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Yan Qin
Xingtai People's Hospital
Yang Zhou
Xingtai People's Hospital
Dianchao Wu
Xingtai People's Hospital
Xing Zhao
wooddrew@aliyun.com

Xingtai People's Hospital

Case Report

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Invasive Primary Appendiceal Mucinous Adenocarcinoma with Transmural Invasion into Bladder and Uterus: A Case Report.

Yan Qin[1], Yang Zhou[2],Dianchao Wu[1], Xing Zhao[3*]

Yan Qin, Surgical Department of Gastrointestinal Neoplasms, Xingtai People's Hospital, Xingtai, Hebei 054000, P.R. China. 289022859@qq.com

Yang Zhou, Department of Pathology, Xingtai People's Hospital, Xingtai 054000, Hebei, China. 869280393@qq.com

Dianchao Wu, Surgical Department of Gastrointestinal Neoplasms, Xingtai People's Hospital, Xingtai, Hebei 054000, P.R. China. 13731060898@163.com

Corresponding author: Xing Zhao, MD, Associate Professor, Xingtai People's Hospital, Xingtai People's Hospital, Xiangdu North Road, Xingtai 054000, Hebei, China. wooddrew@aliyun.com

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Abstract

Primary appendiceal mucinous adenocarcinoma is a rare malignancy that poses significant diagnostic and management challenges because of its atypical presentations. This case report describes a 52-year-old woman who presented with cloudy urine and increased urinary red and white blood cell counts, suggesting a urinary tract infection. However, imaging revealed a large, irregular mass in the right pelvic cavity. A comprehensive tumor resection was performed, encompassing the cecum, uterus, right adnexa, left fallopian tube, and posterior bladder wall. Pathology analysis confirmed the diagnosis of

mucinous adenocarcinoma, with evidence of transmural invasion into adjacent organs, including the urinary bladder and uterus, but no lymph node metastasis was observed. This case highlights the potential for local invasive behavior of appendiceal mucinous adenocarcinoma and the diagnostic challenge posed by urinary symptoms that mimic infection. Comprehensive surgical resection achieved a disease-free status at one-year follow-up, underscoring the value of early recognition and multi-organ resection when contiguous invasion is present. Further studies are needed to better define optimal management strategies for this rare entity.

INTRODUCTION

Primary appendiceal carcinoma is an uncommon condition. The age-adjusted occurrence is 0.12 instances per 1,000,000 individuals annually1. This rate represents 0.01%-1% of all gastrointestinal cancers and 4%-6% of appendiceal tumors. This rate is present in a mere 0.08-0.2% of appendectomy samples. Appendix adenocarcinoma is categorized by the global Oncology Disease Classification into three types: colonic, mucinous, and signet ring cell adenocarcinoma. The signet ring type is exceedingly uncommon, whereas the colonic type is the most prevalent.

Typically, the mucinous variety is distinctly differentiated, frequently leading to pseudomyxoma peritonei, and the mucinous type does not metastasize until an advanced stage2-4. The average age at which the mucinous type begins is from 50 to 60 years, exhibiting a sex ratio of 3 males to 4 females. It's a recognized fact that pelvic organ tumors, including those in the ovary, rectum, and sigmoid colon, have the potential to infiltrate the urinary bladder owing to spatial proximity. Yet, the occurrence of appendiceal mucinous adenocarcinoma penetrating the bladder and oviduct, and uterus is

exceedingly uncommon.[5] Here we report a case of the adenocarcinoma of the appendix that invaded the urinary bladder and uterus, and we reviewed the relevant literature.

PATIENT INFORMATION

Primary concerns

A 52-year-old woman noticed cloudy urine with particulate matter 20 days.

History of present illness

Cloudy urine with particulate matter was last for 20 days before admission. She did not have pain, nausea, or vomiting, no urgency, pain and discomfort, no cramping pain, no fever, and chills. On the third day after admission, the patient's cloudy suddenly became worse.

History of past illness

She had no history of any diseases.

Personal and family history

The patients denied any family history of similar diseases.

Clinical Finding

Upon admission, physical examination demonstrated that vital signs were stable, and no obvious abnormality was found in the cardiopulmonary physical examination.

Timeline (Table.1)

Diagnostic Assessment

Laboratory examinations

Urinalysis indicated an increased count of red blood cells to 152/ul, white blood cells at 879.1/ul, and bacteria at 124.1/ul. After antibiotic treatment, there was no improvement. A follow-up urinalysis still showed no decrease in red and white blood cells.

