Squamous Cell Carcinoma of the Prostate: A Case Report and Brief Literature Review

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ABSTRACT

Squamous cell carcinoma (SCC) of the prostate is a rare and aggressive variant, accounting for only 0.5–1% of all prostate malignancies, and is associated with a poor prognosis. We present the case of an 80-year-old male who presented to the Urology Clinic in Harare, Zimbabwe, with symptoms of bladder outlet obstruction. A transurethral resection of the prostate (TURP) was performed. Histopathological examination revealed a malignant neoplasm with squamous differentiation, which was confirmed by immunohistochemistry to be consistent with pure SCC. This case highlights the importance of histopathological and immunohistochemical evaluation in diagnosing this rare entity, particularly in patients presenting with obstructive symptoms and a non-elevated prostate-specific antigen (PSA) level.

Keywords: squamous cell carcinoma, prostate cancer, rare variant, immunohistochemistry, case report

INTRODUCTION

Prostate cancer (PCa) is the most frequently diagnosed malignancy in men worldwide and represents the sixth leading cause of cancer-related mortality among men (García *et al*., 2024). Disparities in outcomes exist, with higher mortality rates observed in individuals of lower socioeconomic status, often attributable to later detection of the disease (Sekhoacha et al., 2022). While approximately 95% of PCa cases are classified as adenocarcinomas, the disease is known for its histological heterogeneity. The remaining 5% comprise rare variants that develop either independently from distinct cellular origins or via transdifferentiation from pre-existing prostatic adenocarcinoma (Arva & Das, 2011; Kılınç *et al.,* 2016).

Squamous differentiation in PCa is categorized into two primary forms: adenosquamous carcinoma (ASC) and pure squamous cell carcinoma (SCC). ASC is pathognomonic for the coexistence of squamous differentiation with glandular adenocarcinoma, whereas pure SCC is defined by the presence of squamous differentiation in the absence of any glandular components (Arva & Das, 2011).

The histogenesis of prostatic SCC remains a subject of debate. Several theories have been proposed, including an origin from the prostatic urethral urothelium, the transitional epithelium of the periurethral ducts, or the basal cells of the prostatic acini. Alternative theories suggest that SCC may arise from metaplastic changes in adenocarcinoma cells, the emergence of squamous elements from metastatic foci, or the differentiation of pluripotent stem cells (Arva & Das, 2011; Biswas *et al.*, 2015; Malik *et al*., 2011).

Pure SCC is exceptionally rare, constituting less than 1% of all prostatic malignancies (Lee, 2019). It is subclassified as primary, originating in the prostate gland itself, or secondary, resulting from metastatic spread from a non-prostatic primary site. Primary prostate SCC is uncommon, and the secondary form is rarer still, with very few cases reported globally (Chen *et al*., 2023). Notably, approximately half of all documented SCC

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cases arise following prior radiation or hormonal therapy for conventional adenocarcinoma, while the remainder develop *de novo* (Arva & Das, 2011).

The clinical presentation of prostate SCC differs markedly from that of adenocarcinoma. It often manifests with lower urinary tract symptoms (LUTS), including urinary retention, and is typically associated with a normal or low prostate-specific antigen (PSA) level, osteolytic (as opposed to osteoblastic) bone metastases, and may present at a younger age (He *et al*., 2021; Hutten et al., 2021). Consequently, histological diagnosis, supplemented by immunohistochemistry where appropriate, is crucial to distinguish this entity from the more common adenocarcinoma subtype (Biswas et al., 2015).

The diagnosis of pure SCC relies on the application of Mott's five criteria: 1) clearly malignant histological features, 2) definitive evidence of squamous differentiation (e.g., keratinization, squamous pearls, intercellular bridges), 3) absence of glandular or acinar components, 4) no history of prior estrogen therapy, and 5) exclusion of a primary squamous carcinoma elsewhere in the body (Arva & Das, 2011).

Case Presentation

An 80-year-old male presented to the urology clinic in Harare, Zimbabwe with a one-year history of progressive lower urinary tract symptoms, including dysuria and pelvic pain. Digital rectal examination revealed no remarkable abnormalities. Magnetic resonance imaging (MRI) demonstrated an enlarged, heterogeneous prostate gland. A subsequent computed tomography (CT) scan identified a positive obturator lymph node. The patient's serum prostate-specific antigen (PSA) level was 3.4 ng/mL.

