*Case Report*

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# *Urachal Masses Detected in Our Clinic in the Last Year: Reports of Four Cases and Review of the Literature*

Ali Nebioğlu[1], Hasan Erdal Doruk[1], Erdem Akbay[1], Nur Gizem Aykıroğlu[2], Yasemin Yuyucu Karabulut[2], Hasan Hüsnü Yüksek[3]

[1]*Mersin University Faculty of Medicine, Department of Urology, Mersin, Turkey*
[2]*Mersin University Faculty of Medicine, Department of Pathology, Mersin, Turkey*
[3]*Mersin University Faculty of Medicine, Department of Radiology, Mersin, Turkey*

**Abstract**

Urachal tumors are a rare form of malignancy with poor prognostic features, accounting for only 0.5-2% of bladder-related malignancies and 0.01% of all cancers in adults. The most common presenting symptoms are hematuria and a palpable suprapubic mass. This study presents a case series of four patients with urachal masses, including a 54-year-old woman with frequent urination, a 78-year-old man with urgency, a 41-year-old woman with suprapubic pain, and a 43-year-old woman with hematuria. Over the past year, all four masses were detected and underwent cystoscopic examinations and surgical resections. Only one of the four cases was benign, whereas the others were malignant. The objective of this study was to evaluate patients with urachal masses using clinical, radiological, and histopathological approaches to raise awareness about the diagnosis, treatment, and follow-up of these rare tumors and to contribute to the current literature on this topic.

**Keywords:** Hematuria, partial cystectomy, suprapubic pain, urachal mass

## Introduction

The urachus is an embryonic remnant that forms a fibrous band connecting the fetal bladder to the allantois, which is later defined as the umbilical cord in adulthood. Failure in the closure process can lead to cell proliferation, potentially resulting in malignancy. Urachal carcinomas, comprising only 0.01% of all malignancies but accounting for 0.17-0.34% of bladder tumors, are non-urothelial in origin and exceptionally rare (1,2). While urachal carcinomas are more commonly observed in males, they are typically diagnosed in the fifth to sixth decades of life (3). These carcinomas are generally characterized by a poor prognosis and aggressive behavior. In the largest series reported to date, a 5-year overall survival rate of approximately 50% and a 5-year cancer-specific survival rate of approximately 35% have been documented (4). Hematuria is the most frequently observed symptom; however, by the time this symptom manifest, the disease has usually progressed (5). Because of the frequent invasion of the bladder from the midline or dome, urachal carcinomas are often asymptomatic in the early stages and are commonly detected in advanced stages (6).

In this study, we present four patients with urachal masses. By examining this highly uncommon condition clinically, radiologically, and histopathologically, we aim to advance its diagnosis and treatment.

## Case Reports

### Case 1

A 54-year-old female patient was admitted to our clinic with complaints of frequent urination and burning during urination. No pathological findings were detected in the physical examination. The results of laboratory tests (hemogram, complete urinalysis, liver and kidney function tests) were observed within normal reference ranges. However, because of abdominopelvic ultrasonography (USG) performed on the patient, we decided to perform a cross-sectional examination of

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**Address for Correspondence:** Ali Nebioğlu, Mersin University Faculty of Medicine, Department of Urology, Mersin, Turkey
**Phone:** +90 507 973 68 04 **E-mail:** alinebioglu90@gmail.com **ORCID-ID:** orcid.org/0000-0001-6325-1534
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the patient after a 30x25 mm anechoic structure was observed in the superficial neighborhood of the bladder, which may be associated with the bladder. Contrast-enhanced abdominopelvic computed tomography (CT) revealed that the nodular lesion, approximately 30x26 mm in size in the anterior part of the bladder, containing areas of calcification and having a lobulated contour in places, might be a urachal mass (Figure 1). Pelvic diffusion magnetic resonance imaging was additionally applied to the patient, and it was reported that the 30x35 mm sized nodular lesion with peripheral enhancement was consistent with the urachal mass, which was heterogeneously hyperintense on T2W examination and hypointense on T1W examination (Figure 2).

