DISTRIBUTION OF GLEASON SCORE IN PROSTATE ZONES AMONG PROSTATIC CANCER PATIENTS

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ABSTRAK

***Tujuan Penelitian**: Mengetahui distribusi Gleason score pada berbagai zona prostat. **Bahan & Cara**: Dilakukan analisis terhadap 20 spesimen blok paraffin prostatektomi radikal untuk menilai distribusi Gleason score pada berbagai zona prostat. Spesimen diwarnai menggunakan hematoxillin eosin. **Hasil Penelitian**: Diantara 20 spesimen, 16 (80%) spesimen memiliki lebih dari satu fokus keganasan. Kebanyakan fokus keganasan ditemukan di zona perifer (95%), hanya satu spesimen memiliki satu fokus saja pada zona transisional. Lebih dari setengah (55%) dari spesimen prostat memiliki tiga Gleason grade. Hanya satu spesimen memiliki Gleason grade tunggal. **Simpulan**: Hasil penelitian ini mengkonfirmasi sifat karsinoma prostat yaitu heterogen, multi-fokal dan multi-zonal, dengan lokasi predominan di zona perifer. Hampir seluruh fokus pada zona transisional ditemukan bersamaan dengan fokus pada zona perifer.*

***Kata kunci**: Karsinoma prostat, zona prostat, Gleason score.*

ABSTRACT

***Objective:** To analyze the distribution features of Gleason score in the different prostate zones. **Material & Method:** Twenty paraffin block specimens of radical prostatectomy were analyzed looking for Gleason score distribution in each zone. Specimens were stained with Hematoxilin Eosin. **Results:** Among the 20 cancers, 16 (80%) specimens had more than one focus. Most foci were found in peripheral zone (95%), only one specimen contained foci solely found in transitional zone. More than half (55%) prostate specimens contain three different Gleason grades. Only one specimen contained a single grade. **Conclusion:** Our results confirm the heterogeneous, multifocal, and multizonal nature of prostate carcinomas. Most specimens had more than one tumor focus, with predominant location in the peripheral zone. Almost all transition zone foci were found concomitantly with peripheral zone foci.*

***Keywords:** Prostate cancer, prostate zones, Gleason score.*

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INTRODUCTION

Prostate carcinoma is a heterogeneous disease that exhibits considerable histologic and anatomic variability.[1] Many of the difficulties in understanding diseases of the prostate have arisen through poor understanding of the anatomy of the prostate. The recent description of histological separate zones in the prostate has been an important advance, allowing evaluation of separate cancers arising in various zones of the prostate.[2]

The Gleason grading system remains one of the most powerful prognostic factors in prostate cancer and is the dominant method around the world in daily practice. The Gleason grading system should be performed in needle core biopsies and radical prostatectomy specimens where it shows a reasonable degree of correlation between both specimens, and most importantly, it remains vital in the treatment decision-making process.[3]

Detailed characterization of prostate carcinoma distribution in various zones, particularly Gleason score, could lead to improved detection procedures and biopsy strategies.

OBJECTIVE

To analyze the distribution features of Gleason score among prostate zones of the prostate.

MATERIAL & METHOD

Twenty radical prostatectomy specimens were obtained between July 2009 and August 2010. All patients had clinically localized cancer, and none had received neoadjuvant hormonal treatment or prior transurethral resection. Prior to surgery, prostate cancer was histopathologically diagnosed with transrectal ultrasound guided needle biopsy. Staging procedure including digital rectal examination, serum PSA, and transrectal ultrasound guided needle biopsy. Patients underwent a bone scan only when the serum PSA level was greater than 20 ng/ml or when the patient complaining bone pain.

Each prostate gland was pinned to a paraffin block and fixed in 10% neutralized formalin for 24 hours. The entire surface of the prostate was stained with hematoxillin-eosin and seminal vesicles were removed at the level of prostate base. The prostate then sectioned in a transverse plane perpendicular to the posterior surface. All pathological evaluations were conducted by uropathologist, looking for tumor foci, zonal location of each tumor focus and Gleason grade differences in each zone. Clinical staging was per AJCC criteria.

