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The Prevalence and the Pathological Characteristics of the Prostate Cancer in 138 Consecutive Transrectal Ultrasonography-Guided Prostate Biopsies

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Abstract **Original Research Article**

Objective: To determine the prevalence and pathological characteristics of the prostate cancer in our institution's TRUS-guided prostate biopsied patients. ***Patients and method*:** The age, the PSA level and the pathological data were collected and analyzed by means of Excel 2010®. Concerned patients were those who had consecutively undergone a TRUS-guided prostate biopsy between October 17, 2013 and July 31, 2021. ***Results*:** Among 138 patients whose age ranged from 42 to 96 years (mean=65.7years), 81 or 58.7% had a PCa. 97,5% of those PCa were in patients with PSA>30ng/mL whereas 40.2% of them were in patients with PSA≤30ng/mL (p=0.000). The age discrepancy between the PCa patients and the non PCa patients was not significant (p = 0.291). The percentage of positive cores was significantly higher in the PCa patients with PSA>30ng/mL than in the PCa patients with PSA≤20ng/mL (p=0.000 for PSA≤10ng/mL and p=0.001 for PSA≤20ng/mL). 74,2% of the PCa with a GS>7 had a PSA>30ng/mL whereas 50% of the PCa with a GS 6 had a PSA≤10ng/mL (p=0.004). 76, 2% of the PCa with PSA>30ng/mL belonged to the ISUP grade group 5 whereas 50% of the PCa with PSA≤10ng/mL belonged to the ISUP grade group 1 (p=0.003). The GS and the percentage of positive cores increased together and that interdependent increment was significant between GS 6 and 7 (p=0.005), 6 and >7 (p=0.000), 7 and >7 (p=0.013). The percentage of positive cores also increased as the ISUP grade group was rising and again the interdependent increment was significant between the ISUP grade group 1 and 3 (p=0.001), 1 and 4 (p=0.000), 1 and 5 (p=0.000), 2 and 5 (p=0.006). ***Conclusion*:** The prevalence of the PCa was 58.7% among the 138 biopsied patients. It was 2.4 times higher in the patients with PSA>30ng/mL (95.7%) than in the patients with PSA<30ng/mL (40.2%). The majority of the PCa patients (54.3%) had a PSA>30ng/mL and presented a more elevated Gleason score, a more elevated ISUP grade group and a more elevated percentage of positive cores than the PCa patients with PSA≤30ng/mL.

Keywords: Prostate Cancer – PSA – Positive Core – Gleason Score – ISUP Grade Group.

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INTRODUCTION

The TRUS-guided biopsy is crucial to the prostate cancer diagnosis [1, 2]. Our institution was the first state-owned health facility to launch it in our country on October 17, 2013. Delving into the nearly ten year's long practice of the procedure could make local data on prostate cancer come into being.

OBJECTIVE

We aim to determine the prevalence and the pathological characteristics of the prostate cancer from the biopsies performed in our institution.

PATIENTS ET METHOD

We collected and analyzed by means of the Excel 2010®, the age, the PSA level and the pathological data from the consecutive prostate biopsies that we had performed from October 17, 2013 to July 31, 2021. The collected pathological data were the number of cores, the presence of PCa or other diagnosis, the number of PCa positive cores, the Gleason score, the ISUP grade group. We analyzed not the number of cores but the percentage of positive cores, i.e. one hundred times the number of PCa positive cores in a patient divided by the total number of cores taken from that patient. We biopsied patients aged 40 years or more. They must have a sterile urine and present either a PSA>4ng/mL or an abnormal digital rectal examination. Each patient underwent the biopsy 1 or 2 hours after a Normacol® enema and received an intravenous injection of ceftriaxone 1g just before the procedure began. We used a disposable 18 gauge Bard® Monopty® Core Biopsy Instrument to

sample six cores or more from each prostate lobe in each patient.

RESULTS

138 patients had undergone a TRUS-guided prostate biopsy. Their age ranged from 42 to 96 years (mean age=65.7years). Only 4 patients (3%) were under 50 years.

The PSA level varied from 0.88 to 5853ng/mL. The mean, median and modal PSA level was respectively 182.8ng/mL, 14.95ng/mL et 100ng/mL.

The biopsy had sampled 5 to 25 cores per patient, the mean and modal number of cores was 14 and 12. The biopsy had revealed 58.7% prostate adenocarcinomas (PCa), 39.9% benign prostate hyperplasia (BPH), 0.7% of lymphoma B and 0.7% of schistosomiasis.

The mean percentage of positive cores in the PCa patients was 62.1%. 45.7% of the PCa patients had 100% positive cores.

