

Dedication

To my....

**So beloved mother who is always beside me,
and who has always been my guiding light,
shining on every single step in my life**

To my...

**Lovely wife who has always encourage and be
beside me.**

To.....

**The soul of my father who had educated me
the patience and success**

To.....

**All my family members and colleagues in my
work field**

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ABSTRACT

Prostate cancer is one of the world's major killers and has a high morbidity and mortality rates. The aim of this study is to assess the specificity and sensitivity of different markers used in the diagnosis of prostate cancer.

A cross sectional study conducted during the period from January 2011 to July 2013 to determine and evaluate the serum levels of early prostate cancer antigen-2, prostate specific antigen and prostatic acid phosphatase as diagnostic markers for prostate cancer in Sudanese patients. Two hundred Sudanese with prostate tumor (132 with prostate cancer and 68 with benign prostate hyperplasia) were selected as a test group from two teaching hospitals (Omdurman and Suba) in Khartoum state, Sudan. The test group was compared with a control group which included 100 apparently healthy male volunteers. Blood specimens were collected from both groups, and the serum levels of early prostate cancer antigen-2, prostate specific antigen and prostatic acid phosphatase were determined. Age of the test group was matched with the control group.

The serum levels of early prostate cancer antigen-2 was measured using sandwich ELISA and the serum levels of prostate specific antigen was measured using Full automated analyzer (Elecsys 2010). Serum prostatic acid phosphatase was measured using a spectrophotometric technique. Statistical Package for Social Science (SPSS version 17) computer software was used for data analysis.

The results of this study revealed significant elevated means of the serum levels of early prostate cancer antigen-2, prostate specific antigen and prostatic acid phosphatase of the test group when compared with the control group.

The results of this study also indicate higher sensitivity, specificity, positive predictive value and negative predictive value for early prostate cancer antigen-2 (93.2%, 88.2%, 93% and 86%) respectively when compared to prostate specific antigen (67%, 66%, 79% and 52%) respectively; whereas for the prostatic acid phosphatase were found to be (36%, 54%, 60% and 30%) respectively.

The results of this study also indicate significant elevations of the means of the serum levels of early prostate cancer antigen-2 and prostate specific antigen among the four different stages of prostate cancer among prostate cancer patients.

The means of the serum levels of early prostate cancer antigen-2; prostate specific antigen and prostatic acid phosphatase in the results of this study were significantly increased among patients with prostate cancer when compared with control group.

The results of this study showed that the means of the serum levels of early prostate cancer antigen-2 and prostate specific antigen were significantly raised in patients with late stages when compared with those in early stages of prostate cancer. Whereas no significant difference in the mean serum levels of prostatic acid phosphatase.

The current study indicates significant weak positive correlations between the duration of the prostate cancer since detection (in years) and the serum

levels of early prostate cancer antigen-2, prostate specific antigen and prostatic acid phosphatase.

In conclusion; the current study indicates that; measuring the serum levels of EPCA-2 is the most important, specific and sensitive marker for evaluation of prostate cancer, because its mean serum levels was significantly raised among patients with prostate cancer and positively correlated with the duration of cancer and more specific and sensitive when compared to prostate specific antigen and prostatic acid phosphatase. So it is recommended that; EPCA-2 can be used as a prognostic marker, for early prediction and follow up in patients with prostate cancer. Prostate specific antigen can also be used as a predictive and diagnostic marker but it is less sensitive and specific compared to EPCA-2.

مستخلص الدراسة

يعتبر سرطان البروستات واحدا من الأمراض الرئيسية القاتلة على مستوى العالم وذو معدل عالي من الأمراض والوفيات. الهدف من هذه الدراسة هو تقييم التحديد والحساسية للدلائل المختلفة المستخدمة في تشخيص سرطان البروستات.

أجريت هذه الدراسة المقطعية في الفترة ما بين يناير 2011 حتى يوليو 2013 لتقويم مستويات إنزيم الفوسفاتيز الحمضي البروستاتي والمستضد البروستاتي النوعي ومستضد سرطان البروستات المبكر 2 في مصل الدم من المرضى السودانيين المصابين بتضخم البروستات كمؤشرات تشخيصية لسرطان البروستات.

تم إختيار 200 من السودانيين المصابين بتضخم البروستات (132 لديهم سرطان بروستات و68 لديهم ورم بروستات حميد) كمجموعة إختيار من مستشفيات (امدرمان وسوبا) التعليمية بولاية الخرطوم (السودان) حيث قورنت هذه المجموعة مع مجموعة ضابطة تضم 100 من الرجال المتطوعين الاصحاء.

تم جمع عينات الدم من كلا المجموعتين ومن ثم تم تحديد مستويات مصل إنزيم الفوسفاتيز الحمضي البروستاتي والمستضد البروستاتي النوعي ومستضد سرطان البروستات المبكر 2. كما أنه في هذه الدراسة طبقت أعمار مجموعة الإختيار أعمار المجموعة الضابطة.

تم قياس مستضد سرطان البروستات المبكر 2 بإستخدام السندينيش إليزا (ELISA)، وتم قياس المستضد البروستاتي النوعي بإستخدام المحلل الالى الكامل إيكزيس (2010) وتم إستخدام جهاز قياس الأطياف الضوئية لقياس إنزيم الفوسفاتيز البروستاتي الحمضي. وإستخدم برنامج الحزمة الإحصائية للعلوم الإجتماعية لتحليل النتائج.