A transurethral resection of the prostate (TURP) was performed to alleviate the obstruction. Histopathological examination of the resected tissue revealed a moderately differentiated squamous cell carcinoma. Subsequent immunohistochemical (IHC) analysis was conducted, which showed positive staining for p63 and pan-cytokeratin, and negative staining for uroplakin and PSA. This immunoprofile was consistent with the diagnosis of pure squamous cell carcinoma.

Figure 1: Histopathologic photomicrograph of the prostate SCC at 5X magnification with hematoxyllin stain

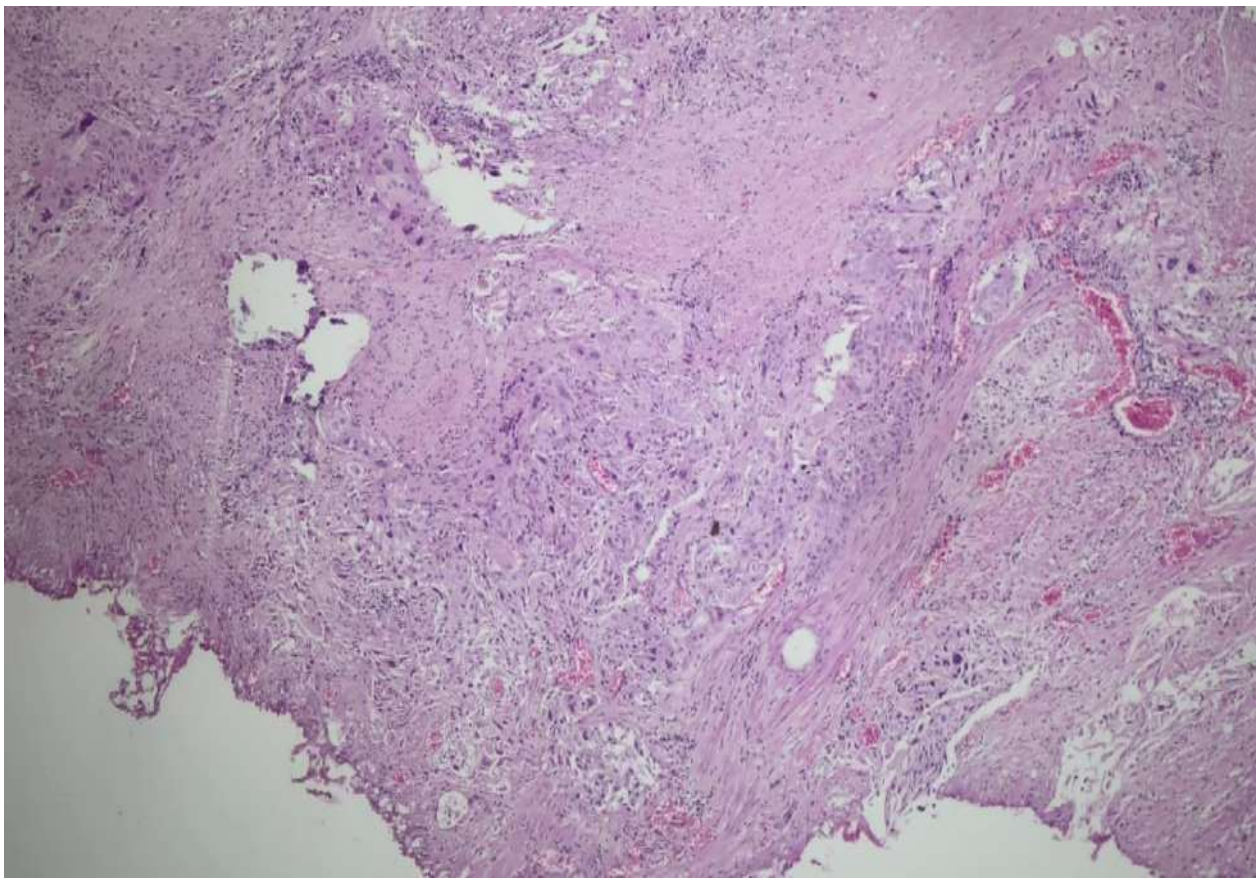

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Figure 2: Histopathologic photomicrograph of the prostate SCC at 10X magnification with hematoxyllin stain

