

## BRIEF ARTICLE

**Cutaneous Prostate Adenocarcinoma Masquerading as Cellulitis**

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**ABSTRACT**

Cutaneous metastases of prostate cancer are a rare entity and mimic many other common cutaneous conditions such as cellulitis, zosteriform lesions, and many others, making it easy to misdiagnose. Recognition of this condition is vital to prevent delays in treatment, as lesions usually appear in late stages of the disease and are associated with a high fatality rate. Here we describe a case of a 64-year-old man with a history of diffuse metastatic prostate carcinoma, who presented with a suprapubic rash that was initially diagnosed as cellulitis but was later determined to be cutaneous metastasis. Clinical characteristics of this metastasis and common dermal lesions with similar clinical presentations are discussed. Clinicians should be aware of the characteristics of this cutaneous metastasis and consider it when evaluating skin lesions that mimic soft tissue infections.

**INTRODUCTION**

Prostate cancer is the second leading cause of cancer deaths and accounts for approximately 211,893 new cancer cases per year, making it the most common malignancy in men.<sup>1</sup> Prostate cancer frequently metastasizes to nearby lymph nodes and bone, particularly the lumbar spine via the Batson plexus, a portal-like venous system between the prostate and lower vertebrae. Other common sites of hematogenous spread include the liver, lung, and pleura. Cutaneous metastases account for only  $\leq 0.36\%$  of known prostatic cancer metastasis cases, often localizing to the lower abdomen, thigh, and scrotal regions.<sup>2</sup> The case being presented describes a patient with a history

of metastatic prostate carcinoma who was evaluated for a suprapubic rash that was later diagnosed as a cutaneous metastasis.

**CASE REPORT**

A 64-year-old male with a history of metastatic prostate carcinoma presented to the emergency department for evaluation of a unilateral suprapubic rash of 2-week duration. The rash was asymptomatic, originating as a small nodular lesion that progressively enlarged and became erythematous and indurated. He was admitted for a presumed skin infection with initial therapy of broad-spectrum antibiotics. The patient was diagnosed with prostatic adenocarcinoma two years prior with an

initial PSA of 298. Computed tomography of the abdomen and pelvis at the time of diagnosis showed sclerotic lesions throughout the skeleton with prominent lymphadenopathy involving the retroperitoneum, bilateral iliac chains, and left groin consistent with metastatic disease. The patient received chemotherapy treatment after initial diagnosis. One month prior to rash presentation, magnetic resonance imaging of the brain revealed diffuse metastasis which was treated with whole brain radiation.

On examination, a non-tender, firm to hard erythematous plaque with overlying crust was noted along the right suprapubic region (**Figure 1**) with extension to the penile base. Penile and scrotal edema were noted. A punch biopsy was obtained from the lesion. Histopathology revealed metastatic adenocarcinoma of prostate origin with evidence of lymphovascular invasion (**Figure 2**). Staining was positive for cytokeratin AE1/AE3 and NKX 3.1 (**Figure 3**). A diagnosis of cutaneous metastasis of prostatic adenocarcinoma was made based on these findings.

