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Correlations between prostate cancer with prostate specific antigen levels in patients

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Abstract

Background: The influence of geographical, ethnic differences, different races possess their respective reference ranges of serum Prostate-Specific Antigen (PSA). The distribution of serum PSA in men without prostate cancer.

Aims: We have investigated the importance of early detection in patients with Lower Urinary Tract Symptoms (LUTS), in whom prostate cancer has been suspected despite a negative trans rectal ultrasound (TRUS) biopsy, by the transition zone of prostate cancer by transurethral resection of the prostate (TURP).

Methods: A total of 63 patients undergoing TURP were evaluated of the period from July 2019 to March 2020. TRUS biopsy patients before TURP (group with cancer) and not (without cancer) were compared to the prostate detection rates. All charts, including prostate-specified antigen (PSA), digital rectal exam (DRE) results, TURP (including volume of resection and a pathology report), and TRUS biopsy results, were evaluated retrospectively. Ethnicity has not been recorded since Al-Najaf is multi-ethnic. Description statistics, statistic tables, the arithmetic medium, standard error, default and two extremes used to analyze the results.

Results: PSA values in different age groups were non-significantly different in cancer detection rate between with and without biopsy groups, the PSA mean was 4.7± 1.6 ng / ml and 3.4± 0.8 ng / ml, and also IPSS was 10.8± 1.4 and 9.1± 2.65 and $p>0.05$ and while APEL (%) mean was 5.65± 2.5 ng / ml and 10.5± 1.35 ng / ml that showed significant difference between with and without biopsy groups and $p<0.05$. The detection rate for prostate cancer and PSA ($p=0.01$) have been positively correlated.

Conclusion: The results of serum PSA must be standardized by country and ethnic group. Ultimately, the diagnosis of prostatic carcinoma in a particular region will increase accuracy.

Keywords: Prostate-Specific Antigen; Prostate Cancer; Carcinoma

1. Introduction

Prostate cancer (cap) is a neoplasm hormone-dependent epithelium-derived acinar and ductal prostate, same that varies in your presentation according to differentiation glandular, behavior, metastatic pattern and response to treatment (1). It is usually multifocal, although it occurs mostly in the peripheral area (85%) compared to the transition zone (15%), according to the zones described by Mc Neal (2).

The detection rate of prostate cancer by transrectal ultrasonography (TRUS) biopsy has increased along with the utilization of both prostate-specific antigen (PSA) and the digital rectal examination (DRE) as screening tests for prostate cancer. When TRUS biopsy is performed because of an elevated PSA value, the detection rate of prostate cancer

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can vary according to factors such as the location of the cancer in the prostate, the number of cores, and the method of TRUS biopsy(3). The detection rate of prostate cancer by TRUS biopsy by randomized sextant core has been reported to be 25-30%; the detection rates of prostate cancer by sextant biopsy with meticulous focus on the far lateral portion and that by 10-core and 12-core biopsy have been reported and advocated by many institutes (4). With an increased number of biopsy cores, morbidity such as rectal bleeding, hematuria, fever, and pain does not increase significantly and unnecessary repeat biopsy is decreased (5). Even with a negative result on an initial TRUS biopsy, repetition of TRUS biopsy is recommended when clinical suspicion of prostate cancer exists, such as with PSA elevation or an abnormal DRE (6). However, it is difficult to detect prostate cancer by repeat TRUS biopsy when the tumor is located in the transition zone. Thus, transurethral biopsy or transurethral resection of prostate (TURP) are the preferred approach in selected cases (7). Transition zone prostate cancer is detected mostly on the anterior part of the prostate and is hard to reach by TRUS biopsy (8).

The diagnosis of the cap has evolved to over time, currently being a priority for this performing exploration digital rectal (DRE), antigen prostate specific (APS) and Ultrasound Transrectal Prostate (UTP) with biopsy (9, 10). A prostate specific antigen test and a digital rectal examination increases the detection rate prostate cancer, compared to digital rectal exam only (11).

Prostate Cancer Detection Rate (BTRP) varies according to the location of the cancer, number of cores (cylinders) and method for performing the BTRP (12). The BTRP by sextants (12 cores) is 25-30% successful. The BTRP the ransition zone it represents 20 to 30% of cancers and it is mainly detected in the anterior part of the prostate where it is difficult to attain using a BTRP (13).