Subsequently, cystoscopy was performed on the patient, and a tumoral formation with a hyperemic, irregular border, and solid appearance was observed in an area of approximately 3 cm on the anterior wall of the bladder. Therefore, pelvic exploration was performed for the patient. Intraperitoneal pelvic exploration was performed using a subumbilical median incision. On exploration, a mass invading the anterior wall of the bladder from the umbilicus level was observed, and the patient underwent radical mass excision and partial cystectomy, considering the surgical margins of the tumor. Histopathological examination of the excised mass revealed mucinous adenocarcinoma (Figure 3). After the operation, the patient was discharged on postoperative day 5 with full recovery.

## Case 2

A 78-year-old male patient was admitted to our clinic with complaints of frequent urination and urgency. Physical examination revealed a suprapubic palpable mass. Because of laboratory examinations, no abnormal pathological findings were detected except for microscopic hematuria (328 erythrocytes in each field) in the complete urinalysis. Because of non-contrast abdominopelvic CT, a mass lesion was detected in the anterior superior of the bladder, in close relationship with the right rectus abdominis muscle, measuring 7x6.5 cm in the widest part, with a multiloculated appearance and thin calcifications on the walls, and it was interpreted that it might be a urachal mass (Figure 4).

Then, cystoscopy was performed on the patient, and a tumoral formation with irregular borders was observed in the area of approximately 4 cm at the junction of the anterior wall of the bladder opposite wall, with a hyperemic and solid appearance around it, and it was decided to perform pelvic exploration for the patient. Intraperitoneal pelvic exploration was performed using a subumbilical median incision. On exploration, a giant mass invading from the umbilicus to the anterior wall of the bladder was observed, and the patient underwent radical mass excision and partial cystectomy, preserving the surgical margins

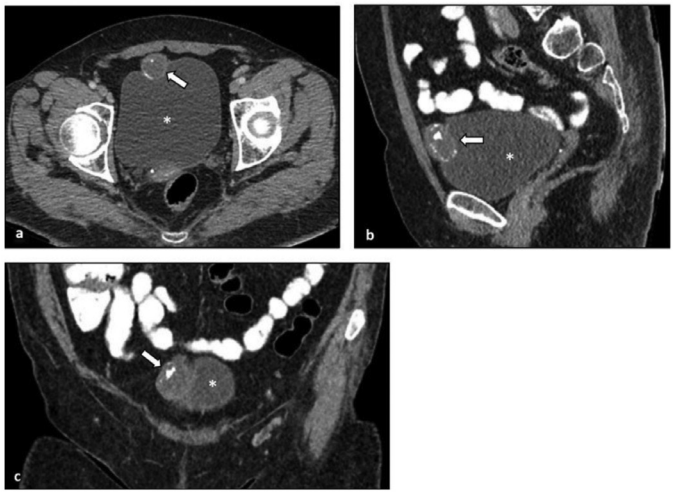

**Figure 1.** Axial **(a)**, sagittal **(b)**, and coronal **(c)** intravenous contrast-enhanced CT sections show a nodular lesion (arrows) with a diameter of approximately 30 mm, which extends toward the prevesical fat tissue and the anterior abdominal wall, contains coarse and curvilinear calcifications, and appears hypodense, most likely due to the presence of mucinous content. The lesion (*) is noted to be of similar density to the bladder

