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CASE REPORT

Urachal Adenocarcinoma in a Young Adult: A Rare Case Report

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CASE PRESENTATION

A 19-year-old female presented to our institution in February 2023 with intermittent gross haematuria and dysuria for 2 months without seeking medical consultation. She then experienced a syncopal attack, prompting consultation and eventual admission. Her medical history included recurrent untreated urinary tract infections since childhood. No family history of malignancy or prior abdominal surgery was noted.

Initial transvaginal ultrasound revealed a solid, slightly irregular ovoid mass measuring 6.9 × 5.9 × 4.7 cm, located in the posterior bladder wall (Figure 1a). The mass exhibited heterogeneous echogenicity with punctate calcifications. Doppler ultrasound revealed moderate vascularity (Figure 1b). The ovaries, adnexa, and uterus appeared unremarkable.

A subsequent computed tomography (CT) urography (Figure 2) revealed a lobulated, heterogeneously enhancing mass in the supravesical region with associated calcifications. The mass abutted the bladder dome with obliteration of the fat plane, suggesting infiltration. A 1.8-cm enlarged lymph node was also noted in the right paravesical region. A urachal neoplasm was considered.

The patient underwent radical cystectomy and total abdominal hysterectomy with bilateral salpingectomy, all of which were well tolerated without complications. Histopathological examination of the excised mass revealed a moderately differentiated mucinous adenocarcinoma, consistent with urachal carcinoma.

Histopathological Findings

The mass was located approximately 6 cm from the umbilicus, with smooth external surfaces and yellow-tan friable content. Histological analysis showed malignant epithelial cells arranged in glandular and cribriform patterns, with extensive extracellular mucin and areas of tumour necrosis (Figure 3). The tumour infiltrated the bladder's lamina propria, muscularis propria, and perivesical fat. These findings were consistent with mucinous adenocarcinoma, a type of urachal carcinoma.

Postoperative Course and Outcome

Following surgery, the patient's recovery was uneventful. She was eventually discharged and underwent three cycles of chemotherapy comprising FOLFOX (leucovorin, 5-fluorouracil, and oxaliplatin). Eighteen months after surgery, she was frequently admitted with recurrent urinary tract infections that were found to be

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Data Availability: All data generated or analysed during the present study are available from the corresponding author on reasonable request.

Ethics Approval: This study was approved by the Institutional Ethics Review Committee of St Luke's Medical Center–Quezon City, The Philippines (Ref No.: SL-21346). The patient was treated in accordance with the Declaration of Helsinki. Informed consent for publication of this case report and the accompanying images was obtained from the patient's mother, as the patient is deceased.

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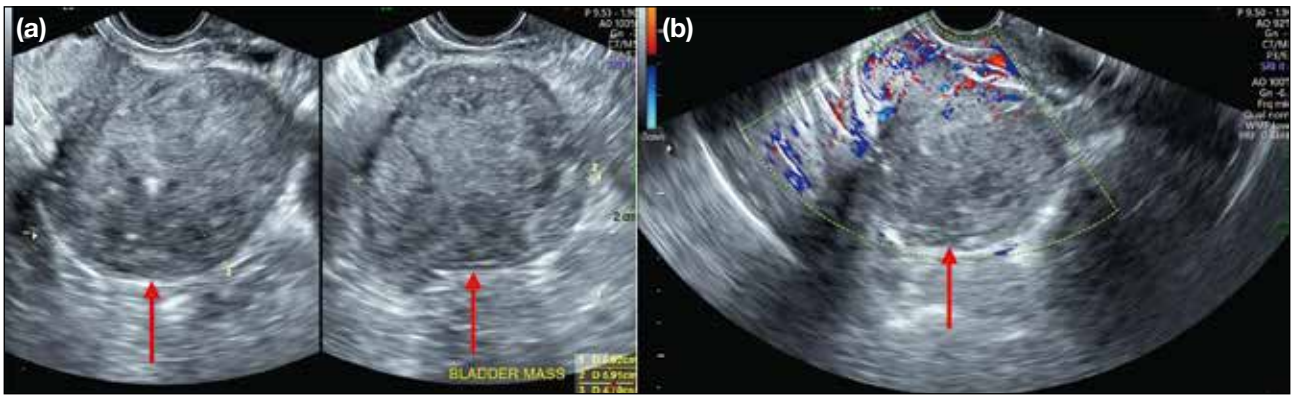

Figure 1. Transvaginal ultrasonography. (a) Slightly irregular ovoid solid mass (arrows) extending from the posterior urinary bladder wall, measuring 6.9 × 5.9 × 4.7 cm. (b) Doppler interrogation showing moderate vascularity of the mass (arrow).

