

Immune Histochemical Evaluation of AMACR (P504S) in Prostatic Adenocarcinoma and Benign Prostatic Hyperplasia in Small Needle Biopsy of Sudanese Patients

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Abstract:

Background: Prostate cancer is a major health problem throughout the world. Immunohistochemistry plays a very important role in the diagnosis of minimal prostatic adenocarcinoma and to exclude one of its benign mimickers, but it should always be interpreted in the context of the H&E appearances. In some cases of minimal prostate cancer morphologic features do not allow a diagnosis of carcinoma.

Methods: 50 needle biopsy specimens, including 28 with small biopsy of prostatic adenocarcinoma and 22 benign prostate were stained immunohistochemically with AMACR .

Results: Of 28 cases of small foci of prostatic adenocarcinoma, 26 (92.9%) expressed AMACR; There was focal positive staining with AMACR in 2 benign cases.

Conclusions: *Immunostaining with AMACR (p504s) could improve the diagnostic performance and help in avoid carrying out new biopsies in small foci of prostatic carcinoma detection.*

Key words: Prostate cancer, AMACR (P504S) marker, needle biopsy

1. INTRODUCTION

Worldwide, prostate cancer is the second most common malignancy in men after lung cancer [1]

Diagnosis of prostate cancer glands can sometimes present a diagnostic challenge for pathologists, since prostate carcinoma can mimic benign prostate glands [2]. The diagnosis of prostatic adenocarcinoma, especially in needle biopsy samples, can occasionally be challenging, either because they only show small foci of prostatic adenocarcinoma, or because of the difficulty in distinguishing prostatic carcinoma from benign mimickers[3] The difficulty in the diagnosis of prostatic adenocarcinoma is mostly seen with minimal (limited<1mm) carcinoma in needle tissue [4] Many major and minor histologic features important for the diagnosis of minimal prostatic carcinoma should be assessed specifically at low- and high-power magnification. The first of the major criteria is an infiltrative growth pattern which frequently presents as the presence of small malignant glands between larger, more complex (and often paler), benign glands. [5] Alpha-methylacyl-CoA racemase (AMACR), formerly known as P504s, is a mitochondrial and peroxisomal enzyme involved in the beta-oxidation of branched fatty acids and bile acid intermediates [6] We aimed in this study to correlate between immunohistochemical expression of AMACR in small focal prostatic carcinoma and BPH in true cut needle biopsy.

2. MATERIALS AND METHODS:

2.1. Materials:

2.1.1. Subjects:

Patients (carcinoma group) with age range from 40 to 102 years (mean = 68.2) and Patient (BPH group) with age range from 60 to 85 years (mean = 72.5 ± 3.1) obtained from the department of pathology, Ibn sena hospital and Military hospital during the period from January 2015 to January 2016 were chosen for this study.

2.1.2. Samples:

A total of 50 prostate needle biopsy specimens, including 28 prostate needle biopsy specimens with prostatic adenocarcinoma and 22 BPH The diagnosis of prostate cancer was established from: Examination of multiple levels of H&E-stained sections and was confirmed by two pathologists.

2.2. Methods:

2.2.1. Immunohistochemical Analysis

Immunohistochemical staining was carried out using streptoavidin-biotin immunoperoxidase technique (thermo fisher). Three to five micrometer thick sections, cut from formalin fixed paraffin embedded blocks, were deparaffinized in Xylene and rehydrated in graded alcohol. The mounted sections were immersed in target retrieval solution, tris buffer EDTA (PH 9.0), then boiled in this solution in PT link for 20 min and then washed in phosphate buffer saline (pH 7.2). Then the slides were then incubated 20 minute using a polyclonal anti-AMACR antibody ready to use thermofisher), After a buffer rinse, bound antibodies were detected with the thermo Envision System. Slides were counterstained with hematoxylin, and rinsed again.

The slides were allowed to air dry and were cover slipped with permanent mounting media. Negative controls, in which the primary antibodies were replaced by PBS, were carried out for each primary antibody For AMACR, prostate carcinoma was used as positive internal control.

- *Immunohistochemical Evaluation:*

- *Evaluation of AMACR:*

Results obtained from two sections were detected by the researchers and confirmed by experienced histopathologist.

Negative and positive controls were used for evaluation of the test sections.

Ethical clearance for this studies is provided by ethical committee of AL-Neelain University -faculty of medical laboratory science .

2.2.2. Statistical analysis

The results of the study were statistically analyzed using SPSS version15 statistical program. Data were expressed as mean± SD for quantitative variables, numbers and percentage. For categorical variables, student t test was used. For statistical analysis of Gleason's grading Spearman's statistical test was used. $P < 0.05$ was considered the significant limit.

3. RESULTS:-

3.1. Staining results with AMACR

AMACR expression in malignant glands had much more extensive and intensive staining results than benign glands ($P < 0.001$). Prostatic carcinoma showed a brown cytoplasmic granular staining pattern of AMACR in the malignant glands and cells.

A total of 50 prostate needle biopsy specimens The Frequency of adenocarcinoma in all sample are 28 (56%) while The Frequency of benign prostatic hyperplasia is 22(44%)

Table (1). Four specimens of prostatic adenocarcinomas were intermediate grade gleason (5-7) and twenty four were high grade Gleason (8-10).

Out of 28 cases of small biopsy of prostatic carcinoma 26 (92.8%) expressed AMACR (p504s), and 2 did not express AMACR (p504s) while in twenty two cases of small biopsy of Benign prostatic hyperplasia have only 3(13.6%) expressed AMACR (p504s) Table(2). the expression of AMACR in prostatic adenocarcinoma is more than BPH which is statically significance (($p < 0.0001$) Pvalue :0.00

Table (1) showing the frequency of prostatic adenocarcinoma and begin prostatic hyperplasia among study population

Sample	Frequency	Percent
Adenocarcinoma	28	56.0
BPH	22	44.0
Total	50	100.0

Table (2):-showing the frequency of expression of AMACR among study population.

Diagnosis	AMCAR expression		Total
	positive	Negative	
Adenocarcinoma	26	2	28
BPH	3	19	22
Total	29	21	50

4. DISCUSSION:

In our finding we found that the expression of AMACR in prostate cancer (92%) is more than benign prostatic hyperplasia (9.9%) but some of benign are expressed.

Our finding is in agreement with study done by Yang et al., 2002; Jiang et al., 2002 Beach et al. 2002 Boran et al. 2011[7]; [8]; [9]; [10] which are found, 71% of cancer cases showed positive immune-staining with AMACR, but variable

intensities and percentages of cells were present. About 71%–100% of prostatic adenocarcinoma stained with AMACR. and also this finding is inconsistent with other study. The sensitivity of AMACR in detecting these variants was found to be 70% by Farinola and Epstein 2004 [20], 68% by Zhou et al., 2003 [21] and 77% by Zhou et al., 2003) [21] respectively.

5. CONCLUSION

Using AMACR as a positive marker alone might be misleading because weak expression of AMACR might be seen in benign glands. Accordingly, one should not render a diagnosis of benignancy based solely on a negative AMACR immune-stain.

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