The GS was respectively >7, 7 and 6 in 38.3%, 37.0% and 24.7% of the PCa patients. 25.9%, 24.7% and 24.7% of the PCa respectively belonged to the ISUP grade group 5, 2 and 1. Each one of the ISUP grade group 3 and 4 contained 12.4% of the PCa patients. All the data are detailed on tables I and II.

Table-I: Patients' charateristics and Pathological data on Prostate biopsy

Variables	**PSA *(ng/mL) ranges for data analysis***				**Overall count**
	<10	**]10-20]**	**]20-30]**	**>30**	
Patients *(N=138)*					
n (%)	52 (37.7)	34 (24.6)	6 (4.4)	46 (33.3)	138 (100)
mean age *(years)*	62.9	64.9	67	69.2	65.7
age range *(years)*	50-82	42-96	61-76	48-85	42-96
Prostate Cancer (PCa)					
n (%)	18 (34.6)	16 (47.1)	3 (50)	44 (95.7)	81 (58.7)
mean PSA *(ng/mL)*	7.29	15.01	23.7	548.04	303.2
PSA range *(ng/mL)*	4.55-10	10.08-19.85	22.38-24.43	30.77-5853	4.55-5853
mean age (years)	62.4	61.9	69	69.4	66.3
age range (years)	50-75	42-96	61-76	48-85	42-96
BPH and other*					
n (*n*/patients)	34 (65.4)	18 (52.9)	3 (50)	2 (4.3)	57 (41.3)
mean PSA *(ng/mL)*	6.5	14.8	25.3	49.7	11.7
PSA range *(ng/mL)*	0.88-9.93	10.19-19.4	22.72-29.59	34.3-65.13	0.88-65.13
mean age (years)	63.2	67.7	65	63.5	64.7
age range (years)	51-82	51-84	64-66	61-66	51-84
% PCa positive cores					
Range	6-50	6-100	19-46	8-100	6-100
n(mean)	18(19.1)	16(43.1)	3(32.5)	44 (87.9)	81 (62.1)
Gleason Score					
6 (%)	10 (55.6)	5 (31.3)	0 (0)	5 (11.4)	20 (24.7)
7 (%)	6 (33.3)	6 (37.5)	2 (66.7)	16 (36.4)	30 (37.0)
>7 (%)	2 (11.1)	5 (31.3)	1 (33.3)	23 (52.3)	31 (38.3)
ISUP GG					
1 (%)	10 (55.6)	5 (31.3)	0 (0)	5 (11.4)	20 (24.7)
2 (%)	6 (33.3)	5 (31.3)	1 (33.3)	8 (18.2)	20 (24.7)
3 (%)	0 (0)	1 (6.3)	1 (33.3)	8 (18.2)	10 (12.3)
4 (%)	0 (0)	2 (12.5)	1 (33.3)	7 (15.9)	10 (12.3)
5 (%)	2 (11.1)	3 (18.8)	0 (0)	16 (36.4)	21 (25.9)

* BPH (Benign Prostate Hyperplasia) and other, i.e. BPH + 1 schistosomiasis (PSA=6.94ng/mL) + 1 lymphoma B (PSA=22.72ng/mL)

The age of 81 PCa patients ranged from 42 to 96 years. 29.6% of them were aged 70 years or more, 42% were 60 to 70 years old. Only 4.9% of the PCa patients were less than 50 years. The mean age was 66.4 years in the PCa patients whereas the mean age was 64.7 years in the non PCa patients. The age discrepancy between the PCa patients and the non PCa patients was not significant (p = 0.291).

Table-II: The Percentages of positive cores, the GS and ISUP grade groups

	% Positives Cores

	Minimum	Maximum	Mean	Median	Mode	Std Deviation	Variance
ISUP GG							
1	6	100	23.2	14.5	8	27.4	751.9
2	6	100	47.5	42	100	33.1	1094.3
3	23	100	82.6	100	100	29.2	851.8
4	19	100	85	100	100	31.8	1008
5	6	100	91.6	100	100	22.9	522.6
Gleason Score							
6	6	100	23.2	14.5	8	27.4	751.9
7	6	100	59.6	50	100	35.6	1265.1
>7	6	100	89.5	100	100	25.7	660.5

Among the 138 patients, those with PSA>30ng/mL were older than those with PSA<10ng/mL (p=0.002). There was no significant age difference among the patients with PSA<30ng/mL (p=1.000).

The mean and median PSA levels were 303.2 ng/mL and 41.3 ng/mL in the PCa patients whereas they were 11.7ng/mL and 8.1ng/mL in the non PCa patients. The PSA level discrepancy was significant (p=0.000) between the PCa patients and the non PCa patients. 95.7% of the PCa were detected in the patients with PSA>30ng/mL and 40.2% of the PCa were detected in the patients with PSA<30ng/mL. That difference in PCa prevalence between the patients with PSA>30ng/mL and those with PSA<30ng/mL was significant (p=0.000).

