Case Report

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Pathology Section

Metastatic Prostatic Acinar Adenocarcinoma Presenting as a Penile Malignant Tumour: A Case Report

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ABSTRACT

Penile metastasis from occult prostatic acinar adenocarcinoma is extremely rare and has been described in only a few case reports in the literature. The incidence of metastasis from known prostatic adenocarcinoma to the penis is less than 0.3%. The present case report involves a 72-year-old man presented with a hard penile mass measuring 2×1.5×1 cm for three months. He also reported lower urinary tract symptoms, two or three episodes of haematuria, anorexia, weight loss, and low back pain. A wedge biopsy of the penile mass was initially reported as adenosquamous carcinoma. Contrast-Enhanced Computed Tomography (CECT) revealed a heterogeneously enhancing, irregular distal penile lesion measuring 2×1.5×1 cm. Mild prostatomegaly measuring 36 cc was noted. Serum Prostate-Specific Antigen (PSA) level was 34 ng/mL. Three weeks later, the patient developed acute urinary retention, and the PSA level increased to 54 ng/mL. Total Penectomy and Transrectal Ultrasound (TRUS) guided biopsy of the prostate were performed. Histopathology revealed prostatic adenocarcinoma with a Gleason score of 8 (4+4), corresponding to Grade Group 4, while the penectomy specimen showed metastatic prostatic adenocarcinoma. Immunohistochemistry (IHC) demonstrated strong positivity for NK3 homeobox 1 (NKX3.1) and PSA, confirming the prostatic origin of the penile lesion. Unlike the present case, most reported patients with penile metastasis from prostatic adenocarcinoma have a known history of prostate cancer diagnosed years before the appearance of penile lesions. Presentation of occult prostatic carcinoma as a primary penile malignant tumour is highly unusual. Thorough clinical evaluation of the prostate in patients with genitourinary malignancies is therefore essential, particularly in the presence of elevated PSA levels.

Keywords: NKX 3.1, Occult malignancy, Penile mass, Prostatic carcinoma, Prostate-specific antigen

CASE REPORT

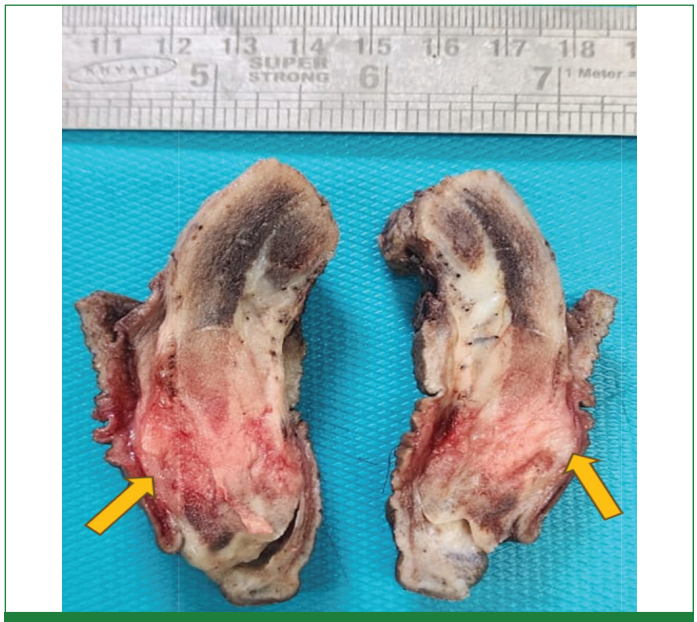
A 72-year-old man presented to the Outpatient Department with a painless penile mass measuring 2×1.5×1 cm for three months. The patient also complained of lower urinary tract symptoms, two or three episodes of haematuria, low back pain, anorexia, and weight loss. No inguinal lymphadenopathy was detected on physical examination. Haematological and biochemical investigations were within normal limits except for mild anaemia (haemoglobin 8 g/dL). Serum creatinine was 1.29 mg/dL (normal range: 0.7-1.3 mg/dL), and Blood Urea Nitrogen (BUN) was 40 mg/dL (normal range: 6-24 mg/dL).

CECT of the abdomen and pelvis revealed a heterogeneously enhancing lesion measuring 2.6×2.2 cm involving the distal penis. The urinary bladder showed features of cystitis, and mild prostatomegaly measuring 36 cc was noted. Serum PSA level was 34 ng/mL. A wedge biopsy of the penile mass was performed and reported as adenosquamous carcinoma.

Three weeks later, the patient developed acute urinary retention, and PSA levels rose to 54 ng/mL. A total penectomy with Blandy perineal urethrostomy and TRUS-guided biopsy of the prostate were performed and submitted for histopathological examination.