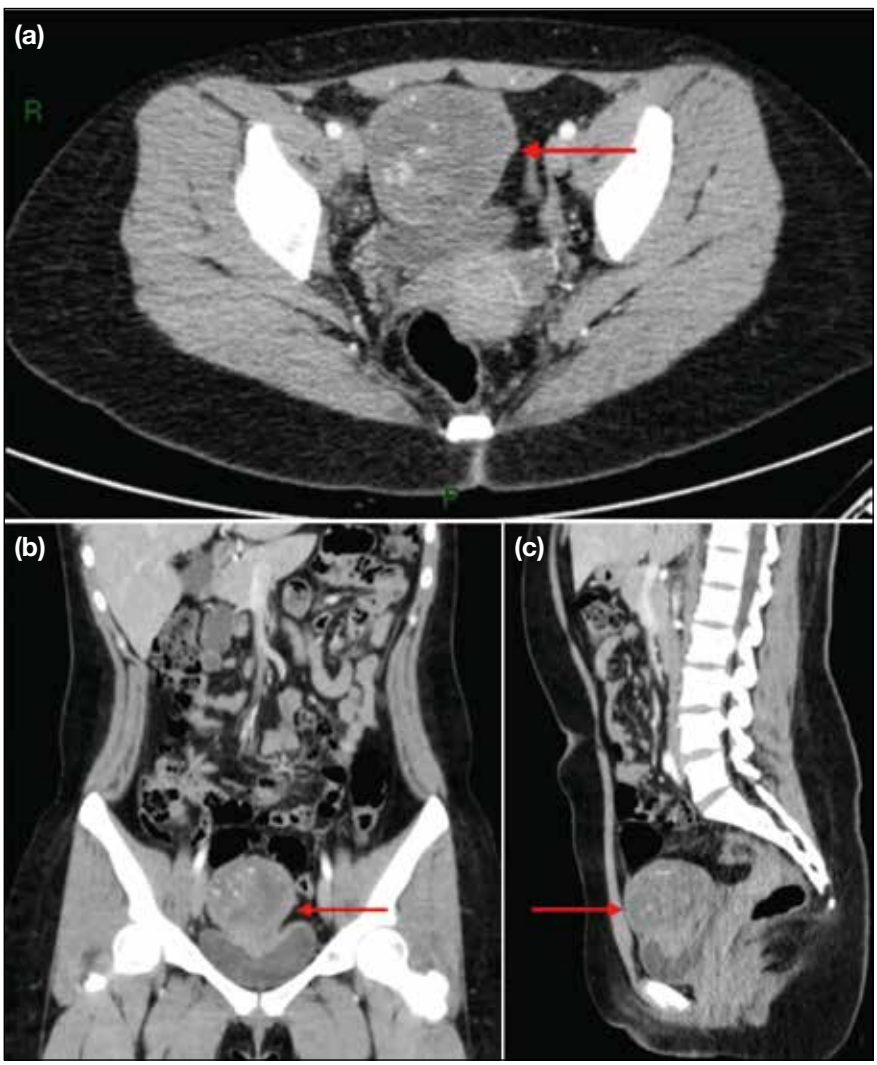

Figure 2. Contrast-enhanced multi-slice computed tomography urography in (a) axial, (b) coronal, and (c) sagittal views. A well-defined lobulated non-enhancing mass with intrinsic punctate calcifications (arrows) is seen at the supravesical region with involvement of the bladder dome. The mass is slightly less attenuating than the adjacent soft tissue, a finding suggestive of a mucus-filled structure.

caused by a newly discovered metastatic growth on the anterior pelvic wall, compressing the urinary collecting system. The patient underwent palliative care and eventually deceased within a year.