CT: Computed tomography

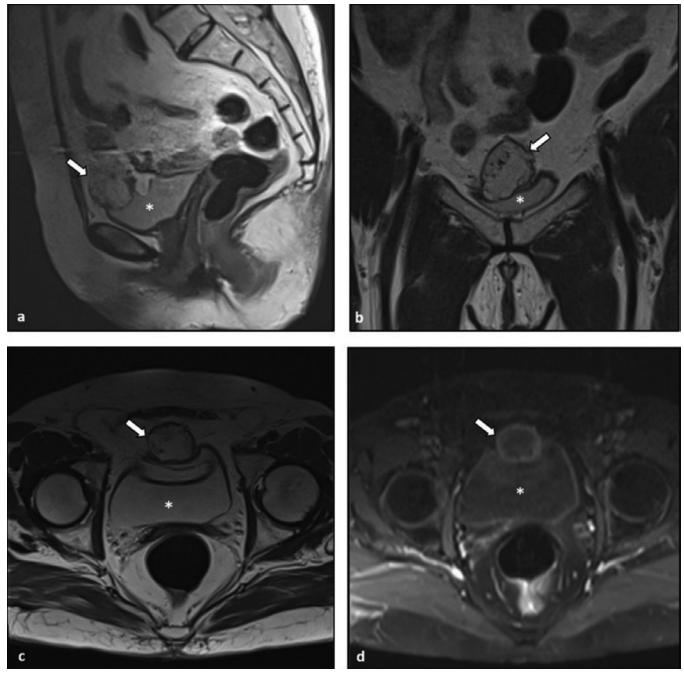

**Figure 2.** In the anterior segment of the bladder, a nodular lesion (arrows) with a diameter of approximately 35 mm is observed on T2-weighted sagittal **(a)**, coronal **(b)**, and axial **(c)** MRI as hyperintense and fat-suppressed. On T1-weighted intravenous contrast-enhanced axial MRI, the lesion appeared as a peripherally ring-enhancing hypointense nodule. Note that the lesion (*) has a similar signal intensity to the bladder

MRI: Magnetic resonance imaging

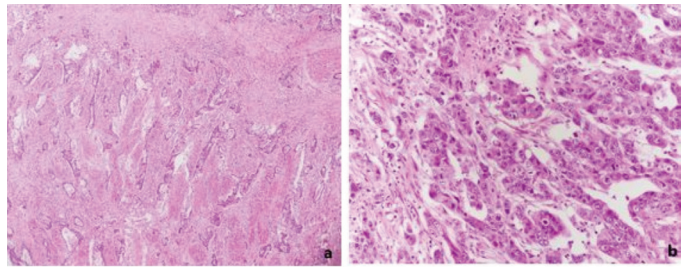

**Figure 3.** Tumor development composed of large hyperchromatic nuclei with prominent nucleoli and atypical epithelial cells, some of which exhibit a cribriform pattern, is observed on a fibrotic background (a; H&E; x40, b; x400)

of the tumor. Histopathological examination of the excised mass revealed mucinous adenocarcinoma (Figure 5). After the operation, the patient was discharged on postoperative day 7 with full recovery.

### Case 3

A 41-year-old female patient was admitted to our clinic with complaints of suprapubic pain and burning on urination. Physical examination revealed a suprapubic palpable mass. The results of laboratory tests (hemogram, complete urinalysis, liver and kidney function tests) were observed within normal reference ranges. However, because of abdominopelvic USG performed on the patient, after a 62 mm anechoic structure was observed in the superficial neighborhood of the bladder, which may be associated with the bladder, it was decided to perform a cross-sectional examination of the patient. As a result of contrast-enhanced abdominopelvic CT, a heterogeneous contrast-enhancing soft tissue mass lesion with dimensions of 65x25 mm at its widest point, extending from the anterior wall of the bladder to the inside of the abdomen, invading the muscles of the anterior abdominal wall was detected, and it was interpreted that it might be a urachal mass (Figure 6).

Then, cystoscopy was performed on the patient, and a tumoral formation with a solid and hyperemic appearance was observed in an area of approximately 5 cm on the anterior wall of the bladder, and pelvic exploration was performed for the patient. Intraperitoneal pelvic exploration was performed using a subumbilical median incision. On exploration, a giant mass invading from the umbilicus to the anterior wall of the bladder was observed, and the patient underwent radical mass excision and partial cystectomy, preserving the surgical margins of the tumor. Histopathological examination of the excised mass revealed fibroblastic proliferation (Figure 7). After the operation, the patient was discharged on postoperative day 3 with full recovery.

