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ORIGINAL ARTICLE

Role of Prostein in the diagnosis of prostate carcinoma

Sarita Kumari

Assistant Professor, Department of Pathology, Major S D Singh Medical College, Farukkhabad, Uttar Pradesh, India

ABSTRACT:

Background: Prostatic adenocarcinoma is the most prevalent form of cancer in men and the second leading cause of cancer death in the United States. The present study evaluated the role of Prostein in the diagnosis of prostate carcinoma. **Materials & Methods:** 65 prostate samples obtained from general surgery department suspected of prostate carcinoma. Samples were fixed in buffered formalin, followed by paraffin embedding and stained with hematoxylin and eosin (H and E). Diagnosis of samples were performed. Immunohistochemistry (IHC) was performed on Ventana automated stainer. **Results:** Age group 30-40 years had 14, 50-60 years had 40 and >60 years had 11 patients. The difference was significant (P< 0.05). Diagnosis was normal epithelium in 12, benign prostate hyperplasia (BPH) in 20, primary adenocarcinoma in 25, metastatic adenocarcinoma in 5 and HGPIN in 3. The difference was significant (P< 0.05). **Conclusion:** Prostein had specificity of 100% in differentiating various prostatic carcinoma hence, can be used in prostate lesions.

Key words: Hematoxylin, Prostein, Prostatic adenocarcinoma

Corresponding author: Sarita Kumari, Assistant Professor, Department of Pathology, Major S D Singh Medical College, Farukkhabad, Uttar Pradesh, India

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INTRODUCTION

Prostatic adenocarcinoma is the most prevalent form of cancer in men and the second leading cause of cancer death in the United States.[1] The patient's death is often due to local or distal lymph node involvement and distant metastasis. The metastasis can be the first presentation in some patients without previous diagnosis of prostatic adenocarcinoma.[2] In many patients, the prostatic carcinoma is either impalpable or encountered incidentally after transurethral resection for benign prostatic hyperplasia, in which situation the patients may potentially have metastases without knowing the presence of prostatic primary. Therefore, in surgical pathology practice, a metastatic prostatic adenocarcinoma is always included in the differential diagnosis when encountering a male patient with metastatic adenocarcinoma of unknown origin.[3,4]

The diagnosis of prostatic adenocarcinoma on histopathology depends on architectural and cytomorphological features supported by immunohistochemistry (IHC). The utility of IHC in prostate cancer is primarily for confirming the diagnosis of carcinoma in biopsy material containing atypical glands.[5] In addition, IHC helps confirm the prostatic origin of the tumor. Though all the prostate markers show excellent specificity, the sensitivity and percentage positivity vary. P501S (prostein) is a prostate-specific marker that is expressed in the cytoplasm of benign and malignant prostatic glandular cells. It has not been detected in any other normal or malignant tissues. The new IHC markers include prostein (P501S) and NKX3.1.[6,7] The present study evaluated the role of Prostein in the diagnosis of prostate carcinoma.

MATERIALS & METHODS

The present study comprised of 65 prostate samples obtained from general surgery department suspected of prostate carcinoma. The study was approved from institutional higher review committee.

Data such as name, age, gender etc. was obtained. Ultrasound (US) or magnetic resonance imaging (MRI) findings and serum PSA values were obtained. Samples were fixed in buffered formalin, followed by paraffin embedding and stained with hematoxylin and eosin (H and E). Diagnosis of samples were performed. Immunohistochemistry (IHC) was performed on Ventana automated stainer. The intensity of positivity was scored from 0 to 3 as follows: score 0 = nonstained; score 1 = weak; score 2 = moderate; and score 3 = strong. Results thus obtained were subjected to statistical analysis. P value less than 005 was considered significant.