Since there is no hard evidence that points to transurethral resection of prostate as a useful screening medium for prostate cancer screening, the goal of this study is to demonstrate the importance of transurethral resection of the prostate in patients with suspected cancer with or without transrectal biopsy negative prostate (14).

The aim of this study was to evaluate the importance of TURP in the early detection of TURP for patients with Lower Urinary Tract Symptoms (LUTS) with negative TRUS biopsy.

2. Material and methods

It is a retrospective, cross-sectional study, and comparative efficacy of transurethral resection prostate in the early detection of prostate cancer in the transition zone. I know included 63 older male patients 25-50 years old who attended the outpatient clinic of Urology for various urinary complaints and had undergone a general physical examination, DRE, transabdominal ultrasonography (TAUS), and PSA estimation of the General Hospital of Najaf city during the period from July 2019 to March of 2020 due to the presence of symptoms of the treatment LUTS, normal DRE and negative BTRP. The patients were divided in two groups:

1) Including study: the patients were divided into

- **High risk for cap:** transurethral resection of prostate in patient with negative BTRP; patients with LUTS, elevated normal DRE and negative BTRP.
- **Low risk for cap:** transurethral resection of prostate in patient without BTRP; patients with LUTS, with APEL percentage > 15), normal DRE, without BTRP.

2) Including study: patients with APEL were excluded. Normal, suspicious rectal examination, positive BTRP, history of previous RTUP, previous BTRP, instrumentation previous urological and blood dyscrasias.

2.1. Statistical analysis

The program was used SPSS verison 21 (SPSS- 21); an analysis was made descriptive being obtained for the variables qualitative simple frequencies and distribution percentage. We obtained measures of central tendency (mean and standard deviation), for variables with non-normal distribution, median and interquartile range. To compare to cancer patients and BTRP biopsy of the cancer patients without BTRP the Fisher's exact test at two tails.

3. Results

In the group of patients (n=63) with risk high for prostate cancer (APEL <15%) with BTRP, 5 (7.94%) patients were diagnosed positive for post-prostate cancer RTUP despite having a biopsy history negative transrectal; the mean age

was 31.2± 5.2 years, the previous of touch was normal for everyone; the average prostate volume in centimeters cubic was 22± 15.15, the free antigen in percentage was 5.65± 2.5 and the mean of the IPSS it was 10.8± 1.4, while 58(92.06%) were diagnosed negative for cancer after biopsy and at RTUP, the mean age of this group was 31.5± 4.3, the mean of the prostate volume in cubic centimeters was of 25.9±14.3, the average% weight was 5.75±0.8 and the mean of IPSS 10.3± 10.8.

In the group of patients (n = 63) with low risk for prostate cancer (APEL%> 15) without of BTRP, but with low obstructive syndrome, 8 (12.7%), were diagnosed of prostate cancer, of these prostate cancer positive patients the middle age was 33.6± 3.6 years, mean AP 3.4± 0.8, mean prostate volume in cubic centimeters of 35.3± 12.2, average of the % APEL of 10.5± 1.35 and the IPSS of 9.1 ± 2.65. 55 (87.30%) were diagnosed negative for prostate cancer after RTUP, the mean age of this group was 34.2± 4.5 years, mean AP 3.4± 0.8, mean prostate volume in cubic centimeters of 32.5± 11.2, mean APEL% of 10.3±2.6 and IPSS of 8.95± 2.45. (Table 1). (Sometimes author mentions like APEL% and sometime %APEL**.**

Table 1 Patient characteristics

Mean± SD	**With Biopsy N = 63**		**Without biopsy N = 63**		
	With cancer N = 5	**Without cancer N = 58**	**With cancer N = 8**	**Without cancer N = 55**	**P-value***
Age (years)	31.2± 5.2	31.5± 4.3*	33.6± 3.6	34.2± 4.5*	<0.001
PSA(ng/ml)	4.7± 1.6	6.4± 6.6*	3.4± 0.8	3.4± 0.8*	
VP (cc)	22± 15.15	25.9± 14.3*	35.3± 12.2*	32.5± 11.2*	
APEL (%)	5.65± 2.5*	5.75± 0.8*	10.5± 1.35*	10.3± 2.6*	
IPSS	10.8± 1.4	10.3 ± 10.8	9.1 ± 2.65	8.95± 2.45	0.57

Data presented as means ± 1 standard deviation; IPSS = International prostatic score symptoms, PSA= antigen prostate specific, VP = prostate volume in cubic centimeters, APEL% = antigen free prostate in percentage; * Significant.

