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Detection of Prostate Cancer using Tumor markers and Biopsy in outpatients in Kerbala city, Iraq

Hassan Ali Al-Saadi[1] and Mohammed Salih Mahdi**
[1]Department of Clinical Laboratory Sciences/College of Pharmacy/University of Kerbala, IRAQ
[2]Department of Immunology /Al-Hussein Teaching Hospital/Kerbala Health Directorate, Kerbala, IRAQ

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Abstract

Prostate cancer incidence and mortality rates vary worldwide. This led to the investigation the prostate specific antigen for detection prostate cancer in the serum of patients by using tumor markers and histopatological procedures. Prostate specific antigen levels of 4–10 ng/mL participated in a protocol for prostate cancer using Analytical immune assay AIA 360, and used histopathological procedure for prostate cancer diagnosis. One hundred and fifty Clinical symptoms (75 PSA,75 control) of prostate cancer were included mean and SD of PSA at ages (20-40,41-50,51-60,61-70,71-80,81-90) higher than mean and SD of control especially age group (71-80) was (9.18±3.56) high significant more than another age groups at ($p \leq 0.05$) compare with control twenty two, twelve and ten patients were suffering from prostate expansion at age groups (71-80), (81-90), (61-70) respectively, testis surgery and CA prostate were (6,5) respectively at the same age groups, prostate inflammation was (7) at age group (71-80) more than another age groups. Adenocarcinoma, hyperplasia, benign, hemorrhagic, testicular mass, and hypoplasia were 20(26.66%), 25 (33.33%), 12(16%), 8(10.66%), 1(1.33%), 9(12%). The PSA using has led to overdiagnosis and resulting to dissolve controversy and histopathological tools to enhanced prostate diagnosis and help in early detection about prostate cancer at males that appointed physicians to set suitable drugs for patients, so early diagnosis by these techniques prevent the complications appearance at patients which led to mortality.

Keywords: Prostate specific antigen, biopsy, prostate cancer.

Introduction

Prostate cancer is more common among male's cancers in any population[1]. Carcinoma of the prostate is responsible for 10% of cancer death in the United States population[2].The prostateenlargement is output of benign hyperplasia[3]. The early detection of prostate specific antigen (PSA)is still considered the best important tool marker of cancer[4,5]. Prostate cancer is leading morbidity and mortality worldwide[6]. It is increasing significantly in the developed countries and most common cause of cancer death in the men[7,8].

Environmental factors consider a large influence on the development of human cancers. 90% of all cancer would probably be preventable, if all carcinogenic environmental factors could be ends[9].

The host is influenced by various factors such as genetic factors, gender, age and nutritional state[10].

Tumor markers are based on that only small amount of PSA leaks from the normal prostate into the circulation, thus the serum concentration isusing for prostate cancer diagnosis, that normally very low than those in seminal fluid[11].

Traditional histopathology based on morphology evaluation has remained the standard diagnostic method for manyyears but introduction of advanced technologies like microarray, mass spectrometry, and automated DNA sequencing have opened new outlook in cancer diagnosis and therapeutics. Using histopathological procedure for prostate cancer diagnosis, pathologists obtains a tissue samples from a prostate biopsy and treats it by staining protocols to clarification the histological structures[12].

PSA leaks into the peripheral blood circulation in small quantities; the amount in serum is increases with age[13].

The aim of this study was to diagnose PSA using tumor markers ,and prostate biopsy in patients at Al-Hussien Hospital/ Kerbala/Iraq.

Material and Methods

Detection of PSA with normal serum: Between 12 September 2011 and 15 February, we performed 150 serum samples (75 suspected PSA) after diagnosed by urologists and (75 control) were collected from out patients aged (20 -90 years) during that period in Al-Hussien Hospital /Kerbala. The samples were collected in the labeled 5 ml tubes then stored and delivered at 4 C .The sera were stored at – 20 C till testing.

75 serum specimens were tested by AIA(Analytical immune assay) 360 to detecttumor markers of (PSA) by using (TOSOH EUROPE) according to manufacturer's instructions.

Detection Prostate cancer biopsies: We performed 75 biopsies samples of PSA positive were collected from same out patients during that period. Paraffin-fixed haematoxylin-eosin stained tissue section slides were retrieved from the laboratory archive and reviewed by three histopathologists to make a consensus diagnosis. Patients' age and histological diagnosis of prostate biopsy was recorded in a tabulated form. Carcinoma of prostate cases were further classified into different grades. Grading was based on glandular differentiation and the most commonly used Gleason method was applied. The grades were as follows[14].