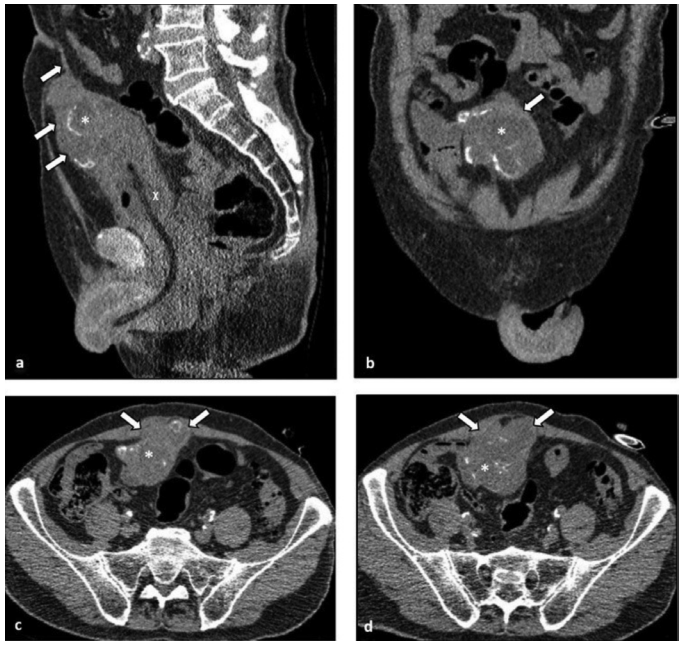


**Figure 4.** On sagittal **(a)**, coronal **(b)**, and axial (**c, d**) non-contrast CT images, a large solid mass (arrows) is observed extending from the anterosuperior segment of the bladder toward the anterior abdominal wall and umbilicus, containing curvilinear calcifications and hypodense areas (*) most likely corresponding to mucinous content, with indistinct borders from the bladder walls.

x: Catheter balloon, CT: Computed tomography

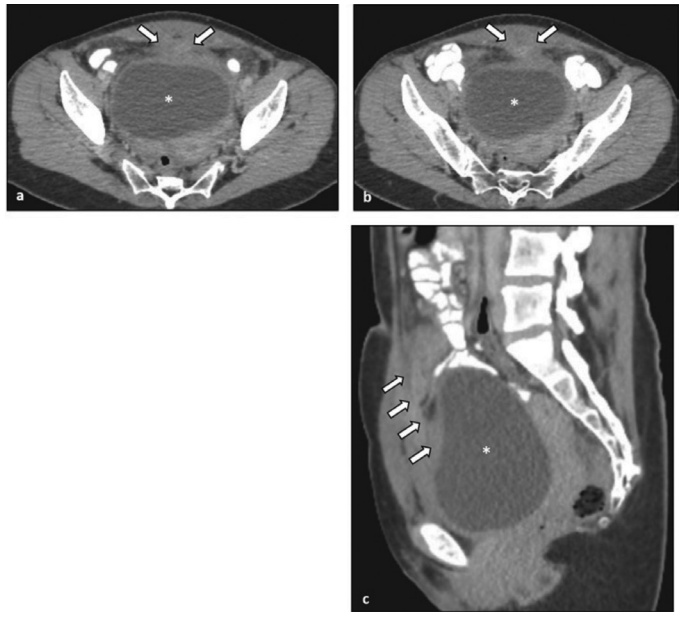


**Figure 6.** On axial (**a, b**) and sagittal **(c)** intravenous contrast-enhanced CT images passing through two different levels, a thick-walled appearance is seen in the anterior segment of the bladder (*), with a heterogeneous contrast-enhancing mass lesion (arrows) of approximately 60x20 mm size that cannot be clearly distinguished from the bladder wall and extends cranially toward the anterior abdominal wall, with an invasive appearance into the rectus muscle, without a distinctive shape

CT: Computed tomography

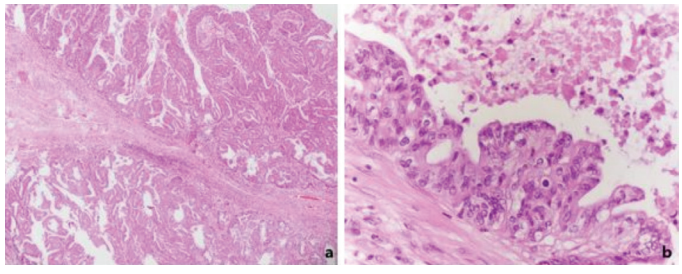


**Figure 5.** An adenocarcinoma exhibiting glandular architecture and frequent mitotic activity is observed (a; H&E; x40, b; x400)