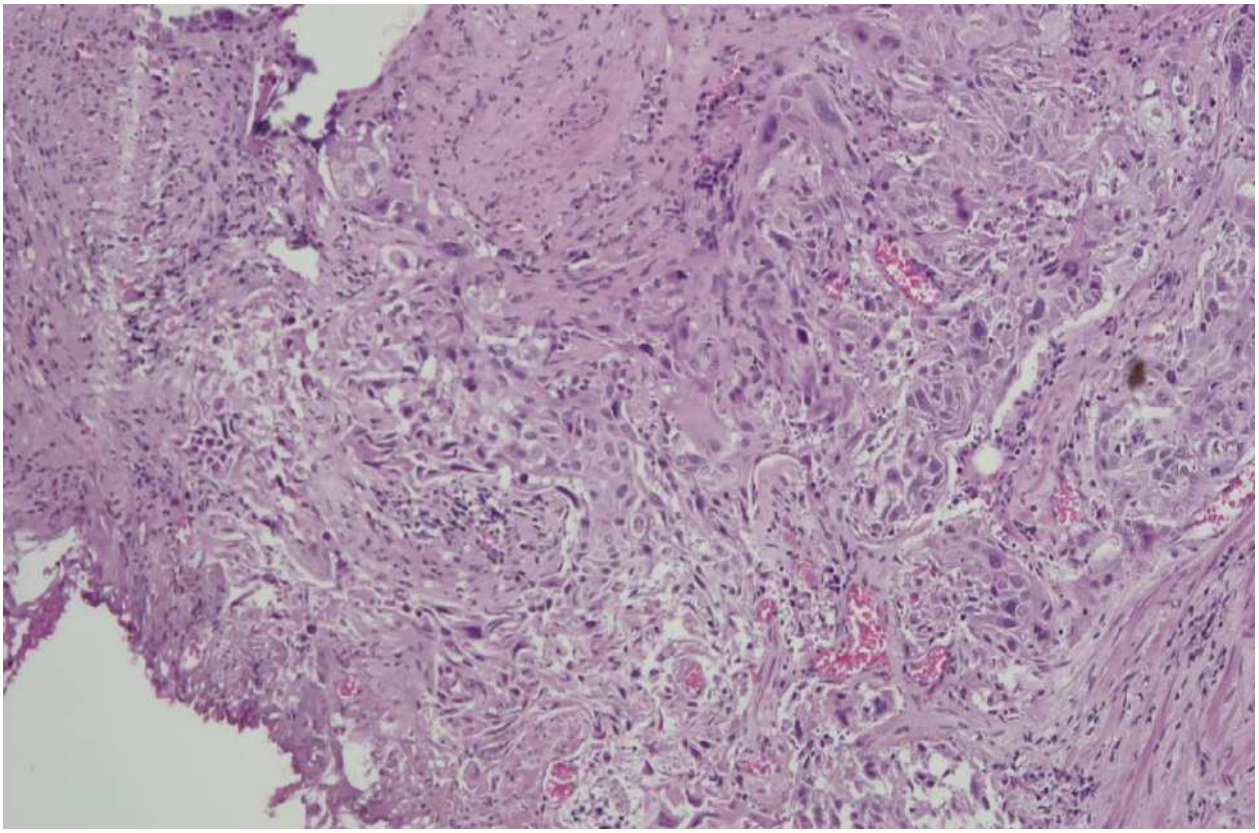

Figure 3: Histopathologic photomicrograph of the prostate SCC at 10X magnification with hematoxyllin stain

