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Case Report

Ethmoidal Metastasis Revealing Occult Prostatic Adenocarcinoma with Neuroendocrine Differentiation: A Diagnostic Pitfall in Sinonasal Pathology — Case Report

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Abstract: Sinonasal metastases from prostatic adenocarcinoma are exceptional and may represent a major diagnostic challenge, particularly in the presence of neuroendocrine differentiation. Ethmoidal involvement is especially rare and may mimic a primary sinonasal malignancy clinically, radiologically, and histologically. We report the case of an elderly man presenting with sinonasal symptoms related to a destructive ethmoidal mass. Histopathological examination revealed an infiltrative malignant proliferation composed of irregular glandular structures associated with a focal neuroendocrine component arranged in solid nests and trabeculae. Tumor cells displayed enlarged nuclei with conspicuous nucleoli. Immunohistochemically, tumor cells were negative for CK7 and CK20, while Prostein expression supported a prostatic origin. Synaptophysin and chromogranin were positive within the neuroendocrine component. Subsequent prostate biopsies confirmed the diagnosis of prostatic adenocarcinoma with neuroendocrine differentiation. This case highlights the importance of integrating morphology, immunohistochemistry, and clinicoradiological findings when evaluating unusual sinonasal tumors. Metastatic prostate carcinoma should be considered in destructive sinonasal lesions occurring in elderly men, even in the absence of a known prostatic malignancy.

Keywords: Ethmoidal Metastasis, Prostatic Adenocarcinoma, Neuroendocrine Differentiation, Sinonasal Tumor, Prostein, Immunohistochemistry.

INTRODUCTION

Prostatic adenocarcinoma rarely metastasizes to the paranasal sinuses, and ethmoidal involvement remains exceptional [1, 2]. Because of their nonspecific clinical and radiological presentation, these lesions may mimic primary sinonasal malignancies, creating a significant diagnostic challenge for both clinicians and pathologists [2-8]. In addition, neuroendocrine differentiation in prostate carcinoma is associated with aggressive behavior and may alter the conventional immunophenotype, further complicating the diagnostic approach [5–7]. We report a rare case of ethmoidal metastasis revealing an occult prostatic adenocarcinoma with neuroendocrine differentiation, highlighting the importance of morphologic and immunohistochemical correlation in unusual sinonasal tumors.

CASE PRESENTATION

A 71 year old man presented with progressive nasal obstruction associated with facial pain and recurrent epistaxis. Radiological investigations revealed a destructive ethmoidal mass with local extension, initially suggestive of a primary sinonasal malignancy. No previous history of prostatic malignancy was known at presentation.

Histopathological examination of the ethmoidal biopsy showed an infiltrative malignant proliferation composed predominantly of irregular glandular

structures embedded within a fibrous stroma. Tumor cells displayed moderate eosinophilic cytoplasm and enlarged nuclei with conspicuous nucleoli (Fig. 1). Focally, a second component arranged in solid nests and trabeculae with neuroendocrine morphology was identified (Fig. 2).

Given the unusual sinonasal location and the poorly differentiated appearance of the lesion, a broad immunohistochemical panel was initially performed. Tumor cells were negative for EMA, progesterone receptors, CD138, TTF1, p40, PAX8, p63, CK7, and CK20. Diffuse cytoplasmic Golgi-like staining with Prostein supported a prostatic origin (Fig. 3). Synaptophysin and chromogranin showed positive staining within the neuroendocrine component (Fig. 4).

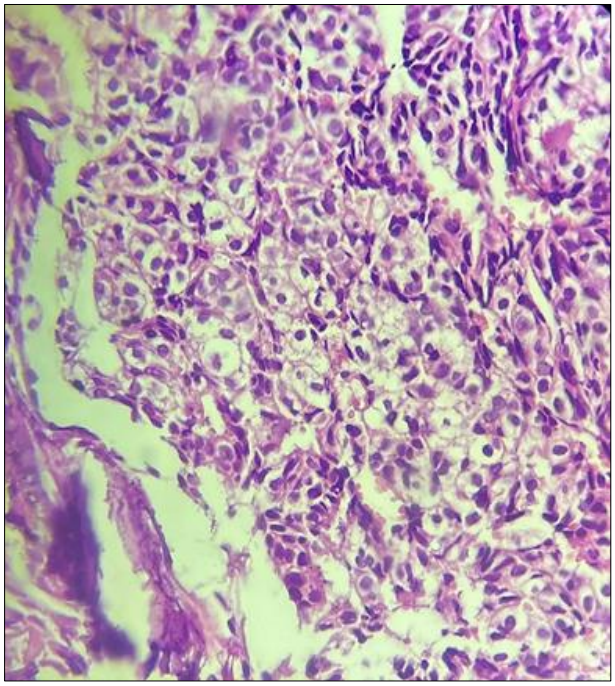

Figure 1: Ethmoidal biopsy showing an infiltrative glandular proliferation embedded within a fibrous stroma (H&E, ×100)