Below the PSA level of 30ng/mL, 34.6% of the PCa were detected in the patients with PSA<10ng/mL, 47.1% of the PCa were detected in the patients whose PSA level ranged from 10 to 20ng/mL and 50% of the PCa were detected in the patients whose PSA level ranged from 20 to 30ng/mL. That difference in the PCa detection rate among the patients with PSA<30ng/mL was not significant (p=0.170).

The percentage of positive cores ranged from 19.1% in the PCa patients with PSA<10ng/mL to 87.9% in the PCa patients with PSA>30ng/mL. The difference was significant between the PCa with PSA<10ng/mL and the PCa with PSA>30ng/mL (p=0.000) on one hand, and between the PCa with PSA>30ng/mL and the PCa with PSA ranging from 10 to 20ng/mL (p=0.001) on the other hand.

The GS was respectively 6, 7 and >7 in 38.3%, 37.0% and 24.7% of the PCa. 74.2% of the PCa with GS>7 were in patients with PSA>30ng/mL whereas 50% PCa with GS 6 were in patients with PSA<10ng/mL. That différence was significant (p=0.004).

76.2% of the PCa with PSA>30ng/mL belonged to the ISUP grade group 5. 50% of the PCa with PSA<10ng/mL belonged to the ISUP grade group 1. The proportions of ISUP grade group 1 decreased as the PSA level increased, allowing the ISUP grade group 5 to gather the highest number of PCa above the PSA level of 30ng/mL. That link between the PSA level and the ISUP grade group was significant (p=0.003).

The Gleason score (GS) and the percentage of positive cores (Table II) tended to increase together. That tendance to increase concomitantly was significant between the GS 6 and 7 (p=0.005), 6 and >7 (p=0.000), 7 and >7 (p=0.013).

The percentage of positive cores also increased when the ISUP grade group increased (Table II). That concomitant increment was significant between the ISUP grade group 1 and 3 (p=0.001), 1 and 4 (p=0.000), 1 and 5 (p=0.000), 2 and 5 (p=0.006).

DISCUSSION

The analysis of the collected data has revealed several facts. The PCa detection rate was 95.7% in the patients with PSA>30ng/mL. In the patients with PSA<30ng/mL, the PCa detection rate was 40.2%, i.e. 2.4 times lower. Below or at 30ng/mL, the link between the PSA level and the PCa detection rate was less evident. That fact is not a surprise as the PSA is known to lack specificity regarding the PCa detection when it is moderately elevated. That lack of specificity is linked both to the intrinsic heterogenicity of the PSA molecule and to the fact that either benign or malignant prostate tissues can produce the PSA. The consequent need to refine the prostate biopsy decision in case of moderate elevations of PSA continue to generate varied tools such as the percentage of free PSA, the PSA velocity, the p2-PSA, the prostate health index [3-6], the prostate cancer antigen 3 [3,7], the multiparametric magnetic resonance imaging [8,9], etc. The detection of a schistosomiasis in 1 patient with PSA=6.94ng/mL and a lymphoma B in 1 other patient with PSA=22.72ng/mL further supports the low PSA specificity to the PCa when it is below 30ng/mL.

More than half (54.3%) of the PCa had a PSA>30ng/mL. The same PCa with PSA>30ng/mL had accumulated other worse prognostic factors: more elevated GS and ISUP grade group, more elevated percentage of positive cores. That fact can be presumed as the data analysis has demonstrated a significant interdependent elevation's link between the PSA level, the GS, the ISUP grade group and the percentage of

positive cores in the PCa patients with PSA>30ng/mL. The late resort of the patients to an appropriate care mainly explains the predominant amount of PSA>30ng/mL amid the PCa patients. Poverty and lack of accurate information feed the people's reluctancy to resort to a urological care for prostate diseases. Also, the local herbalists daily flood the people with false advertisements, thriving on the fact that some prostate surgeries woefully reach a dramatic outcome in some mis-qualified hands working in ill-equipped facilities.

CONCLUSION

The prevalence of the PCa was 58.7% among the 138 biopsied patients. It was 2.4 times higher in the patients with PSA>30ng/mL (95.7%) than in the patients with PSA<30ng/mL (40.2%). The majority of the PCa patients (54.3%) had a PSA>30ng/mL and presented a more elevated Gleason score, a more elevated ISUP grade group and a more elevated percentage of positive cores than the PCa patients with PSA<30ng/mL.

ABBREVIATIONS

PCa = prostate cancer, GS = Gleason score, PSA = Prostate Specific Antigen, ISUP GG = grade group (ISUP = International Society for Urological Pathology). TRUS = trans-rectal ultrasonography, ng/mL = nanogram per milliliter.

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