In the group of low risk for cancer prostate (without BTRP), 44 resulted (34.91%) of HFP +PC, 40(31.75%) of HFP, 17 (13.49%) of HFP+PA+PC, 11(8.73%) HFP+PA, 10(7.94%) neoplasia, 4(1.59%) of PA and 4(1.59%) of PC. Whlie 21 resulted (33.06%) of HFP +PC, 16(25.5%) of HFP, 10(15.9%) of HFP+PA+PC, 9(14.4%) HFP+PA, 3(4.8%) neoplasia, 4(3.17%) of PA and4(3.17%) of PC in high-risk patients for prostate cancer (with BTRP) groups (Table 2).

Table 2 Distribution by diagnosis of patients with elevated PSA only, PSA and BTRP

Suffering	**Number of cases (%)**			
	PSA only		**PSA and BTRP**	
HFP	40	31.75	16	25.5
PA	4	1.59	4	3.17
PC	4	1.59	4	3.17
HFP+PA	11	8.73	9	14.4
HFP+PC	44	34.91	21	33.06
HFP+PA+PC	17	13.49	10	15.9
NEOPLASIA	10	7.94	3	4.8
Total	126	100.00	63	100.00

HFP= fibro glandular hyperplasia of the prostate PA = acute prostatitis, PC = chronic prostatitis.

Histopathological stage in 3 (60%) was table 1 N: 5 and in 2 (40%), it was table 1 N: 8 were prostate cancer with Biopsy**,** as The Gleason score in 2 (40%) was 7, and 6, 9 and 10 represented 1 (20%) were prostate cancer with Biopsy respectively (Table 3)**.**

Table 3 Comparison between prostate cancer patients who underwent biopsy or not

		Prostate cancer (N:13)	
		With Biopsy (n=5)	**Without Biopsy (n=8)**
Pathologic stage	Table1 N: 5	3(60%)	2(25%)
	Table1 N:8	2(40%)	6(75%)
Gleason score	6	1(20%)	2(25%)
	7	2(40%)	3(37.5%)
	8	0(0%)	1(12.5%)
	9	1(20%)	1(12.5%)
	10	1(20%)	1(12.5%)

Analysis for difference statistically significant, the diagnostic effect for prostate cancer was significant (p = 0.001), indicating differences in the results both in the group in which it was performed negative biopsy before RTUP and the group without RTUP biopsy. Age, APEL, APEL% and prostate volume were be the variables that presented differences statistically significant (p = 0.001), it is say, they could influence the detection of prostate cancer according to the method used (BTRP or RTUP). There were no differences statistically significant with respect to IPSS between groups. (Table 1).

4. Discussion

Obstructive symptoms were the main indications of surgery (RTUP) (15); no patient was indicated for RTUP only on high APEL unless related to prostatic symptoms (16).

In five patients with prostate cancer RTUP was used, these patients presented symptomatic prostatic obstruction, suspicion of cancer due to elevation of APEL% low, cases in which the BTRP could not find neoplasm signs; this may represent the percentage of prostate cancer in the area transition that can go unnoticed (false negatives) by BTRP, as it is a technique that depends on the experience of who performs and the process itself to obtain the sample (peripheral area).

In eight of the cases with prostate cancer the underlying pathology was obstructive prostate benign and neoplasm of prostate. These cases correspond to patients symptomatic for significant obstructions, high APEL values, high age, but with APEL %> 15, for which it was decided to perform as a therapeutic RTUP measure because the benefit of such surgery was greater compared with the biopsy.

Regarding the results, the factors that offer a significant effect on difference diagnosis by RTUP and BTRP for cancer of prostate found age, volume prostate, and APEL%.