Grade 1: Well differentiated carcinoma with uniform glandular patterns. Grade 2: Well differentiated carcinoma with gland varying in size and shapes. Grade 3: Moderately differentiated carcinoma with either (a) irregularacinioften widely separated or (b) well defined papillary cribriform structures. Grade 4: Poorly differentiated carcinoma with fused glands widely infiltrating the prostatic stroma.
Grade 5. Very poorly differentiated carcinoma with no or minimal gland formation. Tumour cell masses may have central necrosis.

Gleason pattern 1 and 2 represent a well differentiated prostate adenocarcinoma; Gleason pattern 3 represents a moderately differentiated carcinoma and Gleason pattern 4 and 5 represents a poorly differentiated or anaplastic carcinoma.10 A primary score and a secondary score were given to each prostatic adenocarcinoma specimen. Thus, if a biopsy lesion consisted of 70% pattern 3 and 30% pattern 4, the primary plus secondary pattern would be a 3+4 or Gleason score 7. Thus, most well-differentiated cancer would consists entirely of a Gleason pattern 1 (primary + secondary = 1 + 1 or Gleason 2), and the most poorly differentiated cancer would be a 5+5 or Gleason 10. Gleason score of prostate cancer predicts overall survival10.

Statistical analysis: Analysis was performed using the Statistical Package for Social sciences software program (SPSS 21.0 for Windows) at $P \leq 0.05$.

Results and Discussion

Clinical symptoms (75 cases) of prostate cancer were included mean and SD of PSA at ages (20-40, 41-50, 51-60, 61-70,71-80,81-90) higher than mean and SD of control especially age group (71-80) was (9.18±3.56) high significant more than another age groups at ($p \leq 0.05$) compare with control. Twenty two, twelve, and ten patients were suffering from prostate expansion at age groups (71-80), (81-90), (61-70) respectively, testis surgery and CA prostate were (6,5) respectively at the same age groups, prostate inflammation was (7) at age group (71-80) more than another age groups table 1, figure 1.

Table-1
The clinical symptoms of patients with prostate cancer

Ages groups (years)		No	Mean ± Sd	Prostate expansion	testis surgery	Prostate inflammation	CA Prostate
20-40	PSA(ng/ml)	5	4.96±1.0	1		1	
	Control	7	0.74±0.40				
41-50	PSA(ng/ml)	4	5.73±3.11	3		1	
	Control	4	0.70±0.21				
51-60	PSA(ng/ml)	12	7.89±2.18	8		3	
	Control	19	1.19±0.85				
61-70	PSA(ng/ml)	18	8.24 ±2.35	10	2	3	2
	Control	27	1.80±1.19				
71-80	PSA(ng/ml)	22	9.18±3.56	22	2	7	2
	Control	13	1.49±0.56				
81-90	PSA(ng/ml)	14	8.72±2.06	12	2	3	1
	Control	4	1.62±1.10				
Total		150		74.66%	8%	24%	6.66%

Table-2
Histological diagnosis of prostate lesions in 56 cases

Diagnosis	Age groups (years)	No	%
Adenocarcinoma	60-80	20	26.66
Hyperplasia	20-70	25	33.33
Benign	40-60	12	16
Hemorrhagic	20-60	8	10.66
Testicular mass	20-60	1	1.33
Hypoplasia	20-60	9	12
Total		75	