RESULTS

The mean age of the patients was 60,5 years. Seventeen (85%) of the 20 patients had classification T1c tumors (nonpalpable cancers). The mean preoperative prostate specific antigen (PSA) value

Table1. Characteristics of patients.

Patient Characteristics	n
No. of patients	20
Mean patient age (years)	60,5
Mean PSA (ng/ml)	18,7
Mean prostate volume (cc)	39,5
Clinical stage (%)	
T1c	17 (85)
T2a/b	3 (15)
T3	0
Biopsy Gleason score (%)	
6	9 (45)
7	10 (50)
≥ 8	1 (5)

Table2. Distribution of Gleason score among prostate zones.

	No (%)	Gleason grade														
Number of prostate cancer																
One focus	4 (20)															
More than one focus	16 (80)															
		Primary					Secondary					Tertiary				
Zonal Distribution		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Peripheral zone only	3 (15)	-	-	3	-	-	-	-	3	-	-	-	1	-	-	-
Peripheral zone and transitional zone	15 (75)	-	-	10	5	-	-	-	12	3	-	-	9	-	-	-
Transitional zone only	1 (5)	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Peripheral zone and central zone	1 (5)	-	-	-	-	1	-	-	1	-	-	-	1	-	-	-
Number of Gleason grade	No															
1 grade	3 (15)															
2 grades	6 (30)															
3 grades	11 (55)															
4 grades	0															
5 grades	0															

for 20 patients was 18,7 ng/ml. The average prostate volume was 39,5 cc (table 1). Among the 20 cancers, 16 (80%) specimens had more than one focus. Most foci found in peripheral zone (95%), only one specimen contain foci solely found in transitional zone.

More than half (55%) prostate specimens contain three Gleason grades. Only one specimen contains single grade. Tertiary Gleason grade found in this study was lower than primary or secondary grades, therefore it did not influence the final Gleason score. Gleason grade of the tumors found in transitional zone consistently lower or similar to Gleason grade found in peripheral zone (table 2).

DISCUSSION

Our results confirm previous general descriptions of the location of prostate cancer within the gland.[4,5] Most of the cancer foci were located in peripheral zone of the prostate.

Another important change recently incorporated in current practice is the recognition and reporting or tertiary pattern. This includes tumors with pattern 3, 4, and 5 in various proportions. Tertiary patterns are uncommon, but when the worst grade is tertiary pattern, it should influence the final Gleason score, and therefore, the primary pattern and the highest grade should be recorded following the rule of "the most and the worst". In this study, a higher proportion of cases were found to contain more than 2 grades, and over 50% of them contain at least 3 different grades, this finding mutual with several previous study.[6,7] The progression rate of Gleason scores 5-6 tumor with a tertiary component of Gleason pattern 4 is almost the same as those of pure Gleason score 7 tumors. Gleason score 7 tumors with tertiary pattern 5 experience progression rates following radical prostatectomy approximating pure Gleason score 8 tumors.[8,9] On the other hand, no such significance could be seen in cases of Gleason (4+4) score 8 with tertiary pattern 5, since Gleason score 8 tumors are already aggressive, the existence of patterns 5 elements adds no difference. These tumors should be graded routinely (primary and secondary pattern) with a comment in the report noting the presence of tertiary element. In the setting of high-grade cancer (score 8-10), one should ignore lower-grade pattern if they occupy less than 5% of the area of the tumor.[10,11]

One potential application of our findings is the optimization of prostate biopsy techniques. With concentration of the biopsy targeted to the areas of highest Gleason grade within the prostate.

In addition to the improvement of prostate biopsy strategies, detailed location, and characteristic of prostate cancer may be useful in optimizing locally directed therapies for the treatment of prostate cancer. New treatments that involved the direct intraprostatic injection of gene therapy or other antineoplastic agents potentially can be optimized by focusing such therapies in the areas of highest tumor occurrence.

CONCLUSION

Our results confirm the heterogeneous, multifocal, and multizonal nature of prostate carcinomas. Most specimens had more than one tumor focus, with predominant location in the peripheral zone. Almost all transition zone foci found concomitantly with peripheral zone foci.

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