The RTUP is not currently considered a tool for the diagnosis of adenocarcinoma prostate (17), but in said study it is observed that it can be diagnosed in isolated cases, cases in which the technique biopsy by puncture is insufficient for locate the neoplasm (18). According to current literature in patients with high APEL and negative BTRP it is suggested to repeat biopsies including the transition zone, perform MRI with spectroscopy to detect areas suspicious and failing diagnostic RTUP and therapeutic (19).

Given the significant differences in the number average number of prostate cancer cases diagnosed among those undergoing biopsy with negative result and without biopsy but submitted a RTUP, transurethral resection of prostate in patients with suspected cancer prostate with or without a biopsy history negative transrectal may increase detection early prostate cancer in the transition zone if you present the factors before mentioned, which should be fulfilled indicative for definite treatment and prevention the diagnostic error(20). On the other hand, regarding non-neoplastic histopathological results of the total study population, the highest percentage corresponds to fibroglandular hyperplasia prostate and chronic prostatitits, both cause significant increase in APEL.

This could again be due to various races within the Iraqi community (21). Further studies are expected of the Iraqi population according to their ethnicity (8). Lastly, when comparing our data with those of Oesterling et al (22), they

display misleading findings. A drawback of the present study is that it was not community-based, but patients were from a clinic of urology, with different symptoms (23). In this studies, they were log-transformed due to the log-normal distribution of PSA concentrations.

The research was restricted because it was from one tertiary care center and retrospective. The same influences are at work in all populations (sociodemographic, schooling, health-care practices). Due to the country circumstances our work was not published on time (24). Recovering invaluable documents took us a long period of time. Recent tests under development, such as urinary engrailed-2, which is a highly specific and responsive biomarker for prostate cancer, would require a broad multicenter study to further evaluate the potential for diagnosis and determine if this or any other tests may replace PSA (1).

Clinical examination of resected TURP prostate tissue specimens is a stage diagnosis with and without prostate cancer. The rate of stage detection for prostatic cancer has decreased (15), TURP has more and more been replaced by pharmacology, and PSA is commonly employed for LUTS patients to conduct a screening trial. Therefore, the amounts should have been diagnosed for patients with and without prostate cancer. Tombal *et al* (25) suggested for surgery patients.

13 (20.6 %) patients, among the 63 patients total, were diagnosed with TURP for prostate cancer. The number was 5 (7.94%) and 8 (12.7%), respectively, patients with and without cancer. Our findings were similar to previous data (26).

The prostate cancer detection rate has been decreased significantly to 10 percent by Roehl *et al* (27), if it is concluded that the initial two TRUS biopsies are negative (28).

Several studies indicated that TURP should be detected in patients with a consistent PSA rise and repeated negative TRUS biopsy results in the transition region of prostate cancer. In patients with 3 or more of the previous TRUS negatives, Puppo *et al* (1) reported that detection rates can rise by as much as 57 percent in TURPs and lateralized TRUS biopsies (29). The fact that the majority of transition zone prostate cancer in the previous part of the prostate is difficult to approach by TRUS biopsy has been the reason for the use of TURP as a diagnostic method (13).

In our research, the immediate TURP approach is appropriate due to the rapid relief of bladder outlet blockage and the use of patients suffering from BPH with severe Lucian lymphatic and clinical suspects of prostate cancer following negative findings from a 12-core TRUS biopsy without high-grade intraepithel neoplasia (PIN) atypical small acinar proliferation (ASAP) or a persistent rise in PSA. With respect to the treatment of prostate cancer after TURP, Puppo *et al* (1) suggested that previous TURP did not have a detrimental impact on radical prostatectomy outcomes.

In the previous study, TURP radical prostatectomy was reported to be harder as radical retropubic prostatectomy (RRP) conditions such as periprostatic fibrotic tissue, bladder neck and capsular violation worsened (18). In recent reports, however, peri-operative morbidity and functional findings such as continence and erectile function were comparable in open RRP after TURP alone with no TURP after RRP alone (30).

5. Conclusion

Serum PSA results need to be standardized according to countries and ethnic groups. The final advantage will be increasing precision in the diagnosis of prostatic carcinoma in a given region.

Compliance with ethical standards

Disclosure of conflict of interest

None.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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