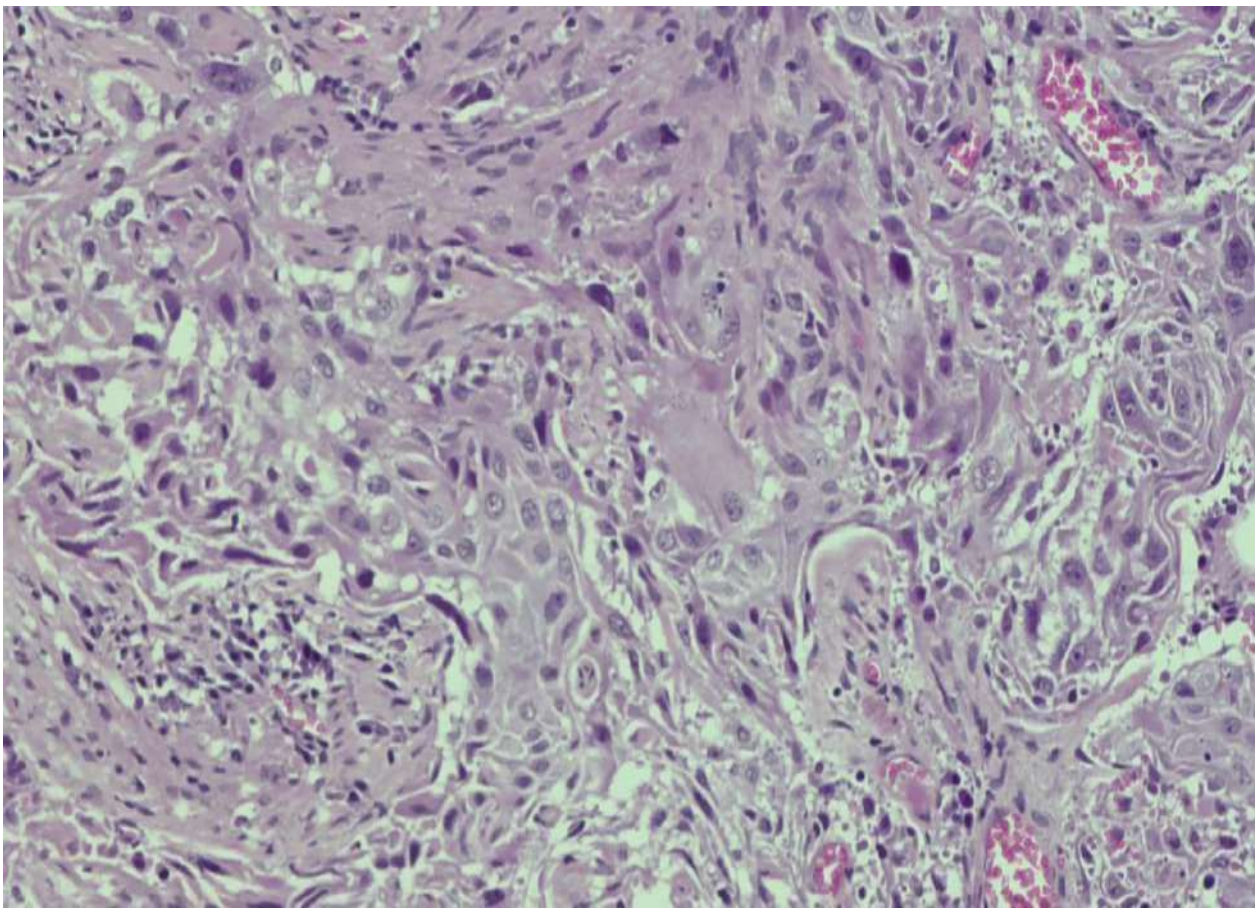

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Figure 4: Histopathologic photomicrograph of the prostate SCC at 20X magnification with P63 IHC showing diffuse positive nuclear staining