Imaging examinations

Computerized tomography (CT) showed: an irregular mass measuring approximately 53 x 88 x 72mm with uneven enhancement on the right side of the pelvis,（Figure.1）. The CT value during the arterial and venous phases was 15-80HU. The lesion's boundaries with the cecum, bladder, and right fallopian tube were unclear. Necrosis-like low-density areas were visible within the lesion. No abnormal enlarged lymph nodes were observed in the abdominal cavity or retroperitoneum

FINAL DIAGNOSIS

Invasive Primary Appendiceal Mucinous Adenocarcinoma with Transmural Invasion into Bladder and Uterus.

THERAPEUTIC INTERVENTION

During the surgery, the tumor, approximately 12 x 10 cm in size, was observed to be located in the cecum, invading the top of the bladder and the uterus. A resection of the tumor along with the cecum, uterus, right adnexa, left fallopian tube, and posterior wall of the bladder. Postoperative pathology indicated the following features:

Pathology analysis verified the presence of a mucinous adenocarcinoma in the appendix, accompanied by a transmural expansion towards the bladder's right posterior wall, right oviduct, and uterus (Figure.2). Lymph node metastasis was not detected. The pathological stages identified were pT3N0M0 (as per

TNM classification) and stage B (according to Ducks, Astler, and Coller classification). On the fifteenth day after surgery, the patient was released from care.

FOLLOW-UP AND OUTCOME

During a year-long post-surgery outpatient review, there were no clear signs of discomfort, recurrence, or distant metastases.

DISCUSSION

The primary objectives of this case report were to document a rare instance of primary appendiceal mucinous adenocarcinoma with direct invasion into the urinary bladder and uterus, and to review pertinent literature to enhance clinical understanding. Our key findings demonstrate successful surgical management of this locally aggressive tumor in a 52-year-old woman, resulting in no evidence of recurrence or metastasis after one year of follow-up. This outcome suggests that favorable short-term results are achievable with comprehensive resection and underscores the importance of early detection in atypical presentations.

Interpretation and Analysis of Results

The transmural invasion of the appendiceal mucinous adenocarcinoma into the bladder and uterus aligns with the tumor's propensity for local aggressiveness, driven by its mucin-producing nature that facilitates peritoneal dissemination and adhesion to adjacent structures. Anatomical proximity within the pelvic cavity likely contributed to this infiltration, The appendix's position near the cecum enables direct extension to pelvic organs without initial lymphatic involvement, consistent with the absence of lymph node metastasis (pT3N0M0 staging) in this case. The presence of necrosis-like areas on CT imaging with the absence of lymph node metastasis suggests rapid tumor growth outpacing

vascular supply, potentially exacerbating local tissue destruction and invasion. This localized progression, instead of distant spread, supports the hypothesis that mucinous subtypes prioritize desmoplastic reactions and mucin accumulation, leading to conditions like pseudomyxoma peritonei in advanced stages, although not evident this case. The patient's presentation with hematuria and leukocyturia, unresponsive to antibiotics, indicates secondary urinary tract involvement, emphasizing the diagnostic challenge where symptoms mimic benign conditions. Surgical resection, including partial bladder and uterine removal, effectively addressed the tumor burden, with postoperative recovery and one-year disease-free status implying that complete excision can interrupt the invasive cascade, offering curative potential in non-metastatic cases.

Comparison with Existing Literature

Literature on primary appendiceal carcinoma, particularly its mucinous subtype, remains sparse.Most reports emphasizie its low incidence and challenges in diagnosis[6,7] (e.g., Petrou et al., 2010; Givalos et al., 2018). Prior studies suggest that appendiceal mucinous adenocarcinomas often present late because of nonspecific symptoms, thereby complicating early detection[8]. Our findings are consistent with established literature regarding the gender distribution, with a tendency toward higher incidence in females, which aligns with findings by Xiao et al[9].

The case we reported is unique in its notable finding of invasion into both the urinary bladder and uterus, which diverges from the more commonly described atypical presentations of appendiceal tumors confined to the abdominal cavity or pelvis. This case thus expands the clinical spectrum of appendiceal malignancies and underscores the importance of comprehensive imaging and surgical evaluation, particularly in patients presenting with lower urinary tract symptoms that may be misattributed to benign conditions[10,11].