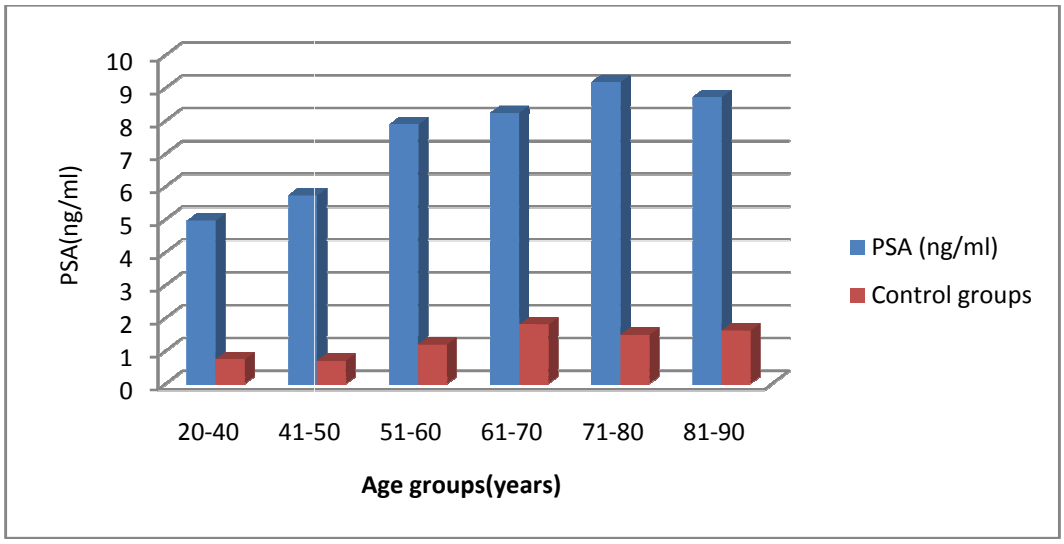

Figure-1
Correlation between PSA and age groups

Table 2 showed adenocarcinoma, hyperplasia, benign, hemorrhagic, testicular mass, and hypoplasia were 20(26.66%), 25(33.33%), 12(16%), 8(10.66%), 1(1.33%), 9(12%) respectively. Table 3, figure 1 were indicated the majority adenocarcinoma of 3, 4, and 7 scores (35.71% , 28.57%, 14.28%) respectively.

Table-3
Distribution of 14 prostaticadenocarcinoma in different Gleason score

Gleason score	No	%
0-10	1	7.14
3-10	5	35.71
4-10	4	28.57
6-10	1	7.14
7-10	2	14.28
9-10	1	7.14

Discussion: The present study was revealed mean and SD of PSA at ages (20-40,41-50,51-60,61-70,71-80,81-90) higher than mean and SD of control especially age group (71-80) was (9.18±3.56) high significant more than another age groups at ($p \leq 0.05$) compare with control, these correlation were revealed significant value compared with healthy persons at $p \geq 0.05$, table 1. In another study 34% patients with prostate cancer were studied at Shiraz/Iran in 2006[15]. In other study was majority of men may have lower urinary symptoms and enlarged prostate in older population[16].

Prostate cancer is associated with sexual history, sexually transmitted diseases has been suggested by case-control investigations. Human papilloma virus or other known sexually transmitted infections are contributed with prostate cancers. A moderate association was found with sexual behavior and sexually transmitted infections, each acting as turns for human papillomavirus. Second, epidemiologists and clinicians will need to cooperate with laboratory investigators in the collection of prostate cancer specimens for virologic testing. History of multiple sexually transmitted diseases, having high rates of both sexually transmitted diseases and prostate cancer, such as African-Americans, might be the most likely to result in the identification of prostate cancer agent[17]. Increasing in consumption of fat and lycopene was associated with declined prostate cancer development. Other factors including educational level, meat consumption, marriage status, vasectomy and smoking have not been shown to affect prostate cancer risk in the Iranian population[18]. Serum prostate specific antigen is considered one of the most important prediction factors amongst patients with prostate cancer and early detection of prostate cancer[19].

Our study was revealed significant value compared with healthy persons at ≥ 0.01. Talukder *et al* was revealed (77.4%) were benign prostatic hyperplasia (BPH). Among 21 malignant lesion adenocarcinoma was 19 (90.5%) and transitional cell carcinoma was 2 (9.5%). The mean ages of carcinoma of prostate cases were (60- 80) years. The mean ages of hyperplasia cases were (25-82)years, while in another adenocarcinoma were in Gleason score 6 (52.6%). The mean age of carcinoma of prostate cases was 65.5 years (95% CI; 61.2 – 69.8 years) ranging from 40 to 80 years. The mean age of Benign prostatic hyperplasia BPH cases was 67.7 years (95% CI; 65.5 – 70.1 years) ranging from 42 to 85 years. Age group 61-70 years was the common peak age group for both BPH and prostatic adenocarcinoma, interaction among genetic factors and environmental may contribute to the pathogenesis of prostate cancers[20].