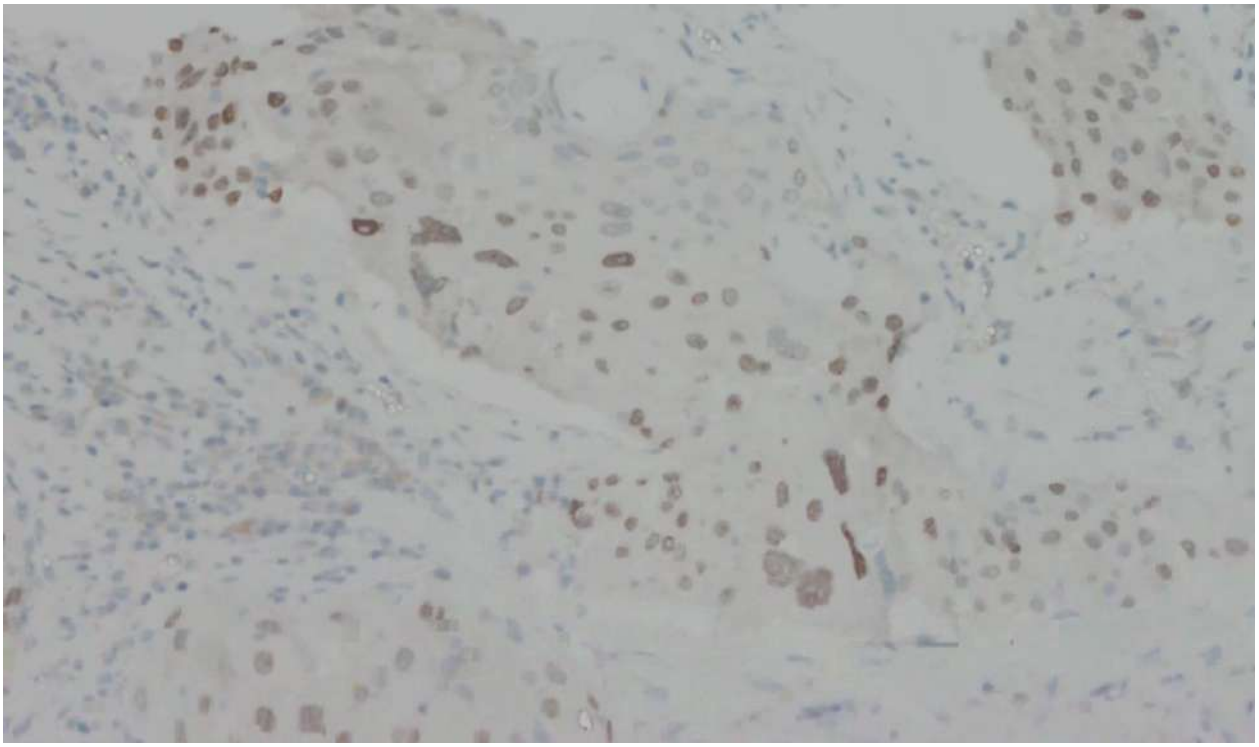

Figure 5: Histopathologic photomicrograph of the prostate SCC at 20X magnification with Pancytokeratin IHC showing positive cytoplasmic staining and membrane accentuation.