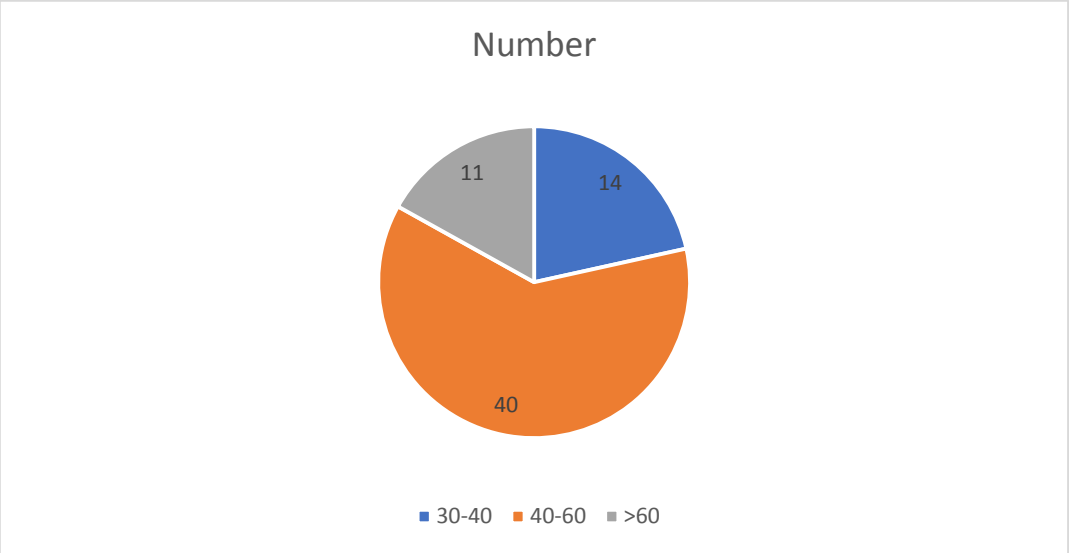
RESULTS

Table I Distribution based on age group

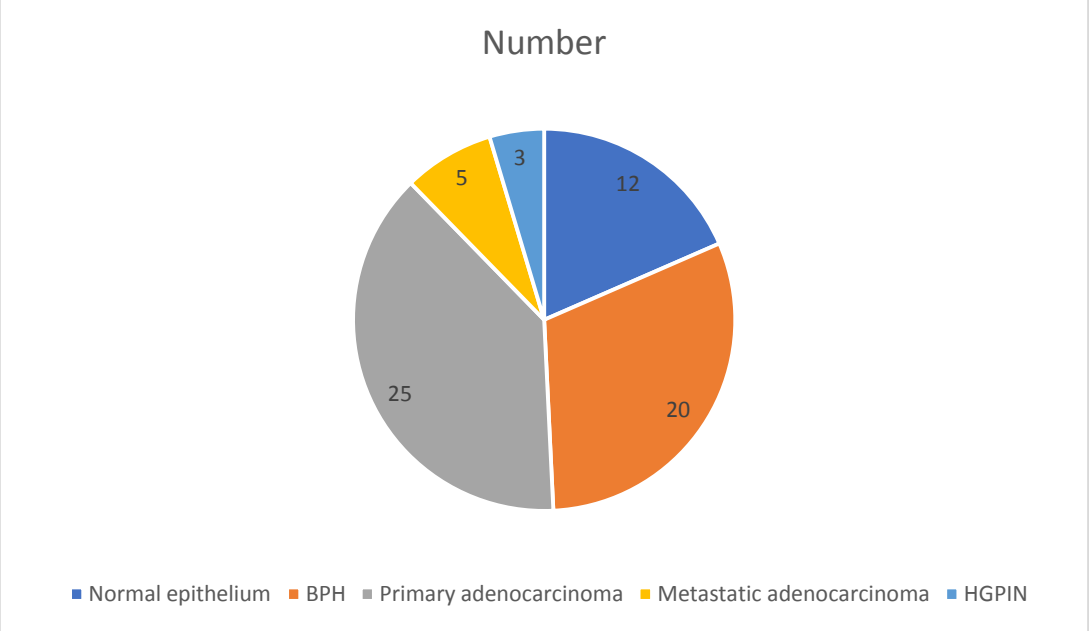
Age group (Years)	Number	P value
30-40	14	0.02
40-60	40	
>60	11	

Table I shows that age group 30-40 years had 14, 50-60 years had 40 and >60 years had 11 patients. The difference was significant (P< 0.05).

Graph I



Graph II Diagnosis of specimens



Graph II shows that diagnosis was normal epithelium in 12, benign prostate hyperplasia (BPH) in 20, primary adenocarcinoma in 25, metastatic adenocarcinoma in 5 and HGPIN in 3. The difference was significant (P< 0.05).

Table II Protein expression and intensity score

Diagnosis	Protein expression	Intensity score
Normal epithelium	100%	1-8-2
BPH	100%	2-2-7
Primary adenocarcinoma	100%	2-2-4
Metastatic adenocarcinoma	100%	1-2-2
HGPIN	100%	2-2-2

Table II shows that protein expression and intensity score for normal epithelium was 100% and 1-8-2, in BPH was 100% and 2-2-7, in primary adenocarcinoma was 100% and 2-2-4, in metastatic adenocarcinoma was 100% and 1-2-2 and in HGPIN was 100% and 2-2-2 respectively.

