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Mucinous Appendiceal Adenocarcinoma Mimicking a Bladder Tumor: A Case Report

Maaz Khan[1], Nasir Khan[2], Abdul Haseeb[3,5*], Riaz Ahmed Khan[4]

[1] Postgraduate Resident Department of Urology, Institute of Kidney Diseases Peshawar, Pakistan.
[2] Assistant Professor, Department of Urology, Bacha Khan Medical Complex, Swabi, Pakistan.
[3] Postgraduate Resident Department of Urology, Institute of Kidney Diseases Peshawar
[4] Associate Professor Department of Urology, Institute of Kidney Diseases Peshawar
[5] The Operating Room Global (TORG).

***Corresponding Author:**
Dr. Abdul Haseeb
ahaseeb.dr@gmail.com
ORCID ID: 0000-0002-7942-4062

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ABSTRACT

Background: Appendiceal mucinous adenocarcinoma is a rare malignancy with nonspecific clinical manifestations, making early diagnosis challenging. Most localized tumors are diagnosed incidentally following appendectomy, whereas advanced disease may present with fistula formation or involvement of adjacent organs.

Case Presentation: A 56-year-old nonsmoking male with no significant comorbidities presented with dysuria, gross hematuria with passage of amorphous clots for six months, and pneumaturia for three months. He denied abdominal pain, melena, or bowel obstruction symptoms.

Clinical Findings and Investigations: Urinalysis revealed numerous red blood cells and pus cells, while urine culture grew Escherichia coli. Ultrasonography demonstrated a solid mass along the right lateral bladder wall with extravesical extension. Following treatment of urinary tract infection, cystoscopy revealed a mucin-covered tumor involving the right lateral and anterior bladder walls with evidence of fistula formation. Histopathological examination of cystoscopy biopsy demonstrated mucinous adenocarcinoma of appendiceal origin. Colonoscopy was unremarkable. Contrast-enhanced CT of the chest, abdomen, and pelvis showed a 6.3 × 4.7 cm heterogeneous mass involving the right lateral and anterior bladder walls with both endophytic and exophytic components and loss of fat planes with an adjacent ileal loop.

Intervention and Outcome: Exploratory laparotomy revealed an appendiceal tumor encasing the ileum and infiltrating the urinary bladder, forming a complex fistulizing mass. En bloc appendectomy, partial cystectomy, and ileal resection with primary anastomosis were performed. Histopathology confirmed pT4bN0M0 mucinous adenocarcinoma arising in a tubulovillous adenoma, with direct invasion of the bladder detrusor muscle and ileum. Surgical margins were negative. Follow-up imaging at three months showed no evidence of recurrence.

Conclusion: Appendiceal mucinous adenocarcinoma may rarely present with urological symptoms due to fistula formation and adjacent organ invasion. A multidisciplinary approach is essential for accurate diagnosis and optimal management in such complex cases.

Keywords: *Appendiceal Mucinous Adenocarcinoma; Hematuria; Pneumaturia; Fistula, Urinary Bladder Invasion.*

INTRODUCTION

Appendiceal mucinous adenocarcinoma is a rare malignancy, accounting for less than 1% of all gastrointestinal cancers. Its incidence is approximately 0.12 per 1,000,000 population per year, and it is incidentally identified in nearly 0.2% of appendectomy specimens, with less than half recognized intraoperatively (1). Clinical presentation is often nonspecific, leading to delayed or incidental diagnosis following appendectomy.

Appendiceal mucinous adenocarcinoma rarely invades the urinary bladder, and fistula formation is exceptionally uncommon, with only a few cases reported in the literature (2). We report a rare case of appendiceal mucinous adenocarcinoma presenting as a presumed bladder tumor with ileal invasion and enterovesical fistula formation.

This report highlights the diagnostic challenges associated with this unusual presentation and emphasizes the importance of considering appendiceal malignancy in the differential diagnosis of complex pelvic masses. It also underscores key aspects of intraoperative decision-making, multidisciplinary management, and postoperative surveillance.

CASE PRESENTATION

A 56-year-old nonsmoking male with no significant comorbidities presented with dysuria, gross hematuria with passage of amorphous clots for six months, and pneumaturia for three months. He denied any history of melena, abdominal pain, or bowel obstruction. On physical examination, the patient appeared lean and pale but was comfortable at rest and fully oriented to time, place, and person. His blood pressure was 130/70 mmHg, pulse rate was 72 beats/minute, and body temperature was 98.4°F. Digital rectal examination revealed a moderately enlarged, firm, and non-tender prostate. The remainder of the general physical and systemic examinations was unremarkable.