Tumor gradeconsidered one of the histologic features for clinical end prediction may contribute to improvement in patient's prognosis.

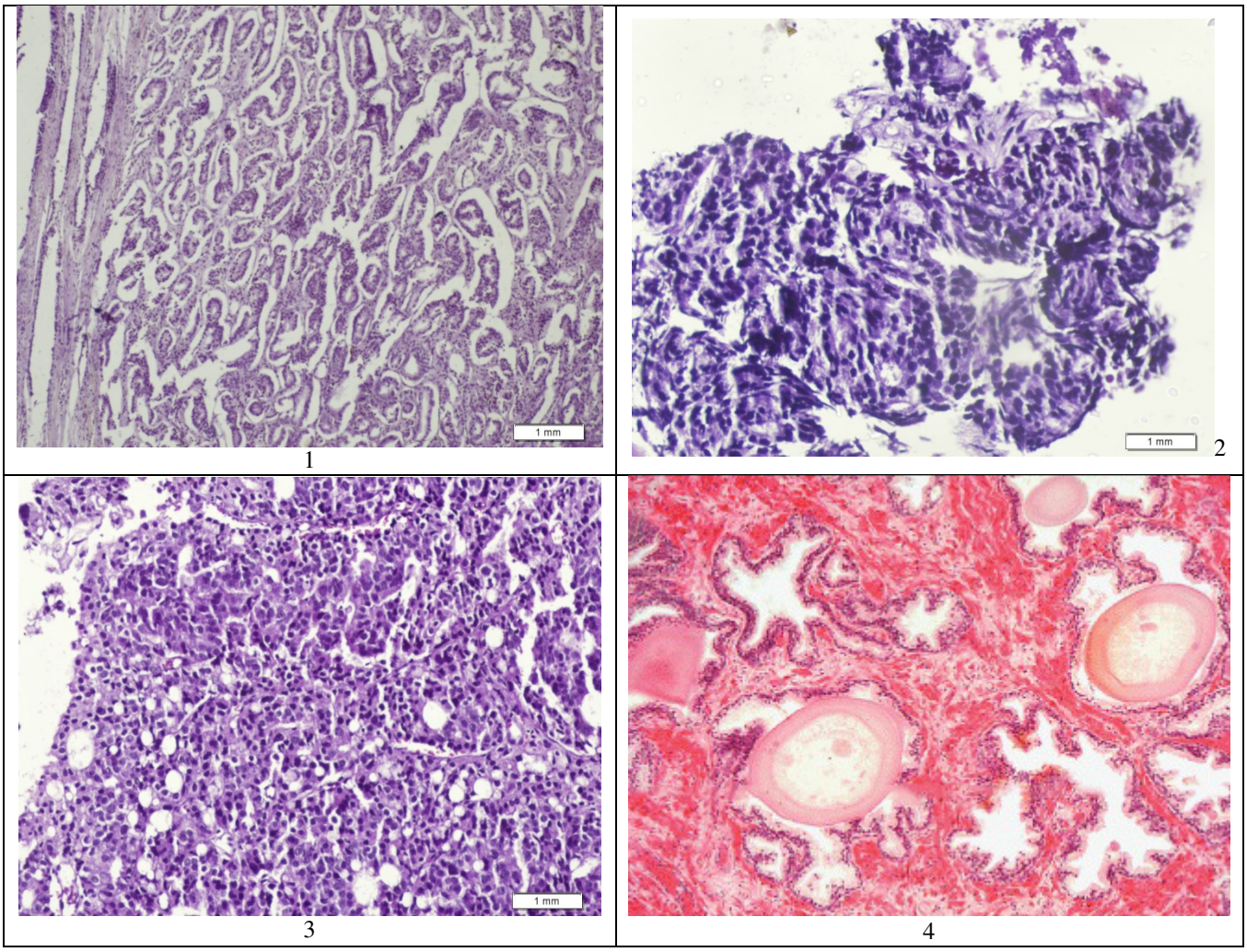

Figure-1
Gleason score of prostate cancer:1/3+3,2/3+4/,3/4+4,4/control (H and E stained)

Conclusion

Our study revealed prostate specific antigen and histological biopsies help in early detection about prostate cancer at males that appointed physicians to set suitable drugs for patients, so early diagnosis by these techniques prevent the complications appearance at patients which led to mortality.

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