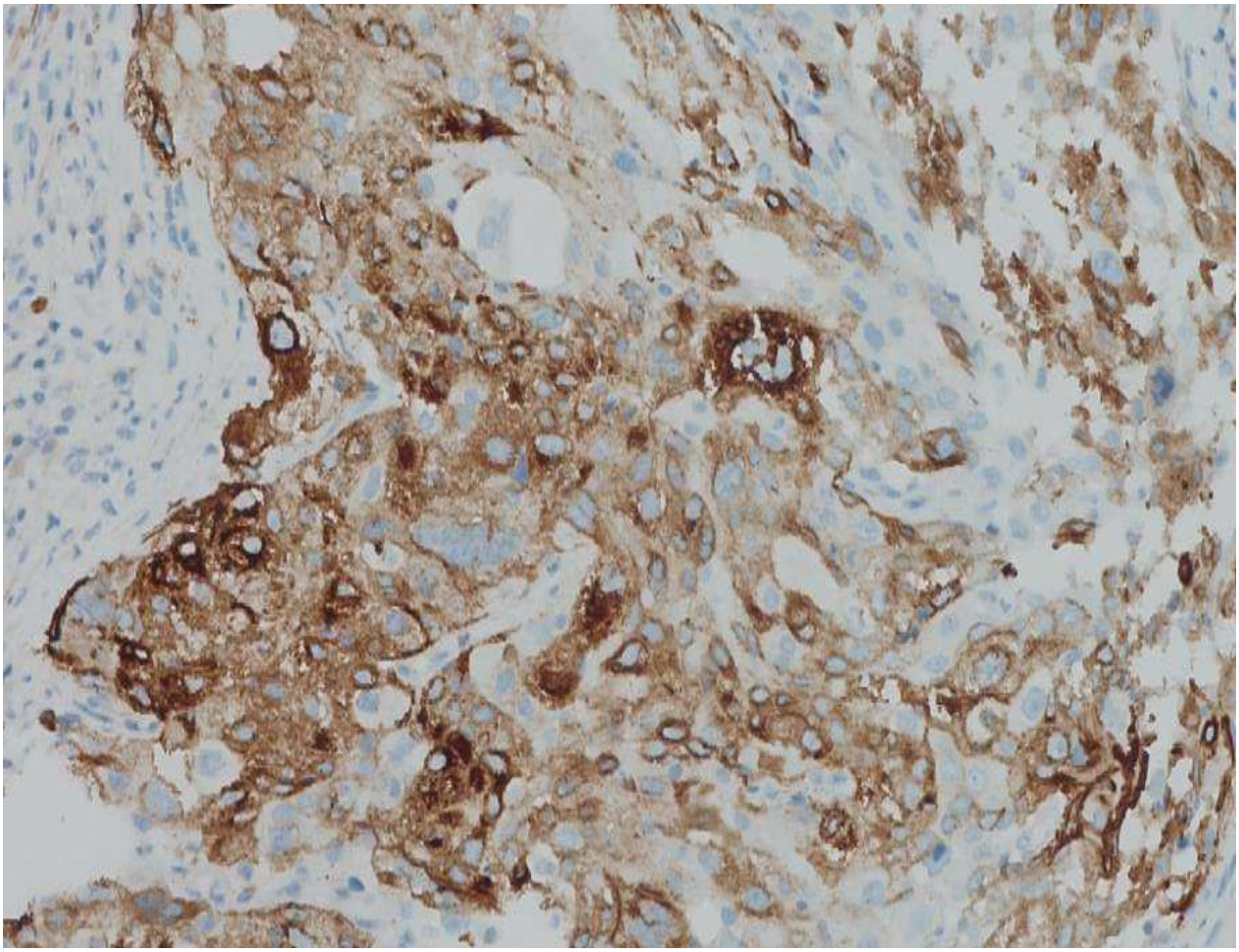

Figure 6: Histopathologic photomicrograph of the prostate SCC at 20X magnification with Uroplakin IHC

