrubu	100,0%	100,0%	100,0%	100,0%

core and prostate weight[17,18].

For these possible reasons, in the last decade new monograms targeting to predict the possibility of upgrading have been designed by many authors[18,19]. By designing monogram using preoperative PSA level, digital rectal examination abnormality and biopsy GS; Xu et al. reported a lower upgrading rate of 26.16% in their study when compared with conventional methods[18].

In addition to these reasons the subjective microscopic examination when biopsy and RP specimen were evaluated by different pathologists can be one of the major reasons of the discordant GS between biopsy and RP specimens. Öztürk et al. also reported this phenomenon as one of the limitations of their study[14].

Another possible factor for especially studies published before Gleason grade grouping system which was offered by Pierorazio et al. and Epstein et al. and accepted by WHO in 2016 was the subjective evaluation of different histopathological patterns[3,4,20]. It was thought that discordance rates will decrease by using grade grouping. For example, as all patients with pattern 5 were accepted in the same grade group or all patients with low GS (<7) were added in the grade group 1, downgrading and upgrading rates were expected to be lower in centers using grade grouping[4].

The strengths of our study is that most of our patients were evaluated by the same pathologist which avoids the interobserver variability as well as biopsied and operated by the same urologists. The weakness of our study is the lowest number of high Gleason grade group (Grade group 5) cases as they have generally treated with radiotherapy or systemic chemotherapy.

Conclusion

In conclusion, it is important to remember that Gleason grade may vary between biopsy results and prostatectomy specimens as needle biopsies represent small areas of tumors. New monograms targeting to predict the possibility of upgrading have been studied worldwide and saturation biopsies are being used for detailed sampling. In addition to this, Grade

grouping also may lower the upgrading and downgrading rates especially in tumors with pattern 5.

Author contributions

All authors contributed to the study conception and design. All authors read and approved the final manuscript.

Conflict of interest

The authors declare that they have no conflict of interest.

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Ethical approval

The experiment was approved by Experiments of the Muğla Sıtkı Koçman University Faculty of Medicine Local Ethics Committee 2021/29-210029 with protocol number approved.

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