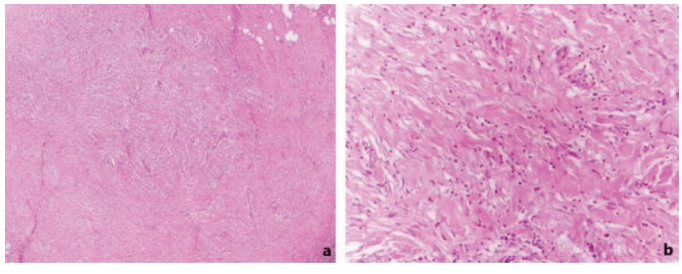


**Figure 7.** Fibroblastic cell proliferation is observed in a fibrocollagenous background (**a**; H&E; x40, **b**; x200)

### Case 4

A 43-year-old female patient was admitted to our clinic with a complaint of bleeding in the urine. No pathological findings were detected in the physical examination. The results of laboratory tests (hemogram, complete urinalysis, liver and kidney function tests) were observed within normal reference ranges. However, because of abdominopelvic USG performed on the patient; After a 30x45 mm anechoic structure was observed in the superficial neighborhood of the bladder, which may be associated with the bladder, it was decided to perform a cross-sectional examination of the patient. As a result of contrast-enhanced abdominopelvic CT; A 25x47 mm mass protruding into the lumen was observed in the anterior wall of the bladder, in the midline, and in the locus of the urachus, and it was interpreted that it might be a malignancy of urachal origin (Figure 8).

Then, cystoscopy was performed on the patient, and a tumoral formation with a hyperemic and solid appearance, with irregular borders, was observed in an area of approximately 3 cm on the anterior wall of the bladder, and pelvic exploration was performed for the patient. Intraperitoneal pelvic exploration was performed using a subumbilical median incision. On exploration, a mass invading from the umbilicus to the anterior wall of the bladder was observed, and the patient underwent radical mass excision and partial cystectomy while preserving the surgical margins of the tumor. Histopathological examination of the excised mass revealed mucinous adenocarcinoma (Figure 9). After the operation, the patient was discharged on postoperative day 5 with full recovery.

Oral and written informed consent for the study was obtained from all patients.

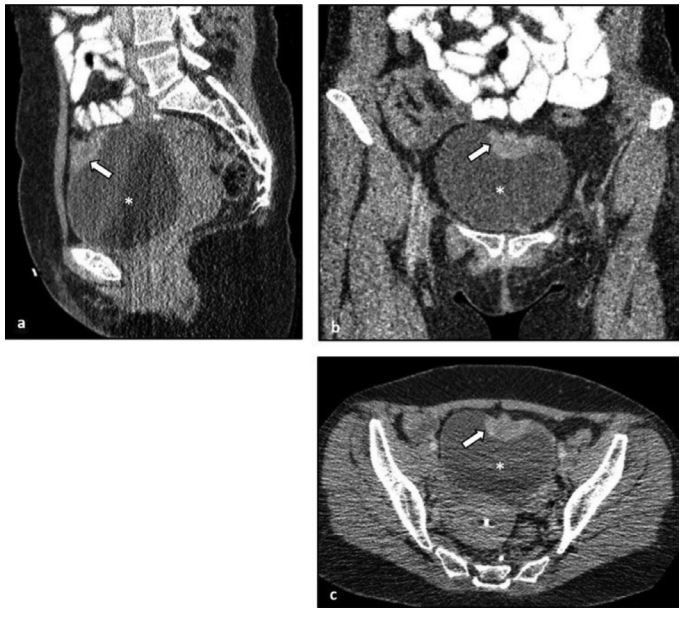

**Figure 8.** In sagittal **(a)**, coronal **(b)**, and axial **(c)** intravenous contrast-enhanced CT images, a soft tissue mass (arrows) measuring 20x40x40 mm with a slightly hypodense contrast-enhanced center is observed in the anterior dome of the bladder (*), located in the midline and not clearly distinguishable from the bladder walls, with a nodular extension toward the anterior perivesical fat