DISCUSSION

Urachal adenocarcinoma is a very rare primary bladder neoplasm, accounting for only 0.35% to 0.7% of all primary bladder cancers.[1] This malignancy tends to

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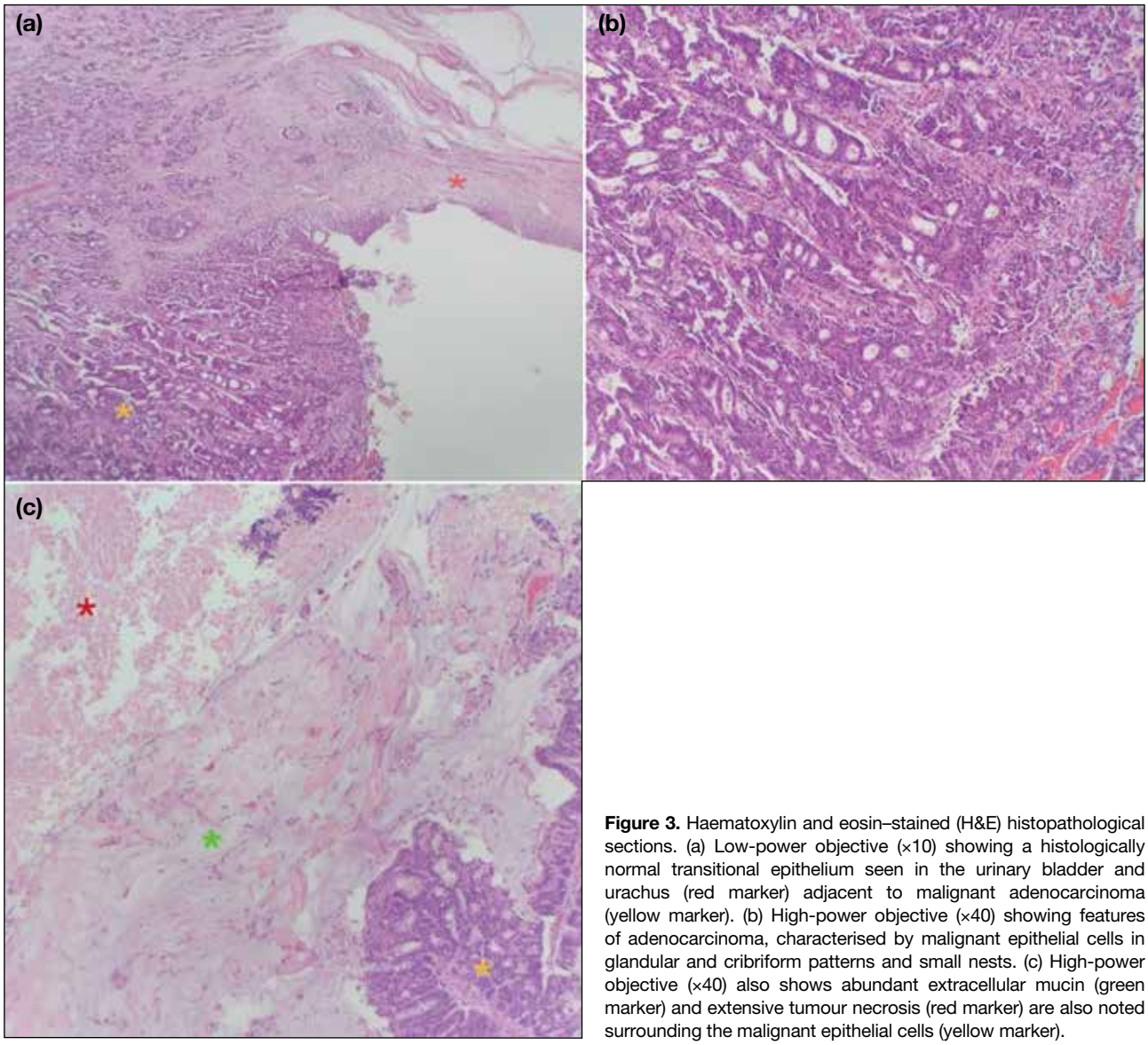

