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CASE REPORT

A Rare Case of Primary Mucinous Adenocarcinoma of the Urinary Bladder

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Abstract

Globally, bladder cancer accounts for substantial cancer-related morbidity and mortality ranking in 9th position. Transitional cell carcinoma constitutes the majority of such cases, accounting for approximately 90–95%, while non-urothelial bladder cancers, comprising epithelial and non-epithelial subtypes, are relatively rare. Adenocarcinoma, one of the epithelial non-urothelial types, constitutes only 0.5–2% of all primary bladder cancers, and the mucinous subtype is extremely rare. In this article, we present a rare case of primary mucinous adenocarcinoma of the urinary bladder.

Keywords: Bladder cancer, Adenocarcinoma, Histopathology, Mucicarmine, CK7, CK20

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Introduction

Bladder cancer is one of the leading causes of cancer-related morbidity and mortality worldwide, primarily affecting the males of sixth and seventh decades. Epidemiologically, bladder cancer ranks within the top ten cancers worldwide. Bladder cancers can be broadly classified as either urothelial or non-urothelial based on histology. Nearly nine out of ten bladder cancers are of urothelial origin [1].

Non-urothelial bladder tumours represent a rare subset and are further divided into epithelial and non-epithelial tumors. Epithelial subtypes include squamous cell carcinoma, adenocarcinoma, and small cell carcinoma, while non-epithelial variants encompass rare entities such as sarcomas, paragangliomas, melanomas, and lymphomas. Among these, Adenocarcinoma forms a very small proportion of primary bladder malignancies, with the mucinous subtype representing a small fraction of these cases. Primary bladder adenocarcinoma (PBA) is most frequently diagnosed in individuals aged 5^{th}-6^{th} decade and may be associated with risk factors such as persistent urachal remnants, bladder exstrophy, and long-standing mucosal irritation resulting in glandular metaplastic changes [2].

Mucinous adenocarcinoma of the bladder is rare and often presents with nonspecific symptoms such as hematuria, dysuria, and suprapubic pain. Due to its poor response to chemotherapy and radiotherapy, surgical excision remains the most effective management. The diagnostic approach typically involves imaging, cystoscopy, urine cytology, and biopsy, followed by histopathological and immunohistochemical evaluation to differentiate it from secondary adenocarcinomas originating from the gastrointestinal tract [2].

Although it is histologically distinct from urothelial carcinomas, there is limited literature on the clinicopathological behavior, treatment strategies, and prognosis of mucinous PBA. Therefore, we report a rare case of primary mucinous adenocarcinoma of the bladder with atypical location involving the bladder dome and anterior wall to add to the existing body of literature on this subject [3].

Case Report

A 64-year-old male presented with complaints of suprapubic pain, dysuria, and haematuria for one month. He also had a chronic smoking history. On clinical examination, gross anaemia was noted. Local examination elicited suprapubic tenderness; however, no palpable abdominal mass was detected. On ultrasonography, a distended urinary bladder with an irregular mass measuring 5 × 3.4 cm involving the dome and anterior wall; (the third dimension could not be clearly assessed) was reported. Following appropriate diagnostic workup and multidisciplinary tumour board review, the patient underwent radical cystectomy. The resected specimen, sent for histopathological confirmation, consisted of a urinary bladder measuring 9 × 4 × 3 cm. On cut section, the bladder wall was markedly thickened and showed abundant gelatinous material along with a solid area measuring 3 × 2 cm (Figure 1).

Figure 1. Radical Cystectomy specimen showing large mucinous pools and solid area

Sections studied microscopically showed abundant extracellular mucin with pleomorphic floating signet ring cells arranged singly and in glandular patterns. The tumour cells also exhibited a high nuclear-to-cytoplasmic ratio and infiltrated the muscularis propria. The cells were characterized by eccentrically placed, hyperchromatic nuclei compressed by intracytoplasmic mucin vacuoles (Figure 2-5).