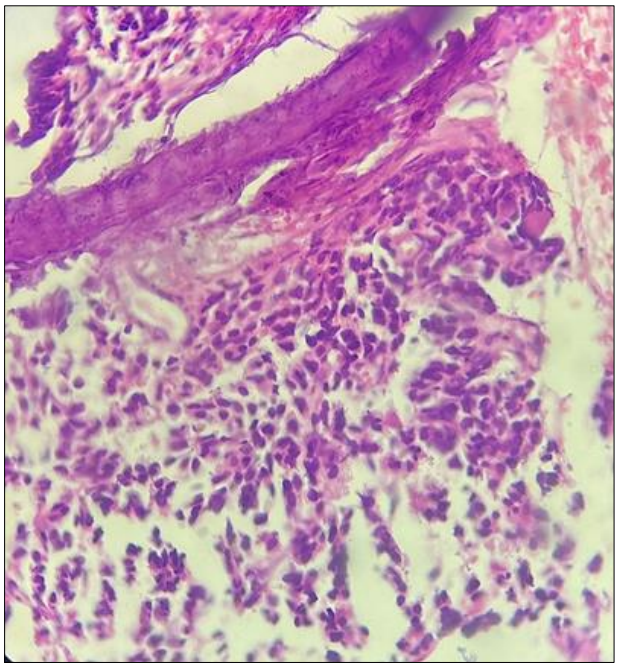

Figure 2: Focal neuroendocrine component arranged in solid nests and trabeculae within the ethmoidal lesion (H&E, ×100)

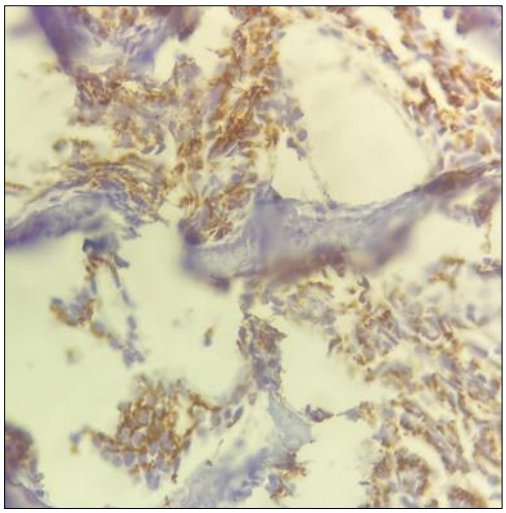

Figure 3: Diffuse cytoplasmic Golgi-like Prostein expression supporting prostatic differentiation

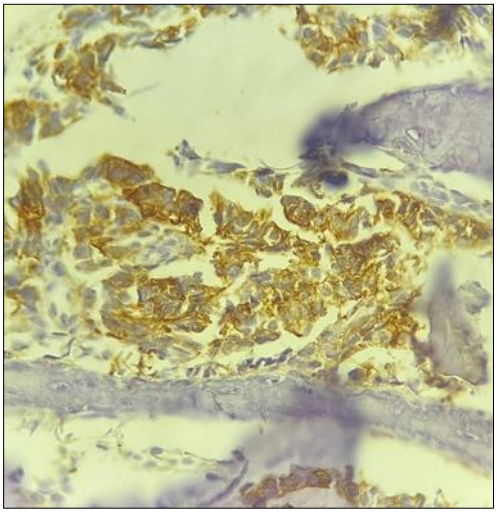

Figure 4: Synaptophysin and chromogranin positivity within the neuroendocrine component of the ethmoidal lesion

Subsequent prostate biopsies revealed an infiltrating prostatic adenocarcinoma displaying similar morphological features with prominent nucleoli (Fig. 5). Focal neuroendocrine differentiation identical to that observed in the ethmoidal lesion was also identified on prostate biopsies (Fig. 6), confirming the diagnosis of ethmoidal metastasis from a prostatic adenocarcinoma with neuroendocrine differentiation.