Although investigators have documented similar neoplasms [12], none have studied cases of overlapping pelvic organ involvement to the extent presented here. Noteworthy is the well-documented progression of mucinous adenocarcinomas to conditions such as pseudomyxoma peritonei [13], reinforcing the hypothesis that the mucinous subtype is prone to local spread due to its histological properties.

Relevance to clinical practice and potential impact on management

Primary appendiceal mucinous adenocarcinoma remains rare; most clinicians encounter it only sporadically. This case is clinically relevant because the patient presented exclusively with urinary symptoms (cloudy urine, microscopic hematuria, and leukocyturia unresponsive to antibiotics) without abdominal pain or gastrointestinal complaints. Such a presentation can easily be misdiagnosed as uncomplicated urinary tract infection, delaying recognition of an underlying pelvic malignancy. Greater awareness of this atypical presentation may prompt earlier cross-sectional imaging when urinary findings fail to resolve, particularly in middle-aged women.

From a management standpoint, the case illustrates that contiguous transmural invasion into the bladder and uterus does not necessarily imply distant metastatic disease. Complete en-bloc resection of the involved organs achieved a one-year disease-free outcome without adjuvant systemic therapy. This supports consideration of an aggressive surgical approach when preoperative or intraoperative findings indicate localized invasion, rather than automatic assumption of unresectability or immediate referral for neoadjuvant chemotherapy. Multidisciplinary discussion involving gastrointestinal surgeons, urologists, and gynecologists is essential for operative planning. While a single case cannot redefine guidelines, it reinforces the principle that

radical multi-visceral resection can be both feasible and potentially curative in carefully selected patients without nodal or distant metastases.

Limitations

This report describes a single patient; therefore, generalizability is inherently limited. Follow-up is only one year, so longer-term recurrence risk remains unknown. Molecular profiling and detailed immunohistochemical characterization of the tumor were not performed, restricting insight into potential targeted-therapy options. Finally, the precise histological grade and extent of mucin extravasation were not quantified beyond the stated pathological stage, limiting direct comparison with larger series that stratify outcomes by grade and peritoneal burden.

CONCLUSION

This case illustrates key aspects of the local invasive behavior of primary appendiceal mucinous adenocarcinoma. Early recognition of atypical urinary presentations and a willingness to perform comprehensive multi-organ resection when local invasion is confirmed can lead to favorable short-term outcomes. Multidisciplinary management is essential. Further research into the biological mechanisms and optimal treatment strategies for these rare tumors is warranted.

Declarations

Ethics approval and consent to participate

According to the Ethics Committee of Xingtai people's Hospital, case reports may be published without obtaining individual written informed consent,

provided that patient anonymity is preserved and the report contains no identifying information.

Consent to publish

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Data availability

Not applicable.

Competing interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Authors' contributions

Qin Y contributed to conceptualization, Methodology; Zhou Y contributed to data curation, Writing- Original draft preparation; Wu DC contributed to supervision; Zhao X contributed to writing- reviewing and editing.

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310
311
312 Table.1 Timeline of the patient's clinical course.

Timepoint	**Clinical Presentation**	**Diagnostic Testing**	**Interventions**	**Outcomes**
20 days prior to admission	Cloudy urine with particulate matter. No pain, nausea, urgency, or fever.	N/A	N/A	Symptoms persisted.
Admission	Vital signs stable.	Urinalysis showed elevated RBCs (152/ul), WBCs (879.1/ul), and bacteria (124.1/ul).	Antibiotic treatment.	N/A
Day 3 of admission	Worsening of cloudy urine.	Follow-up urinalysis showed no	N/A	No improvemen

Timepoint	Clinical Presentation	Diagnostic Testing	Interventions	Outcomes
		decrease in RBC and WBC counts.		t from antibiotics.
Surgery	N/A	Postoperative pathology confirmed appendiceal mucinous adenocarcinoma (pT3N0M0) with invasion into bladder, right oviduct, and uterus.	Resection of the tumor, cecum, uterus, right adnexa, left fallopian tube, and posterior bladder wall.	N/A
Day 15 post-surgery	N/A	N/A	Released from care (Discharged).	Postoperative recovery.
1-year Follow-up	No signs of discomfort.	Outpatient review.	None	No recurrence or distant metastases.