CT: Computed tomography

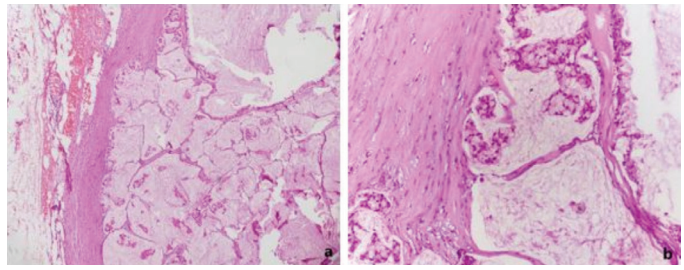

**Figure 9.** Adenocarcinoma composed of atypical epithelial cells with hyperchromatic nuclei and containing mucin pools in wide areas is observed (**a**; H&E; x100, **b**; x400)

## Discussion

The urachus is a channel between the allantois and fetal bladder. With the development of the fetus, the lumen of the urachus becomes obliterated, but it remains as a small fibromuscular band called the median umbilical cord, which connects the dome of the bladder to the umbilicus. Epithelial cells in this band may cause the development of urachal cancer (7).

Primary urachal adenocarcinoma is a very rare tumor that was first described by Hue and Jacquin (8) in 1863. Approximately 70% of urachal adenocarcinomas are mucin-producing tumors that contain calcifications (5). Although hematuria is the most common symptom, the disease usually progresses when this symptom occurs. Commonly metastasized sites include the lymph nodes, peritoneum, and lungs. In bladder apex tumors, the urachus remnant extending toward the umbilicus may not always be discernible, but it is a very important finding in the diagnosis.

The use of abdominopelvic CT with contrast is particularly important in the diagnosis of urachal masses. A study in which urachal adenocarcinomas were evaluated radiologically; reported that calcifications observed on contrast-enhanced abdominopelvic CT are characteristic in the diagnosis of urachal adenocarcinomas, especially urachal mucinous adenocarcinomas (9). Calcifications were also observed in the contrast-enhanced abdominopelvic CT of the patients we reported.

Currently, there is no effective treatment for this rare disease, and the main treatment option is surgery. To compare the prognosis of surgical and nonsurgical treatment, Pinthus et al. (10) conducted a retrospective study involving 40 patients with urachal adenocarcinoma and found that surgical treatment was associated with higher survival rates. Currently, there are two main surgical treatment options: partial and radical cystectomy. When comparing partial and radical cystectomy, Bruins et al. (11) did not observe a significant difference in overall survival. However, recurrence rates were found to be higher after partial cystectomy than after radical cystectomy (11). However, extensive tumor resections with surgical margins can be curative in most non-metastatic urachal cancers (12). In addition, there is currently no conclusive evidence of the curative effect of chemotherapy and radiotherapy.

## Conclusion

In conclusion, urachal masses are tumoral formations that are difficult to diagnose early, are quite rare, can be benign and malignant, and have a very poor prognosis. Here, we contribute to the literature by examining four cases of urachal masses, three malignant and one benign, clinically, radiologically, and histopathologically to better illuminate these diseases, reduce the rate of clinical and pathological misdiagnosis, and contribute to treatment management.

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**Contribution:** There is not any contributors who may not be listed as authors.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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### Ethics

**Informed Consent:** Oral and written informed consent for the study was obtained from all patients.

**Peer-review:** Externally peer-reviewed.

### Authorship Contributions

Surgical and Medical Practices: H.E.D., E.A., Concept: H.E.D., Design: A.N., Data Collection or Processing: A.N., N.G.A., Y.Y.K., H.H.Y., Analysis or Interpretation: E.A., Literature Search: A.N., N.G.A., Writing: A.N.

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