Laboratory investigations revealed numerous red blood cells and pus cells on urinalysis, while urine culture demonstrated growth of Escherichia coli. Initial ultrasonography of the abdomen and pelvis showed a solid lesion arising from the right lateral wall of the urinary bladder with extension into the extravesical region. Following treatment of the urinary tract infection, cystoscopy was performed, which revealed a solid growth involving the right lateral and anterior walls of the urinary bladder (Figure 1). The lesion was covered with mucinous deposits, and communication with the extravesical space was visualized, suggesting fistula formation. Cold-cup biopsies were obtained, and histopathological examination demonstrated mucinous adenocarcinoma consistent with appendiceal origin. Colonoscopy was subsequently performed to exclude a primary colorectal malignancy; however, no abnormalities were identified. Contrast-enhanced computed tomography (CT) of the chest, abdomen, and pelvis demonstrated a 6.3 × 4.7 cm lobulated, heterogeneously enhancing lesion involving the right lateral and anterior walls of the urinary bladder, with both exophytic and endophytic components (Figure 2). The exophytic component exhibited loss of the intervening fat plane with an adjacent loop of small bowel, raising suspicion of direct invasion.

The case was discussed in a multidisciplinary tumor board meeting. Based on the available clinical, radiological, and histopathological findings, the differential diagnosis included mucinous adenocarcinoma of the urinary bladder invading the small bowel or, alternatively, a gastrointestinal primary tumor invading the bladder. Consequently, en bloc radical cystectomy with small bowel resection, mesenteric excision, and ileal conduit diversion was planned based on presumed diagnosis. During exploratory laparotomy, the tip of the appendix was found to harbor a tumor encasing the ileum and directly infiltrating the urinary bladder, forming a complex mass. The appendix was collapsed and difficult to distinguish from the adjacent ileum due to fistulous communication with both the ileum and urinary bladder. No gross peritoneal deposits, pseudomyxoma peritonei, or mesenteric involvement were identified (Figure 3A & Figure 3B). An en bloc resection comprising appendectomy, segmental ileal resection with its mesentery, and partial cystectomy was performed, followed by primary bladder closure and ileo-ileal anastomosis. The postoperative course was uneventful, with no fever,

sepsis, or requirement for blood transfusion. The patient was discharged on postoperative day six in stable condition. Histopathological examination of the resected specimen revealed pT4bN0M0 mucinous adenocarcinoma arising from the appendix on a background of tubulovillous adenoma, with direct invasion of the bladder detrusor muscle and trans-serosal involvement of the ileum. All surgical margins were free of tumor (Figure 4). Follow-up CT imaging of the abdomen and pelvis at three months demonstrated no evidence of local recurrence or metastatic disease. The patient was subsequently referred to medical oncology for further management and surveillance.

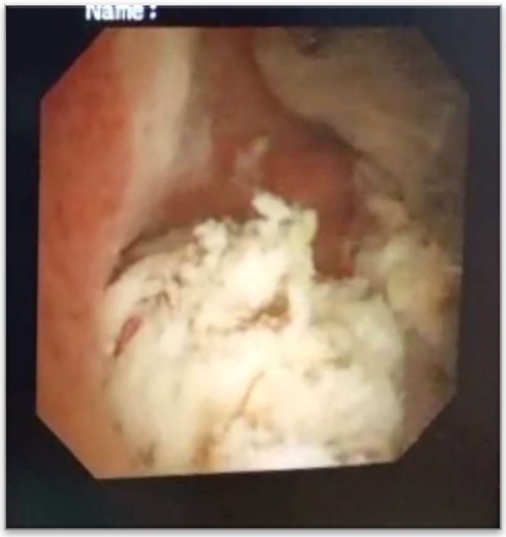

Figure 1: Cystocopic appearance of a solid growth on the right lateral and anterior wall of urinary bladder