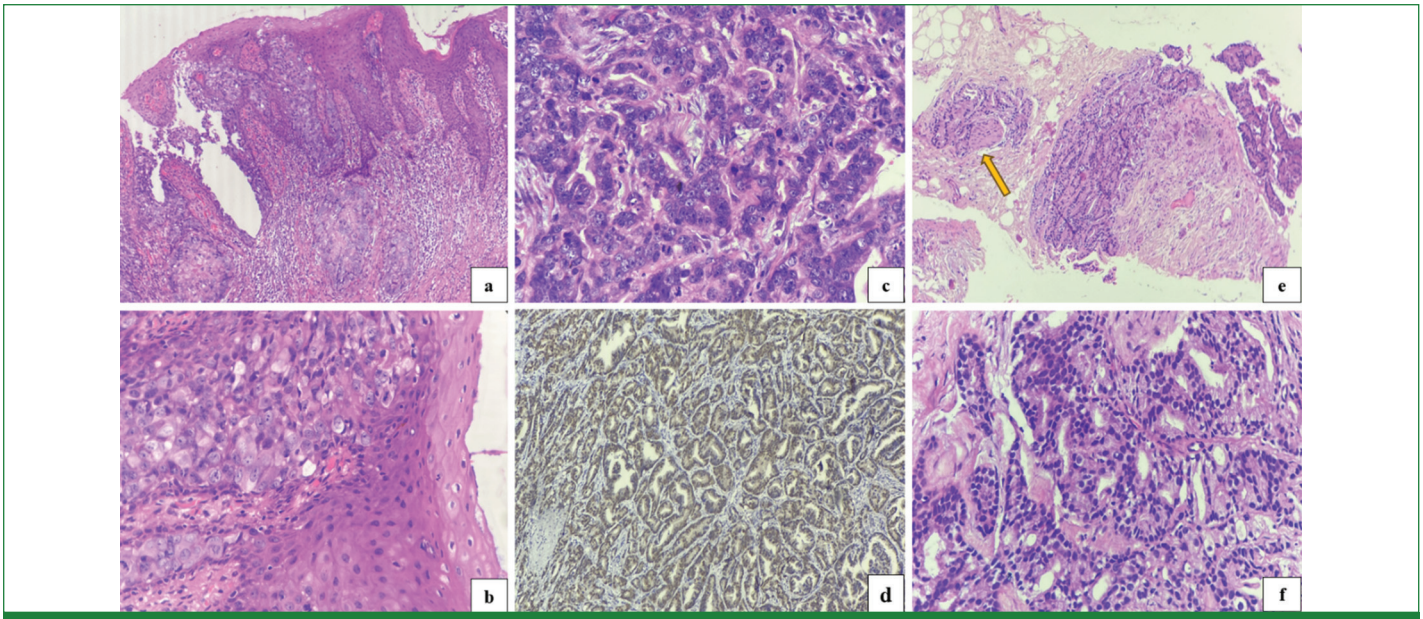
The TRUS biopsy showed prostatic adenocarcinoma with a Gleason score of 8 (4+4), Grade Group 4. The tumour involved the base, middle zones, and left-side of the prostatic apex. Histologically, the tumour displayed fused glandular and cribriform patterns, with individual tumour cells showing nucleomegaly, prominent nucleoli, and amphophilic cytoplasm. A focus of perineural invasion was identified, and tumour infiltration of periprostatic ganglia was observed.

The penectomy specimen measured 7×3×2.5 cm and had an unremarkable external surface. On sectioning, a poorly defined grey-white tumour measuring 2×1.5×1 cm was noted involving the glans and shaft. The tumour extended to the inner surface of the prepuce and involved the distal urethra [Table/Fig-1].



[Table/Fig-1]: Cut-section of the total penectomy showing a 2×1.5×1 cms grey-white tumour involving the glans, shaft, urethra and extending to the prepuce (Arrows show the tumour)

Microscopic examination revealed high-grade adenocarcinoma composed of fused complex glands with pleomorphic nuclei and prominent nucleoli. Tumour infiltration into the overlying squamous epithelium was present. Given the concurrent prostatic adenocarcinoma, IHC studies were performed. NKX3.1 showed strong diffuse nuclear positivity, and PSA demonstrated strong