Figure.1

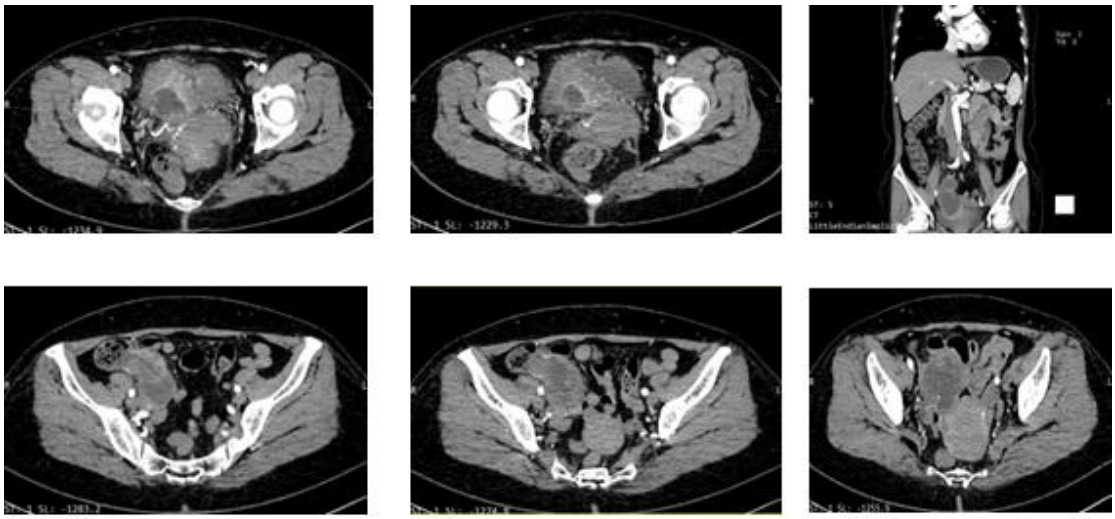


Figure.1Computerized tomography showed:an irregular mass measuring approximately 53×88×72mm with uneven enhancement on the right side of the pelvis

Figure.2

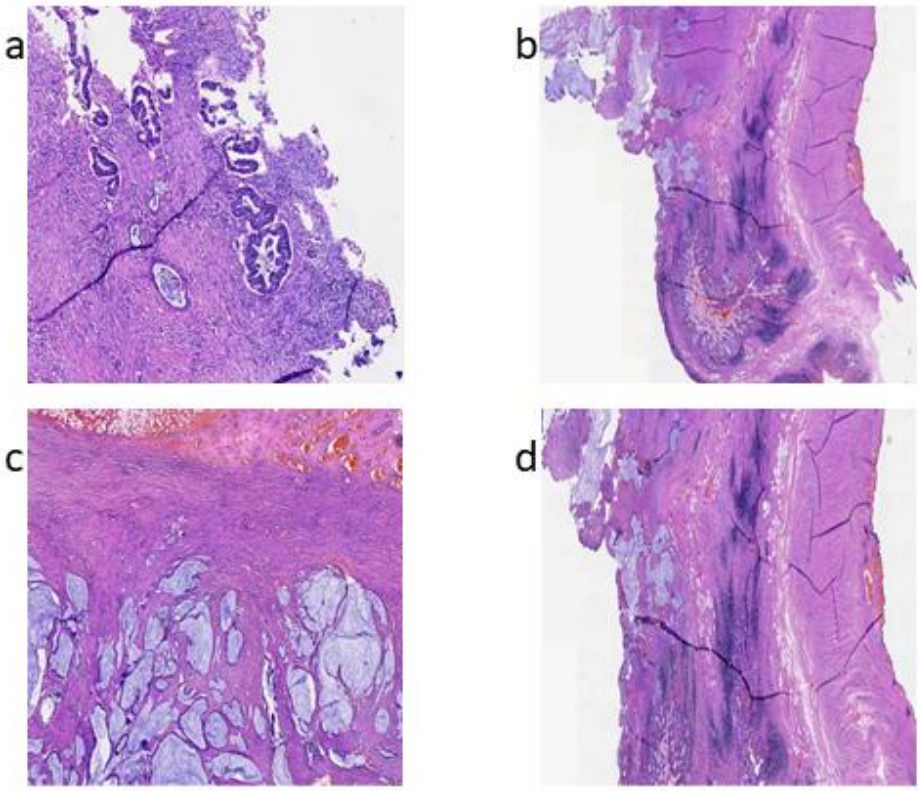


Fig.2 Pathology analysis verified the presence of a mucinous adenocarcinoma in the appendix, accompanied by a transmural expansion towards the bladder's right posterior wall, right oviduct, and uterus.

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