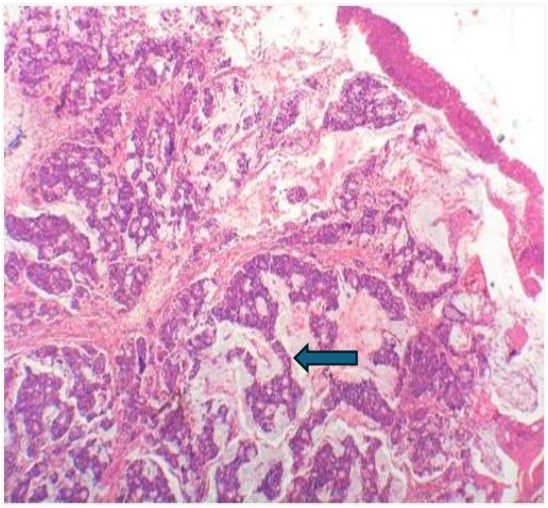

Figure 2. 4X H&E Pleomorphic tumor cells in glandular pattern and abundant mucinous pools

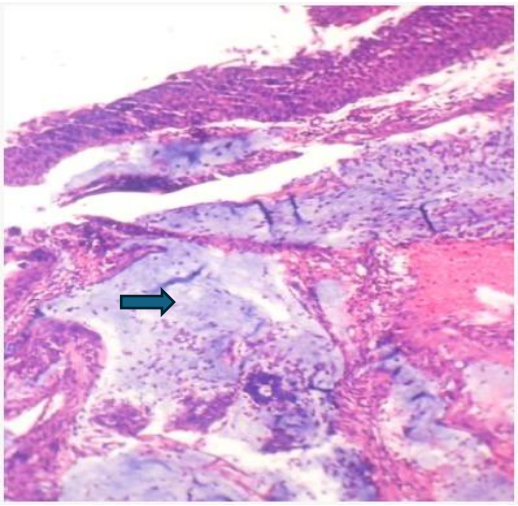

Figure 3. 10X H&E Abundant mucinous pools with floating tumor cells

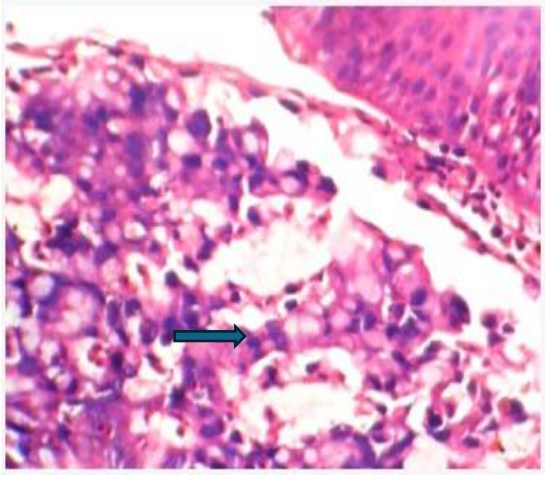

Figure 4. 40X H&E Mucin secreting pleomorphic tumor cells arranged in glandular pattern

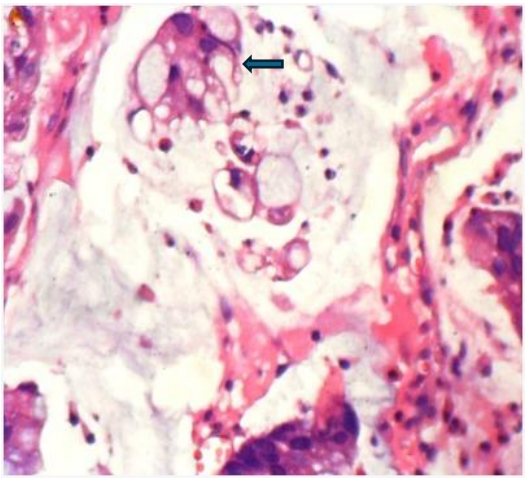

Figure 5. 40X H&E Large Mucinous pools with floating tumor cells

Considering the patient's age and the tumour location at the dome and anterior wall of the bladder, the differential diagnoses included primary mucinous adenocarcinoma of the bladder, urachal carcinoma, secondary bladder involvement from prostatic or colorectal adenocarcinoma, and metastatic mucinous adenocarcinoma from the gastrointestinal tract.