[Table/Fig-2]: (a) Penile biopsy showing malignant glands in the subepithelial tissue which also invade the overlying squamous epithelium (H&Ex100); (b) Infiltration of the overlying squamous epithelium by sheets of malignant epithelial cells (H&Ex400); (c) High power view of the tumor showing focal glandular pattern. Individual tumor cells show markedly pleomorphic nuclei, prominent nucleoli, and brisk mitosis (H&Ex400); (d) Immunohistochemistry (IHC) with NKX 3.1 showing strong nuclear positivity in the malignant cells, proving a prostatic origin (NKX 3.1x100); (e) TRUS biopsy of prostate showing prostatic acinar adenocarcinoma with a fused glandular pattern. Tumor surrounding a periprostatic ganglion (arrow) (H&Ex100); (f) TRUS biopsy of prostate showing prostatic acinar adenocarcinoma, Gleason score 8 (4,4)/Grade Group 4. Fused glandular pattern/cribriform pattern seen (H&Ex400). H&E: Haematoxylin and Eosin

diffuse cytoplasmic positivity [Table/Fig-2]. Cytokeratin 7 (CK7), Cytokeratin 20 (CK 20), and Caudal Type Homeobox 2 (CDX2) were negative, confirming the prostatic origin of the penile tumour. A final diagnosis of metastatic prostatic acinar adenocarcinoma to the penis was made.

The patient subsequently underwent bilateral orchidectomy, which revealed benign testes with hypospermatogenesis.

Fluorodeoxyglucose Positron Emission Tomography (FDG-PET) showed diffuse FDG uptake in an enlarged prostate measuring 4×3.6×4 cm (SUVmax 6.64), along with multiple sclerotic skeletal metastases. Non-FDG-avid lymph nodes were observed in the abdomen and pelvis.

Prostate-Specific Membrane Antigen (PSMA) PET scan demonstrated diffuse intermediate-grade uptake in the prostate (4 × 4 × 3.6 cm; SUVmax 8.20). Intermediate uptake was also noted in bilateral superficial inguinal lymph nodes with preserved hila (SUVmax 8.70) and para-aortic lymph nodes (SUVmax 5.96). The patient was subsequently referred for chemotherapy.

DISCUSSION

Penile metastasis from occult prostatic acinar adenocarcinoma is extremely rare and has been described in only a few case reports in the literature. Patients with metastasis of prostatic adenocarcinoma to the penis usually present late in the course of the disease and often have widespread metastases at the time of diagnosis [1]. Most of these patients have a history of prostatic carcinoma diagnosed several years earlier [2-5]. However, it is highly unusual for patients to present initially with penile metastasis, leading to subsequent detection of a primary prostatic malignancy [4,6]. Simultaneous presentation of penile and prostatic adenocarcinoma has been reported in a few cases [7,8].

The incidence of penile metastasis from prostatic adenocarcinoma is difficult to establish but is estimated to be less than 0.3% [9]. Penile metastasis usually occurs in advanced stages of the disease, and 41-80% of affected patients die within six months of diagnosis [10].

Urogenital malignancies are the most common tumours to metastasise to the penis, followed by gastrointestinal tract cancers [11]. Metastases from prostate carcinoma account for approximately 34%, while those from bladder carcinoma account for about 30% [12]. Penile metastases typically involve the central portions of the corpus cavernosum or corpus spongiosum, in contrast to primary penile lesions, which most commonly affect the glans [3,13]. The anatomical distribution of metastatic penile lesions is reported as follows: penile root (38.8%), shaft (38.8%), and glans (22.2%). Isolated involvement of the foreskin is extremely rare [14].

Penile metastasis may be asymptomatic or may present as a penile nodule, priapism, erythematous lesion, dysuria, haematuria, or urinary retention [2,6,8,11]. The precise mechanism of penile metastasis remains unclear; proposed pathways include retrograde venous flow, direct extension, tumour implantation, haematogenous spread, and lymphatic dissemination [4,6,7].

Ultrasonography typically demonstrates hypoechoic or heterogeneous nodules within the corpora cavernosa or spongiosum, often with increased vascularity [8-10]. Magnetic resonance imaging is the most reliable imaging modality for evaluating penile lesions, characteristically showing nodules of low signal intensity on T1- and T2-weighted images with post-contrast enhancement. However, histopathological examination with IHC remains the gold standard for diagnosis. Positivity for NKX3.1 and PSA confirms prostatic origin, as observed in the present case [6,9-11].

Management usually includes partial or total penectomy, combined with chemotherapy and/or radiotherapy. Hormonal therapy or surgical orchidectomy is employed for control of the primary prostatic carcinoma.

CONCLUSION(S)

Most patients with metastatic acinar adenocarcinoma of the prostate involving the penis have a prior history of prostate cancer diagnosed several years before the development of penile metastasis. Presentation of occult prostatic adenocarcinoma as a penile malignant tumour is exceptionally rare. Thorough clinical evaluation of the prostate in patients presenting with genitourinary malignancies is essential, particularly in the presence of elevated PSA levels.

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