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Utility of NKX3.1 immunohistochemistry in the differential diagnosis of seminal vesicles versus prostatic tissue in needle biopsy

Tomas Pitra[1], Kristyna Pivovarcikova[2], Reza Alaghehbandan[3], Eva Maria Compérat[4], Milan Hora[1], Joanna Rogala[2], Maryna Slisarenko[2], Michal Michal[2], Ondrej Hes[5]

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Highlights

- *NKX3.1 is considered reliable marker of prostatic origin.*
- *NKX3.1 reactivity in seminal vesicles tested by 2 antibodies.*
- *NKX3.1 tested in a total of 63 non-neoplastic seminal vesicles.*
- *Seminal vesicles were completely negative (both antibodies).*

Abstract

NKX3.1 is considered a reliable immunohistochemical marker of prostatic origin with high specificity and sensitivity. However, NKX3.1 positivity has been described in other neoplastic and non-neoplastic tissues, such as mesenchymal chondrosarcoma, sex-cord stromal tumors, rete testis adenocarcinoma, lobular and ductal carcinoma of the breast, salivary glands, peribronchial submucosal glands, and Sertoli cells. We analyzed expression of two antibodies (mono and polyclonal) of NKX3.1 in a total of 63 non-neoplastic seminal vesicles. We used 52 resection materials (12 seminal vesicles without prostatic adenocarcinoma, 26 seminal vesicles with prostatic adenocarcinoma infiltration, and 14 cases of seminal vesicles infiltrated by urothelial carcinoma) and 11 prostatic core needle biopsies with incidentally sampled fragment of seminal vesicles. In all cases, tissues from seminal vesicles were completely negative for NKX3.1, despite using polyclonal and monoclonal NKX3.1 antibodies, and regardless of the detection system utilized (diaminobenzidine (DAB) versus alkaline phosphatase (AF)). However, prostatic adenocarcinoma was negative in several cases (n = 6), when AF detection system was used. Reaction with DAB was strong and robust in all cases.

Based on our data, we can recommend NKX3.1 as a negative immunohistochemical marker of seminal vesicles.

Introduction

The diagnosis of prostatic adenocarcinoma is mostly based on morphology. Distinguishing the benign mimics from prostatic adenocarcinoma is of paramount importance, given an inaccurate diagnosis may result in inappropriate patient management and care. This is particularly important in limited tissue specimens such as needle core biopsy. In such scenarios, immunohistochemistry may play a crucial role in the diagnostic workup process. This is rather important in situations where the origin of detected malignancy is not entirely clear, requiring the utility of sensitive immunomarkers, elucidating prostatic, urothelial or other origin.

The antibody against NKX3.1 is a reliable marker of prostatic origin with high specificity and sensitivity. Due to its highly restricted expression in prostate epithelial cells, NKX3.1 is used as a diagnostic biomarker for prostate cancer and other metastatic lesions originating from the prostate. However, NKX3.1 expression has been reported in other tissues/tumors such as mesenchymal chondrosarcoma, *EWSR1–NFATC2* sarcoma, sex-cord stromal tumors (both testicular and ovarian), rete testis adenocarcinoma, lobular and ductal carcinoma of the breast (more commonly in lobular carcinoma), salivary glands, peribronchial submucosal glands, and Sertoli cells [[1], [2], [3], [4]]. Nonetheless, the staining pattern of NKX3.1 (nuclear) is a major benefit compared to PSA, which is expressed within cytoplasm and may sometimes be more challenging for interpretation, particularly in high grade tumors.

One of the most traditional and notorious diagnostic pitfalls in prostate pathology is the presence of seminal vesicles in prostatic core needle biopsy. Seminal vesicles can easily mimic prostatic adenocarcinoma and distinguishing it might be challenging. To the best of our knowledge, comprehensive studies dealing with the reactivity of NKX3.1 in seminal vesicles are currently missing. In this study, we examined the utility of NKX3.1 in non-neoplastic seminal vesicles tissue as a diagnostic tool in the differential diagnostic workup.

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