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showing negative staining

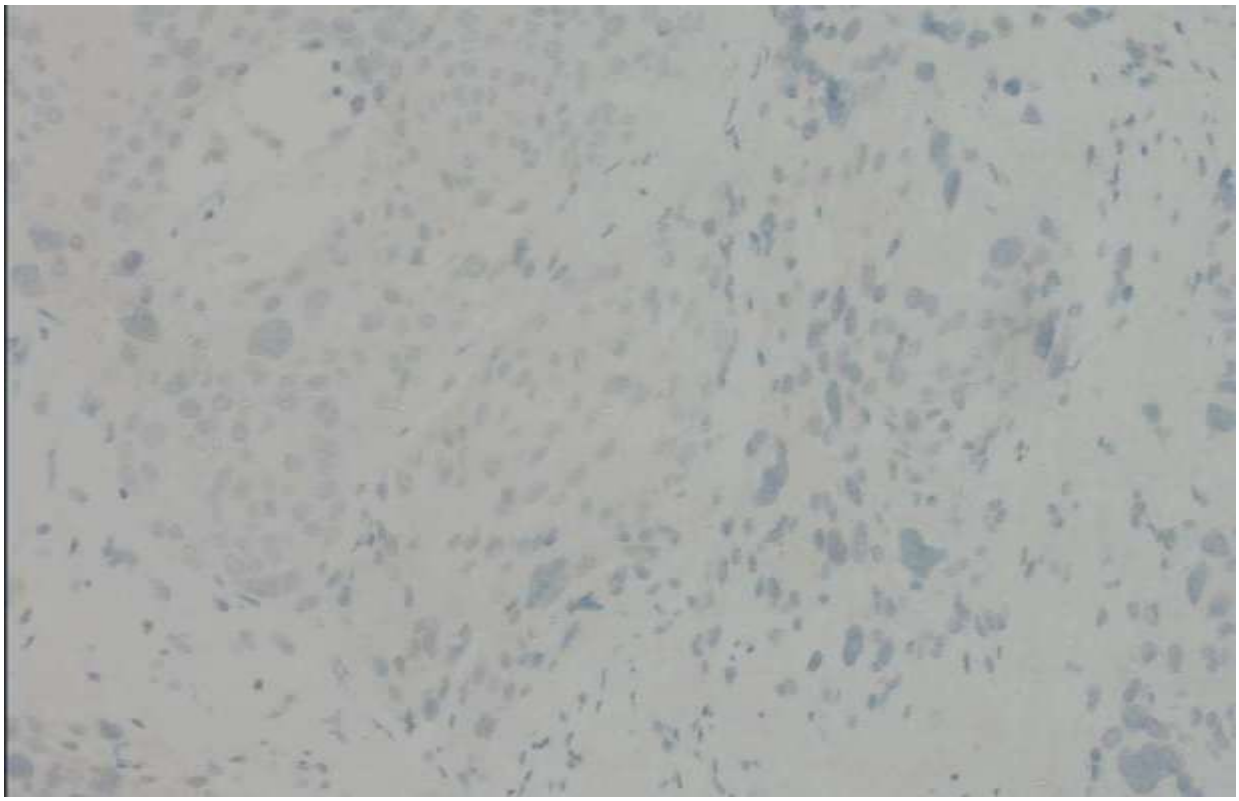
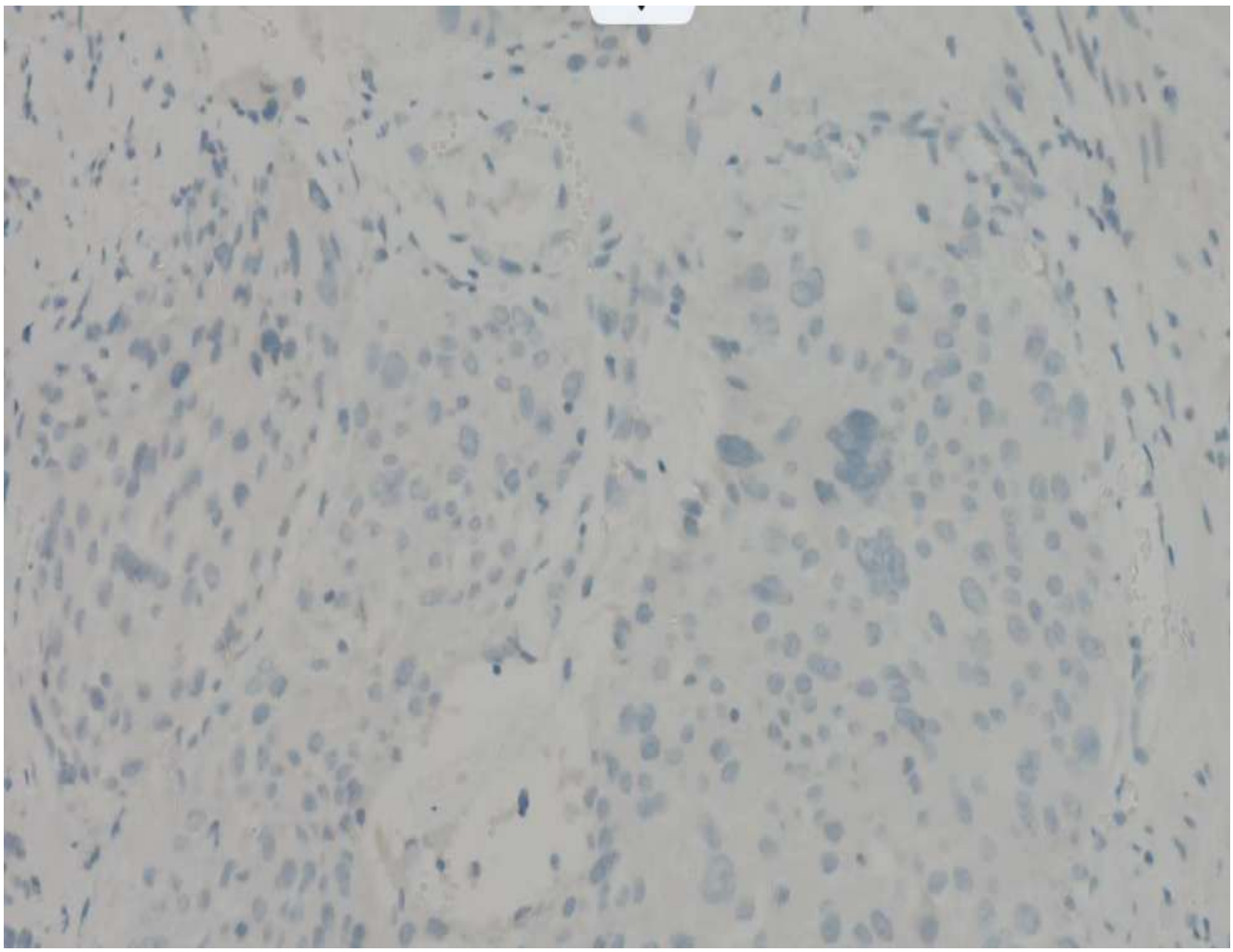