## DISCUSSION

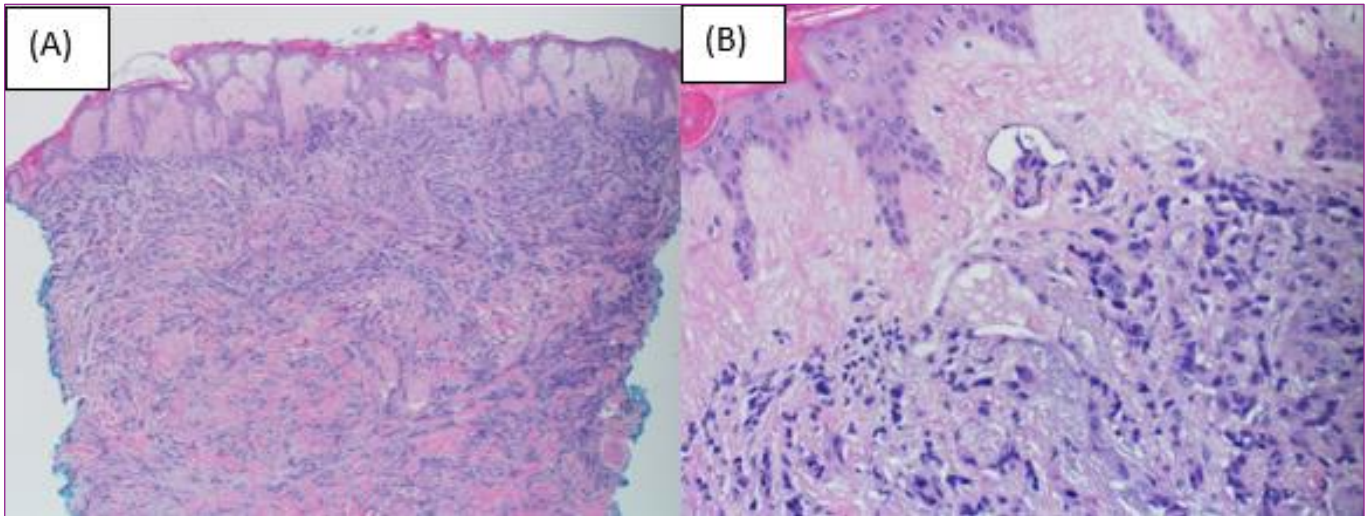
Cutaneous metastases of prostate cancer are rare and frequently mimic other conditions such as cellulitis, sebaceous cysts, telangiectasias, zosteriform lesions, lipomas, and furuncles/carbuncles, and frequently are misdiagnosed leading to inappropriate antibiotic treatment.<sup>3</sup> Breast cancer is the most common form of malignancy to metastasize to the skin, whereas prostate cancer is the least likely.<sup>4</sup> It is critical to consider cutaneous metastasis as a differential diagnosis to prevent delayed treatment. Cutaneous metastases tend to appear in later stages of the disease and many patients pass away within one year of

occurrence.<sup>2</sup> Additionally, cutaneous metastasis can be the first indication of extranodal metastatic disease, potentially appearing before an internal malignancy is detected.<sup>5</sup>