Special histochemical staining was performed in this case. Mucicarmine staining demonstrated strong positivity, highlighting abundant extracellular mucin pools as well as intracytoplasmic mucin within the tumour cells. These findings confirmed the mucinous nature of the neoplasm. The presence of mucicarmine-positive material supported the diagnosis of mucinous adenocarcinoma and aided in differentiating it from other bladder malignancies, such as urothelial carcinoma with glandular differentiation, which typically lacks extensive mucin production. Immunohistochemical analysis showed the tumour cells to be positive for CK7 and CK20, while CDX2 and GATA3 were negative, further supporting the diagnosis of primary mucinous adenocarcinoma of the urinary bladder.

Discussion

Primary bladder adenocarcinoma is an infrequently diagnosed malignancy accounting for less than 2% of all bladder cancers. It is classified into three categories based on origin: primary, urachal, and metastatic. Among these, the mucinous variant is particularly rare. The tumour most commonly arises at the bladder base or urachal region, especially at the dome and anterior wall, and predominantly affects men in the sixth to eighth decades of life. The incidence is higher in schistosomiasis-endemic areas and in patients with bladder exstrophy [4].

Two principal mechanisms have been proposed for its pathogenesis: persistence of embryonal glandular remnants or glandular metaplasia of the urothelium secondary to chronic irritation, infection, or urinary stasis. Chronic conditions such as cystitis glandularis, recurrent urinary tract infections, and persistent urachal remnants are recognized precursors of malignant transformation.

Clinically, haematuria is the most frequent presenting symptom, often accompanied by dysuria, frequency, or suprapubic pain. Cystoscopic examination commonly demonstrates a solitary mass lesion, indistinguishable from urothelial carcinomas. Due to their deep infiltration, most cases present at stage T2 or T3 at diagnosis [5].

Morphologically, bladder adenocarcinomas exhibit diverse histological patterns: not otherwise specified, enteric type, signet ring cell, mucinous, clear cell, hepatoid, and mixed types. Most are well to moderately differentiated and produce variable amounts of mucin. Abundant extracellular mucin lakes are a hallmark of the mucinous subtype containing clusters of malignant epithelial cells, often with signet ring morphology. These features closely resemble metastatic colorectal adenocarcinoma, posing a diagnostic challenge [5].

Special stain particularly mucicarmine, serves as an important adjunct in confirming the mucinous nature of adenocarcinomas. Mucicarmine specifically stains epithelial mucins, producing a deep rose-pink coloration of intracellular and extracellular mucin pools. In mucinous adenocarcinoma of the

bladder, strong mucicarmine positivity highlights abundant mucin production by malignant epithelial cells, supporting the diagnosis and helping to differentiate it from urothelial carcinoma with glandular differentiation, which usually shows minimal or absent mucin staining [6].

Immunohistochemistry (IHC) is essential to confirm the primary origin. Primary bladder adenocarcinomas typically express CK7, CK20, and CEA, whereas metastatic colorectal carcinomas are CK20-positive, CK7-negative, and show nuclear β-catenin and CDX2 expression. Urothelial carcinomas with glandular differentiation produce less mucin and lack prominent signet ring cells, while PSA and GATA3 positivity support prostatic and urothelial origins, respectively [6].

Distinguishing between urachal and non-urachal adenocarcinomas is vital for management and prognosis. Urachal carcinomas, usually centred at the dome, have a relatively favourable prognosis and can be treated by partial cystectomy with en bloc urachectomy. Non-urachal tumours require radical cystectomy with pelvic lymph node dissection, as they tend to present at an advanced stage. The role of adjuvant therapy remains uncertain; limited evidence suggests modest benefit from postoperative radiotherapy, while chemotherapy has shown minimal survival improvement [7].

Conclusion

Primary mucinous adenocarcinoma of the bladder is a rare but distinct pathological entity that can mimic metastatic gastrointestinal malignancy both morphologically and immunohistochemically. Accurate diagnosis through clinicopathological and immunohistochemical correlation is essential, as prognosis and management differ markedly between primary, urachal, and secondary adenocarcinomas.

Limitations

Complete clinical details and follow-up data were unavailable for the patient. Immunohistochemistry was performed; however, the slides could not be retrieved at the time of manuscript submission.

Conflicts of interest

The authors declare that they do not have conflict of interest.

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Ethics committee approval

All ethical concerns including informed consent were addressed by the authors.

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