أظهرت هذه الدراسة زيادة ذات دلالة إحصائية فى متوسطات مستويات مصلى مستضد سرطان البروستات المبكر2 ومستضد البروستات النوعى وإنزيم الفوسفاتيز البروستاتى الحمضى فى مجموعة الإختبار عند مقارنتها مع المجموعة الضابطة.

وأشارت نتائج هذه الدراسة أيضا إلى إرتفاع الحساسية، التحديد، القيمة التنبؤية الموجبة والسالبة لمستضد سرطان البروستاتا المبكر2 وقد كانت 93.2 % ، 88.2 % ، 93% و 86 % على التوالي عند مقارنتها مع مستضد البروستات النوعى 67%، 66%، 79% و 52% على التوالي، اما بالنسبة الى إنزيم الفوسفاتيز البروستاتى الحمضى فقد كانت 36% و 54%، 60% و 30% على التوالي.

وتشير نتائج هذه الدراسة الى زيادة ذات دلالة إحصائية فى متوسطات مصلى كل من مستضد سرطان البروستات المبكر2 ومستضد البروستات النوعى عند مقارنتها فى المراحل الأربعة المختلفة لسرطان البروستات لدى المرضى المصابين بسرطان البروستات.

متوسطات كل من مصلى مستضد سرطان البروستات المبكر2 ومستضد البروستات النوعى و إنزيم الفوسفاتيز البروستاتى الحمضى فى نتائج هذه الدراسة أعطت مؤشرا لزيادة ذات دلالة معنوية فى المرضى المصابين بسرطان البروستات عند مقارنتها مع المجموعة الضابطة.

وأیضا أظهرت نتائج هذه الدراسة زيادة ذات دلالة معنوية فى متوسطات مصلى سرطان البروستات المبكر2 ومستضد البروستات النوعى فى المرضى المصابين بسرطان البروستات فى المراحل المتأخرة عند مقارنتها مع المرضى المصابين بسرطان البروستات فى المراحل المبكرة، كما أظهرت نتائج هذه الدراسة عدم وجود إختلاف ذو دلالة معنوية فى متوسط إنزيم الفوسفاتيز البروستاتى الحمضى عند مقارنة المرضى المصابين بسرطان البروستات فى

المراحل المتأخرة مع المرضى المصابين بسرطان البروستات فى المراحل المبكرة.

وايضا أشارت نتائج هذه الدراسة الى وجود علاقة ارتباط ذات دلالة إحصائية ضعيفة وموجبة بين فترة الإصابة بسرطان البروستات منذ اكتشافه بالسنوات مع مستويات مصل مستضد سرطان البروستات المبكر 2 ومستضد البروستات النوعى و إنزيم الفوسفاتيز البروستاتى الحمضى.

وفى الختام تشير هذه الدراسة الى أن قياس مستويات مصل مستضد سرطان البروستات المبكر-2 مؤشر مهم وأكثر تحديد وحساسية لتقييم سرطان البروستات وذلك نسبة للزيادة ذات الدلالة الاحصائية فى متوسط مستوياته فى مصل الدم لدى المرضى المصابين بسرطان البروستات ولوجود علاقة ارتباط ذات دلالة إحصائية موجبة مع فترة الإصابة بسرطان البروستات كما أنه أكثر تحديدا وحساسية عند مقارنته مع مستد سرطان البروستات النوعى و إنزيم الفوسفاتيز البروستاتى الحمضى وعليه يوصى بإمكانية إستخدام مستضد سرطان البروستات المبكر-2 كمؤشر تشخيصى وللتنبؤ المبكر ومتابعة سرطان البروستات. مستضد سرطان البروستات النوعى أيضا يمكن إستخدامه كمؤشر تشخيصى وللتنبؤ بسرطان البروستات ولكنه أقل تحديد وحساسية عند مقارنته مع مستضد سرطان البروستات المبكر-2.

ABBREVIATIONS

ACS	American Cancer Society
ACTH	Adrenal corticotrophin hormone
AFP	Alpha-fetoprotein
ASCO	American Society of Clinical Oncology
ATP	Adenosine Tri-Phosphate
BPH	Benign Prostate Hyperplasia
C PSA	Complexed Prostate Specific Antigen
CA125	Cancer Antigen 125
CA19-9	Cancer Antigen 19-9
CEA	Carcinoembryonic antigen
CP	Chronic Prostatitis
CPPS	Chronic Pelvic Pain Syndrome
DRE	Digital Rectal Examination
ELISA	Enzyme Linked Immunosorbent Assay
EPCA-2	Early Prostate cancer Antigen-2
EPS	Expressed Prostatic Secretion
f PSA	Free Prostate Specific Antigen
HCG	Human chorionic gonadotropin
HIFU	High-Intensity Focused Ultrasound
HPC1	Hereditary Prostate cancer gene 1
HRP	Horseradish Peroxidase

LUTS	Lower Urinary Tract Symptoms
MRS	Magnetic Resonance Spectroscopy
NCCN	National Comprehensive Cancer Network
NCI	National Cancer Institute
PAP	Prostatic Acid Phosphatase
PCa	Prostate Cancer
Ph¹	Philadelphia chromosome
PIN	Prostatic Intraepithelial Neoplasia
PLCO	Prostate, Lung, Colorectal, and Ovarian Cancer
PSA	Prostate Specific Antigen
PSMA	Prostate Specific Membrane Antigen
RB	Retinoblastoma
ROC	Receiver Operating characteristics Curve
t PSA	Total Prostate Specific Antigen
TRUS	Transrectal UltraSonography
TMB	Tetramethylebenzidine
UV	Ultra Violet
XMRV	Xenotropic MuLV-related virus

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