Figure 3. Haematoxylin and eosin–stained (H&E) histopathological sections. (a) Low-power objective (×10) showing a histologically normal transitional epithelium seen in the urinary bladder and urachus (red marker) adjacent to malignant adenocarcinoma (yellow marker). (b) High-power objective (×40) showing features of adenocarcinoma, characterised by malignant epithelial cells in glandular and cribriform patterns and small nests. (c) High-power objective (×40) also shows abundant extracellular mucin (green marker) and extensive tumour necrosis (red marker) are also noted surrounding the malignant epithelial cells (yellow marker).

have a male predilection and typically occurs in adults between 40 and 70 years old. The most common clinical feature is haematuria, as seen in the index patient. Other signs and symptoms include dysuria, abdominal pain, a suprapubic mass, and discharge of blood, pus, or mucus from the umbilicus.[2] Only six adult cases of urachal adenocarcinoma diagnosed before the age of 30 years have been reported in the English literature, with the youngest diagnosed at age 26 years.[1,3-6]

Ultrasonography is often performed as the initial imaging modality and can provide a general impression of the lesion, including its location and characteristics.[7] Sonographic imaging features of urachal adenocarcinoma include: (1) a solid mass extending between the dome of the bladder and the abdominal wall, with an irregular shape and bladder wall invasion; (2) a hypoechoic, heterogeneous echo pattern with a small amount of calcification; and (3) patchy, short-line blood flow signals within the mass.[8] These characteristic features were analogous to those seen on the initial ultrasonography performed in our patient.

CT imaging can be used to confirm the ultrasonographic findings or serve as the first-line imaging to evaluate local disease, tumour extension, and the presence of pelvic lymph node involvement or distant metastases.[7] A key diagnostic feature of urachal adenocarcinoma

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on CT is its supravesical midline location. The mass often demonstrates predominantly low attenuation, attributable to its mucinous content found on pathological examination. Calcifications are also commonly seen in mucinous tumours.[9] These findings closely correspond to the appearance and location of the tumour in the index patient's CT urography.

Although urachal remnants are lined by urothelial epithelium, 80% of urachal cancers are adenocarcinomas, including mucin-producing (69%) and mucin-negative (15%) subtypes.[7] The reason why adenocarcinoma is the predominant malignant epithelial type in urachal cancers remains unclear, but it has been hypothesised that chronic irritation may induce malignant transformation of transitional epithelium into columnar epithelium.[7] Another theory proposes that intestinal metaplasia in the urinary bladder is associated with cytogenetic abnormalities and significant telomere shortening relative to telomere length in adjacent normal urothelial cells.[10] These theories may help explain how urachal adenocarcinoma can, albeit rarely, present in a younger demographic, such as in the case of the index patient who experienced recurrent urinary tract infections and was therefore subject to d from childhood.

Differential diagnoses for urachal adenocarcinoma include ovarian malignancies and other types of urinary bladder cancer. Sonographic and CT findings of these malignancies may reveal large, complex masses similar to the radiographic findings of urachal adenocarcinoma.[11-13] Nonetheless, the key feature that supports a diagnosis of urachal adenocarcinoma over other possibilities is the supravesical midline location of the mass.

Surgery remains the mainstay of treatment for urachal adenocarcinoma. For muscle-invasive disease, radical cystectomy with en bloc resection of the urachal ligament may be the only curative option. Nonetheless, survival still strongly correlates with the stage and grade of the disease. A study reported a 5-year survival rate of 50% for stage I to III tumours, while no stage IV patients survived beyond 2 years.[11] Urachal adenocarcinoma has also been found to be resistant to chemotherapy and radiotherapy; therefore, early definitive diagnosis and radical resection are essential for a better outcome.[11]

CONCLUSION

Urachal carcinoma is a rare and aggressive malignancy that should be considered in the differential diagnosis of pelvic masses, even in young patients. The rarity of this condition highlights the importance of radiological imaging in early detection. Ultrasonography and CT are essential for identifying the tumour and assessing its extent. Although surgical resection remains the treatment of choice, the prognosis is generally poor, underscoring the need for further research into effective therapies for this rare and challenging type of cancer.

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