DISCUSSION

Immunohistochemical staining with prostate specific antigen (PSA) is widely used to aid in the diagnosis of metastatic prostatic carcinoma.[8,9] However, PSA may not be expressed in all cases of prostatic adenocarcinoma, especially in some poorly

differentiated prostatic carcinomas or metastatic carcinoma. Prostatic acid phosphatase (PAP) did not show better sensitivity than PSA in this regard. In addition, immunoreactivity of PSA has been found in some non-prostatic tissues. P501s (prostein) is a prostate-specific marker that is expressed in the cytoplasm of benign and malignant prostatic glandular cells.[10] Prostein is a 553 amino acid protein which contains 11 potential transmembrane spanning domains. It has not been detected in any other normal or malignant tissues. There is no correlation between prostein gene expression and the prostatic carcinoma Gleason score. Further, no gross difference in the level of protein expression between primary and metastatic prostatic carcinomas is observed.[11] The present study evaluated the role of Prostein in the diagnosis of prostate carcinoma.

We found that age group 30-40 years had 14, 50-60 years had 40 and >60 years had 11 patients. Yin et al[12] in their study immunohistochemical stains with anti-P501s antibodies were performed on 5-micron sections of tissue microarray (TMA) specimens. The TMA is constructed with normal donor prostates (NDP), prostatic adenocarcinoma (PRCA), non-neoplastic prostatic tissues adjacent to malignant glands (NAT), benign prostatic hyperplasia (BPH), high-grade prostatic neoplasia (PIN), metastatic adenocarcinoma to lymph nodes (MLN), metastatic adenocarcinoma to other sites (MC), and samples of benign testis, colon, adrenal and kidney. The two groups of metastatic lesions were also subjected to stains with antibodies to PSA. A composite score (ranging from 0 to 3) was assigned to score intensity of staining. Granular staining pattern of p501s was seen in all benign glands (score = 1.77 – 2.1) and malignant acini (score = 1.52) at the apical aspect of cytoplasm, predominantly adjacent to the nuclei. No staining was observed in controls including testis, colon, adrenal and kidney. The MLN group received a score of 1.0, with 10% of cases negative for p501s. The MC cases had a score of 0.64, with 16.7% of case showing loss of p501s expression. Although the metastatic lesions demonstrated similar rate of negative expression with PSA antibody, only 2 MC cases (3.3%) showed simultaneous negative stains for both P501S and PSA.

We found that diagnosis was normal epithelium in 12, benign prostate hyperplasia (BPH) in 20, primary adenocarcinoma in 25, metastatic adenocarcinoma in 5 and HGPIN in 3. Carder et al[13] studied the expression of PSA and prostein in 54 metastatic prostatic carcinomas (30 lymph nodes and 24 distant metastasis), where PSA was expressed in 87% and prostein in 86.7% of samples. The mechanisms responsible for the diminished expression of P501S in metastatic prostatic carcinomas are unknown but could be similar to those for PSA. Queisser[10] showed sensitivity of PSA, PSMA, and androgen receptor to be 97%, 94%, and 91%, respectively and concluded that sensitivity can be increased up to 98% to 100% with the combined use of PSMA and P501S.

We found that protein expression and intensity score for normal epithelium was 100% and 1-8-2, in BPH was 100% and 2-2-7, in primary adenocarcinoma was 100% and 2-2-4, in metastatic adenocarcinoma was 100% and 1-2-2 and in HGPIN was 100% and 2-2-2 respectively. It was found that PSA immunoreactivity declined from benign epithelium to PIN and prostatic adenocarcinoma, suggesting that PSA is regulated differentially and decreased in expression with malignant transformation. The mechanisms responsible for the diminished expression of p501s in metastatic prostatic carcinomas are unknown, but could be similar to those for PSA. Interestingly, there was a trend of decreased p501s expression in the groups of primary prostatic carcinoma (PCA) and non-neoplastic prostatic tissue adjacent to malignant glands (NNT) although no statistical differences were identified compared with groups of NDP, BPH and PIN.[14] Since no Gleason score was given to the metastatic lesions, it was possible that metastatic carcinomas represent higher-grade cancers.

CONCLUSION

Authors found that Prostein had specificity of 100% in differentiating various prostatic carcinoma hence, can be used in prostate lesions.

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