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Pathology

Role of Cell Block in Diagnosis of Prostate Adenocarcinoma

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Abstract **Case Report**

Cytology plays an important role in the preoperative assessment of many cancers. It is used as a first-line pathological investigation in both screening and diagnostic purposes. Cell block prepared from residual tissue fluids and fine-needle aspirations can be useful adjuncts to smears for establishing a definitive diagnosis. Cell block is a mini formalin-fixed paraffin-embedded (FFPE) biopsy obtained from fine-needle aspirate or fluid sediment. Preservation of cytologic material in the cell block for IHC and molecular studies adds to its diagnostic accuracy and enables long-term archiving for future analyses. Cell block also helps in providing additional architectural information. LBC is another technique that can also be used to prepare cell blocks with better preservation of tumor cells. ***Aim:*** To determine the diagnostic value and accuracy of CELL BLOCK cytology (CB) in the diagnosis of prostate carcinoma.

Keywords: Cytology, cell block (CB), fine-needle aspiration cytology (FNAC), immunocytochemistry.

INTRODUCTION

The cell block preparation for microscopic evaluation was first introduced by *Bahrenburg* in 1896. The cell block technique has been in use since 1900 and we have been using this technique for last 30 years.

Prostate cancer is one of the leading causes of mortality and morbidity in developed countries [1]. Most cases of prostate cancer are detected by abnormal serum total prostate specific antigen (PSA) levels and a typical digital rectal examination leading to transrectal biopsy [2]. Although the diagnosis of prostate cancer from biopsy specimens is considered definitive, there are reports pointing out that the standard biopsy regimens miss 15-35% of prostate cancers [3]. Several modifications in biopsy technique, number, and localization of biopsy cores have been described to increase cancer detection [4, 5]. However, investigations on these issues are still ongoing. Cell block preparation from FNAC can also be used as a useful adjunct for histopathological evaluation of the prostate cancer. In this study, we evaluated the diagnostic accuracy of the Cell block technique in the diagnosis of prostate cancer.

Case History

A 77 year aged male presented on August 2019 with haematuria and obstruction during voiding for 15 days.

On per rectal examination prostate was hard in consistency while mucosa was free. Ultrasonographically the prostate was enlarged (62x52x52) mm with volume about 88 cc. Residual urine was minimum. The PSA was raised 76.4 on 31.7.19 and 82.3 on 16.8.19 (normal 0-4ng/ml). The patient was referred for FNAC and was instructed to come up with bowel clearance prior to the test. A 22 bore LP needle was used for FNAC through per rectal approach.

From the aspirates two smears were prepared and the residual material was subjected to cell block preparation. For cell block preparation autologous blood clotting technique was followed which we have been following for last thirty years [6]. The clot/cell pellete was fixed in 10% neutral buffered formalin solution and processed into a paraffin –embedded block. The histological slides were stained with hematoxylin and eosin (H & E).

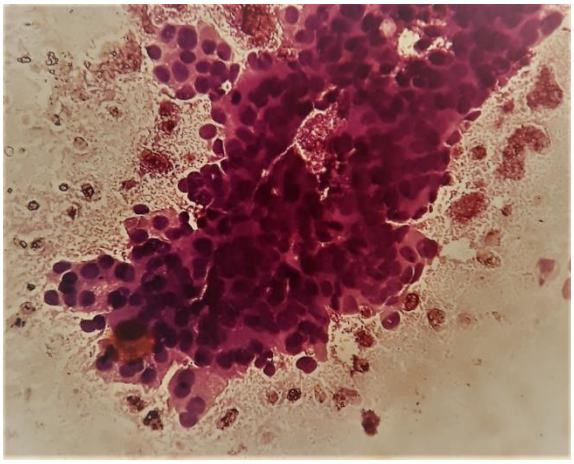

Fig-1: FNA Cytology of Prostatic Adenocarcinoma

Smears show epithelial cells in sheets and singles scattered on a thin haemorhhagic background. The cells show scanty cytoplasm with pleomorphic nuclei. Nuclear overlapping appreciated. Hyperchromatic nuclei show prominent nucleoli in some of them. Diagnosis of adenocarcinoma prostate was made (Fig-1).

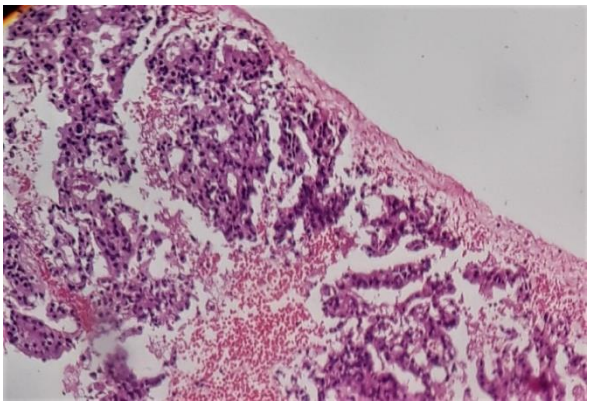

Fig-2: Prostate adenocarcinoma in cell block

The neoplastic glandular cells showed features of small gland proliferation in micro-acinar pattern displaying small, irregular glands and crowded glands arranged in back to back fashion with minimal intervening stroma. Cells were round or-oval with well-defined cell borders and clear-granular cytoplasm. The nucleus was round, usually eccentric, and had a prominent nuclear border. The nuclear chromatin was fine, powdery, and evenly distributed. Nucleoli were seen only in some tumor cells but, when present, were large, prominent and centrally placed. The background is haemorrhagic due to blood clot mechanism adopted to produce cell pellet (Fig-2).

DISCUSSION

FNAC yielded cell block preparation and interpretation is a well-established technique for providing excellent material for ancillary studies such as immunochemistry, fluorescence in situ hybridization (FISH), ultrastructural examination, cytogenetics, cell culture preparations, and molecular studies. The need of the hour is to obtain more information from less and less material obtained through minimally invasive procedures such as FNAC.

The technique is simple, cost effective, preserves the original sample for permanent fixation and appears to be reliable [7, 8]. The pathologist can instantly interpret the smears that are prepared, whereas histological analysis of the core biopsy takes a minimum of 24 hours.

In the literature, there is little published information about the use of cell block cytology in diagnosing prostate cancer. Mannweiler *et al*., found CELL BLOCK cytology helpful in diagnosing prostate malignancy, particularly in clinically suspicious cases with an elevated PSA level and atypical digital rectal examination, which had previous routine biopsies with an inconclusive result for malignancy [9].

In our case the patient presented with hard prostate on PR examination and rising titre of serum PSA. Cytology diagnosis was in favour of adenocarcinoma prostate which was supported by the cell block diagnosis. The paraffin embedded block is available for further study, if required.

Willems *et al*., concluded that this method had a central role in diagnosis and management of prostate carcinoma, including post-therapy follow-up [10].

CONCLUSION

In conclusion, cell block prepared from residual tissue fluids of fine-needle aspirate can be useful adjuncts to smears for establishing a more definitive diagnosis. These paraffin-embedded cell blocks have been popular since these can be handled like any other histologic specimen. Rapid on-site evaluation (ROSE) can help in attaining adequate material in the cell block that is a major concern to the cytopathologists. Ancillary studies can be done using cell blocks including IHC and various molecular techniques.

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