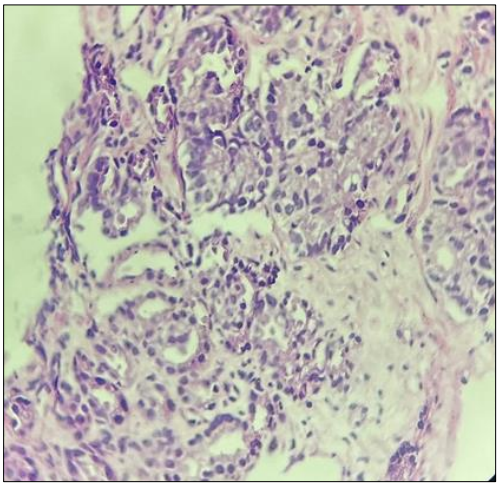

Figure 5: Prostate biopsy showing infiltrating prostatic adenocarcinoma with prominent nucleoli (H&E, ×200)

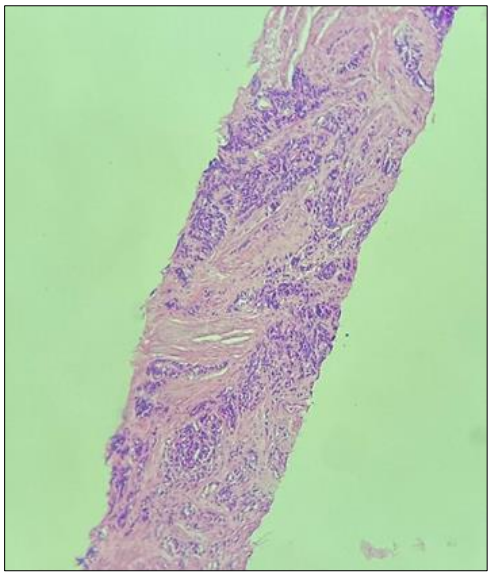

Figure 6: Focal neuroendocrine differentiation identified on prostate biopsy, similar to the ethmoidal lesion (H&E, ×40)

DISCUSSION

Metastases to the sinonasal tract are uncommon and account for a very small proportion of sinonasal malignancies. Renal cell carcinoma represents the most frequent primary tumor metastasizing to this region, whereas prostatic adenocarcinoma remains an exceptional cause [1]. Ethmoidal involvement is particularly rare, with only isolated cases reported in the literature [1-8]. Owing to their nonspecific clinical and radiological presentation, sinonasal metastases are frequently mistaken for primary head and neck malignancies at initial evaluation [2-8].

The spread of prostatic carcinoma to the craniofacial region is thought to occur mainly through the valveless vertebral venous plexus described by Batson, allowing retrograde hematogenous dissemination from the pelvic venous system to the skull base and paranasal sinuses [3]. Clinical manifestations are variable and may include nasal obstruction, epistaxis, facial pain, orbital symptoms, or cranial nerve involvement depending on local extension [1, 2].

Histopathological diagnosis may be particularly challenging in small biopsies and unusual metastatic sites. In the present case, the lesion initially raised the differential diagnosis of a primary sinonasal malignancy, including intestinal-type adenocarcinoma, sinonasal neuroendocrine carcinoma, olfactory neuroblastoma, and metastatic renal cell carcinoma. Intestinal-type adenocarcinoma represents an important differential diagnosis because of its gland-forming architecture and frequent ethmoidal localization [4]. The infiltrative glandular proliferation with prominent nucleoli strongly suggested metastatic prostatic adenocarcinoma; however, the associated neuroendocrine component further complicated the diagnostic interpretation.

Neuroendocrine differentiation in prostate carcinoma is increasingly recognized and is associated with aggressive clinical behavior and therapeutic resistance [5–7]. Histologically, it may present as solid nests or trabecular proliferations expressing synaptophysin and chromogranin [5-7]. Di Sant'Agnese [9], first emphasized the diagnostic and prognostic implications of neuroendocrine differentiation in prostate carcinoma, while Bonkhoff [10], later demonstrated that neuroendocrine differentiation may occur focally within otherwise conventional acinar adenocarcinoma and contribute to tumor progression. Such differentiation may partially modify the conventional immunophenotype of prostate carcinoma, making diagnosis more challenging in unusual metastatic locations [5, 6].

Immunohistochemistry therefore played a crucial role in establishing the diagnosis. In our case, negative CK7 and CK20 staining argued against several primary sinonasal adenocarcinomas, whereas the absence of PAX8 and TTF1 expression made renal and pulmonary origins unlikely. Diffuse Prostein positivity represented a major clue supporting prostatic differentiation.

Correlation with subsequent prostate biopsies demonstrating identical morphological and neuroendocrine features definitively confirmed the diagnosis.

This case highlights the importance of considering metastatic prostate carcinoma in the differential diagnosis of destructive sinonasal tumors occurring in elderly men, even in the absence of previously known prostatic malignancy. Careful integration of morphology, immunohistochemistry, and clinicoradiological findings remains essential for

accurate diagnosis in these rare and diagnostically challenging lesions.

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