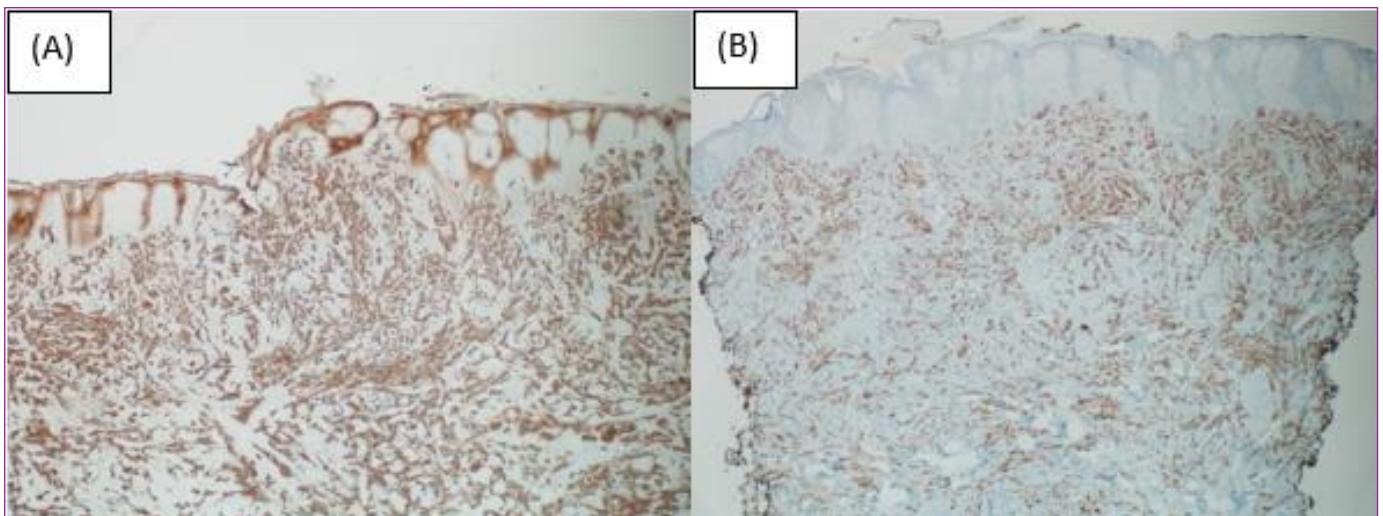


**Figure 1.** Clinical image of lesion illustrating a firm erythematous and indurated plaque with some overlying crust.

The gross appearance of prostatic adenocarcinoma metastasis is inconsistent, and patients may report pain to no symptoms at all.<sup>2</sup> The metastasis typically presents as several rubbery pink to violaceous nodules, indurated plaques with a peau d'orange appearance, or telangiectatic plaques but can also appear as edema or a generalized rash.<sup>2,5</sup> To distinguish metastasis from other dermatological conditions, the lesion(s) should be biopsied and histologically examined. Specimens should be stained with immunohistochemical markers to aid in diagnosis. The tumor suppressor gene, NKX3.1 has been shown to be highly sensitive (98.6%) and specific (99.7%) for metastatic prostate adenocarcinoma.<sup>6</sup> Cytokeratin AE1/AE3 is a marker for epithelial differentiation in malignant tumors



**Figure 2. (A)** Medium power view of a punch biopsy of the lesion showing irregular epidermal hyperplasia and a conspicuous grenz zone with overlying infiltrate arranged as strands and cords through a sclerotic dermis. **(B)** High power view displaying Lymphovascular invasion.



**Figure 3. (A)** Cytokeratin AE1/AE3 immunostain is strongly positive within the neoplastic infiltrate supporting epithelial origin. **(B)** NKX3 immunostain highlighting the malignant cells strongly supporting a diagnosis of metastatic adenocarcinoma.

that are not well differentiated and can help offer insight on tumor behavior.<sup>7</sup> Staining for prostate specific membrane antigen (PSMA), a type-2 integral membrane protein may also be beneficial in diagnosis. However, PSMA can be present in both benign and malignant prostatic tissue and high PSMA expression does not necessarily indicate a highly aggressive tumor.<sup>8</sup> The tissue sample in the

presented case stained positive for PSMA but was omitted for this reason.

Utilizing palpation and tissue texture changes during the physical examination can aid in diagnosis. On deep palpation, skin metastases may feel tender, firm, indurated, and rope-like in texture<sup>9</sup>, these types of clinical signs suggest a need for further work-up. Palpation alone is often insufficient for



diagnosis, which is why skin biopsy and immunohistological evaluation is recommended.<sup>10</sup>

Cellulitis, an acute infection of the dermis and subcutaneous tissues commonly caused by *Staphylococcus aureus* or *Streptococcus* species infections, appears as an expanding, warm, tender, edematous and erythematous area without sharp borders.<sup>11</sup> As cellulitis is relatively common and clinical signs are not pathognomonic, it is frequently misdiagnosed leading to roughly 130,000 unnecessary hospitalizations every year.<sup>11</sup> The diagnosis relies solely on a clinician's ability to recognize cellulitis as there are no accurate laboratory or imaging tests at this time.<sup>11</sup> Data suggests that approximately 30% of cellulitis patients are misdiagnosed and receive unnecessary antibiotic treatment.<sup>12</sup>

A zosteriform pattern describes cutaneous lesions that are localized and distributed unilaterally within a dermatome, an area of skin corresponding to sensory nerves that all originate from a single nerve root.<sup>10</sup> The pattern is classically attributed to Herpes Zoster infections, which occur after recrudescence of Varicella-Zoster viral infections. This is frequently observed as a painful zosteriform pattern in a V-shape on the back or as a S-shape along the anterolateral aspect of the trunk.<sup>10</sup> Although cutaneous metastases of prostate cancer rarely present as zosteriform lesions, if this type of skin lesion is present for over 14 days, primary skin cancers and to a lesser extent, cutaneous metastases of internal malignancies, should be considered in the clinical differential. In a study of 15 cases of cutaneous zosteriform metastases, seven of the cases were initially misdiagnosed as a herpes zoster infection and treated with antiviral medications.<sup>10</sup>

## CONCLUSION

The variable presentation of cutaneous metastases of prostate cancer makes it difficult to diagnose, often resulting in delayed or improper treatment. As skin metastasis is a rare form of this malignancy and lesions may mimic other dermatologic conditions, this may be the basis for frequent misdiagnosis. To accurately distinguish cutaneous prostatic metastases from other conditions, a thorough history and physical exam focusing on palpation and tissue texture, combined with supportive diagnostics, can guide clinicians in differentiating malignancy from other benign skin conditions.

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