Figure 6: Histopathologic photomicrograph of the prostate SCC at 20X magnification with PSA IHC showing negative staining



DISCUSSION

Primary squamous cell carcinoma of the prostate is a rare tumor, accounting for only 0.5% to 1% of all prostate malignancies (He *et al*., 2021; Hutten et al., 2021; Kılınç *et al*., 2016). Since the first case was reported in 1926, fewer than 100 cases have been described in the literature, underscoring its rarity. The mean age at presentation is reported to be 59 years (range 52–79) (Biswas et al., 2015); our patient was notably older at 80 years of age, which expands the known demographic for this disease.

Clinically, prostate SCC typically presents with outlet obstruction symptoms, similar to other prostatic diseases (Kılınç *et al*., 2016), which aligns with our patient's presentation of progressive bladder outlet obstruction. A key diagnostic feature of SCC is its association with a normal serum PSA level, as exemplified by our patient's PSA of 3.4 ng/mL. This is pathophysiologically consistent with the theory proposed by Lager *et al.*, which posits that adverse stimuli cause the malignant cells to lose their secretory function for PSA and prostatic acid phosphatase while retaining their capacity for keratin production (Lager *et al*., 1988).

The diagnosis of pure SCC is formally established using Mott's five criteria (Arva & Das, 2011). Our case fulfilled all these criteria: histology confirmed a malignant invasive carcinoma with squamous differentiation (evidenced by keratinization and intercellular bridges) and an absence of glandular components. Furthermore, the patient had no history of estrogen therapy, and clinical evaluation ruled out a primary squamous cancer at another site.

While no single immunohistochemical marker is specific for SCC, the profile in this case strongly supports the diagnosis. The positivity for p63 and pan-cytokeratin, coupled with negativity for uroplakin and PSA, is characteristic. The negative uroplakin and PSA effectively help exclude urothelial carcinoma and prostatic adenocarcinoma, respectively. The CT finding of an involved obturator lymph node at presentation is consistent with the known aggressive behavior of primary prostate SCC, which is reported to spread locally to periprostatic tissues, bladder, and seminal vesicles, and to metastasize early to lymph nodes and bone (Kılınç et al., 2016; He *et al.,* 2021).

CONCLUSION

Primary squamous cell carcinoma of the prostate is a rare and distinct clinical entity that necessitates a comprehensive evaluation integrating clinical presentation, radiological findings, and detailed histopathological analysis for accurate diagnosis. Establishing a correct diagnosis is critical, as the therapeutic management and prognosis of SCC differ significantly from those of the more common prostatic adenocarcinoma. Histologically, it is essential to differentiate pure SCC from other prostatic conditions exhibiting squamous features, such as adenosquamous carcinoma and benign squamous metaplasia.

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