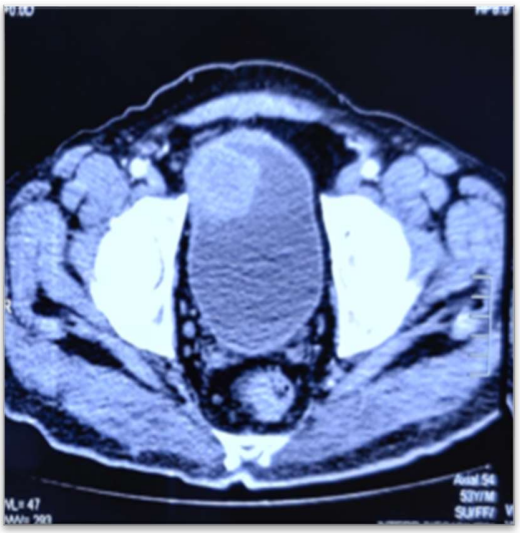

Figure 2: A 6.3 cm x 4.7 cm lobulated heterogeneously enhancing lesion arising from the right lateral wall and anterior wall of urinary bladder having exophytic and endophytic components.

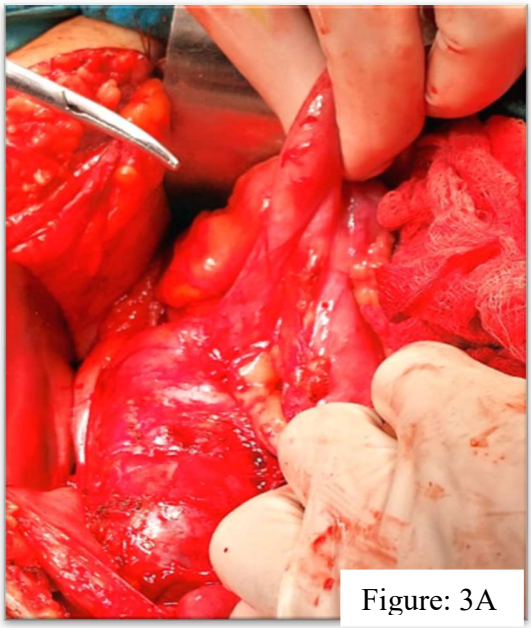

Figure: 3A

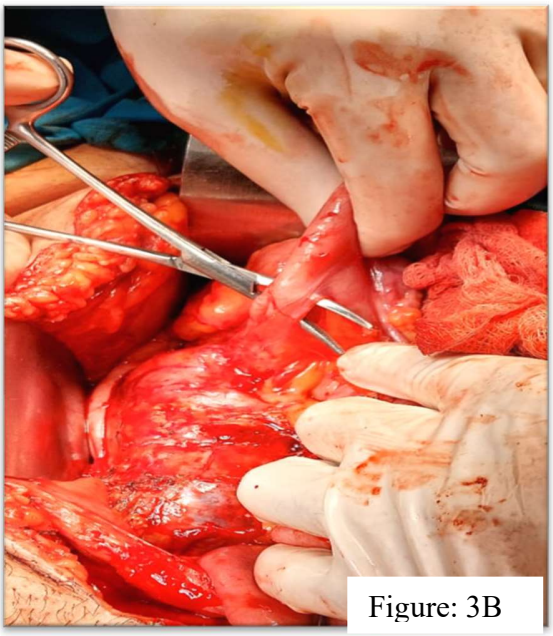

Figure: 3B

Figure 1A & Figure 2B: The gross intra operative view showing a mass like structure encasing ileum, appendix and invading urinary bladder.

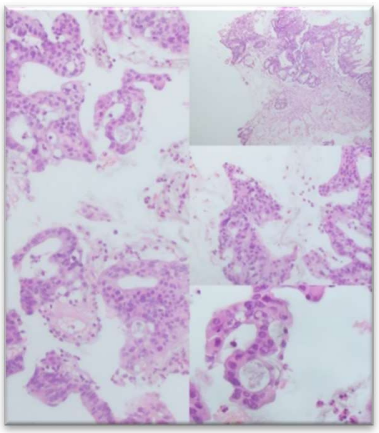

Figure 3: Shows histopathological assessment using hematoxylin and eosin staining with x100 and x400 magnification. The findings are consistent with mucinous adenocarcinoma of appendix, showing infiltrating glands with abundant mucin.

DISCUSSION

Mucinous adenocarcinoma of the appendix is a rare malignancy with nonspecific clinical manifestations, making early diagnosis challenging. Most patients present with symptoms mimicking more common gastrointestinal or genitourinary conditions, and diagnosis is frequently established at surgery or on final histopathology when the disease is already locally advanced (3).

The present case highlights an unusual presentation of appendiceal mucinous adenocarcinoma with hematuria, pneumaturia, and bladder wall involvement, closely resembling a primary bladder malignancy. Preoperative cystoscopy

demonstrated a bladder mass with fistulous communication, while biopsy revealed mucinous adenocarcinoma. Combined with CT findings showing a bladder lesion with adjacent small bowel involvement, the initial working diagnosis favored an advanced bladder tumor invading the bowel.

Urachal carcinoma was also considered in the differential diagnosis because of its mucin-producing nature and tendency to involve the bladder; however, this entity accounts for less than 2% of all bladder cancers. Unlike urothelial carcinoma, the standard treatment for localized urachal carcinoma is partial cystectomy with en bloc resection of the urachus rather than radical cystectomy. Contrast-enhanced CT is the primary imaging modality for the evaluation of appendiceal neoplasms. Findings such as appendiceal dilatation, mural thickening, soft tissue masses, and mural calcifications may raise suspicion for a mucinous neoplasm (4). In patients presenting with appendiceal mucocele and acute appendicitis, CT findings including cystic appendiceal dilatation, mural calcification, or luminal dilatation greater than 13 mm have demonstrated good diagnostic performance. However, these characteristic features were absent in our patient because the appendiceal tumor had fistulized into both the ileum and urinary bladder, allowing continuous drainage of mucin and preventing the development of a distended mucus-filled appendix.

Magnetic resonance imaging (MRI) may provide additional information regarding the site of origin, local invasion, and peritoneal disease burden. Diffusion-weighted MRI has been reported to improve the detection of small-volume peritoneal metastases, while MRI may outperform CT in assessing tumor extent and small bowel involvement in selected patients (5,6). In retrospect, preoperative MRI may have helped better delineate the appendiceal origin of the tumor and aided operative planning.

A key learning point from this case is the importance of intraoperative vigilance. During exploration, the appendiceal tumor was found to encase the ileum and infiltrate the urinary bladder, forming a complex mass. The appendix was collapsed and difficult to identify because of fistulous communication with both organs. Consequently, the typical appearance of a mucin-filled appendix was absent, and the appendiceal origin was not apparent preoperatively. In such circumstances, surgeons should maintain a high index of suspicion for an appendiceal primary when encountering mucinous tumors involving the bowel and urinary bladder. Intraoperative frozen-section analysis may be helpful, as confirmation of the tumor origin could influence the extent of oncological resection.

Appendiceal adenocarcinomas commonly spread through the terminal ileal and cecal lymphatic pathways. When the diagnosis is established preoperatively, right hemicolectomy with en bloc mesenteric lymphadenectomy remains the standard oncological treatment for non-metastatic disease. Reported survival outcomes are superior following right hemicolectomy compared with appendicectomy alone (7,8). Although limitations are inherent in rare and diagnostically challenging cases, the absence of preoperative MRI and intraoperative frozen-section analysis in our patient may have influenced the optimal surgical strategy.

This case illustrates the diagnostic complexity of appendiceal mucinous adenocarcinoma presenting as a bladder mass with enterovesical fistula. Awareness of this rare presentation, multidisciplinary evaluation, and careful intraoperative assessment are essential to achieve accurate diagnosis and appropriate management.

CONCLUSION

Appendiceal mucinous adenocarcinoma invading both the ileum and urinary bladder with fistula formation is an exceptionally rare presentation and poses significant diagnostic challenges. Owing to its nonspecific clinical and radiological features, accurate preoperative diagnosis may be difficult, often resulting in diagnosis at an advanced stage. A high index of suspicion, careful intraoperative assessment, and the judicious use of frozen-section analysis are essential

for appropriate surgical management. Close multidisciplinary collaboration among radiologists, pathologists, surgeons, and oncologists is critical to achieving optimal oncological and functional outcomes.

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ETHICAL APPROVAL
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DECLARATION OF COMPETING INTEREST
The authors have no conflicts of interest to disclose in relation to this work.

CONSENT
Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available on request.

AUTHORSHIP
MK and AH drafted the manuscript; RAK supervised the study; NK critically reviewed the manuscript. All authors reviewed and approved the final manuscript.

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