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Primary Ureteral Transitional Cell Carcinoma in a Dog

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Abstract : A 14-year-old, castrated male mixed-breed dog weighing 9 kg was presented for hematuria and dysuria. Abdominal ultrasound showed unilateral hydronephrosis and hydroureter with focal thickening of the ureteral wall. Surgical exploration revealed an intraluminal mass arising from the proximal left ureter. Mass resection was performed. Histopathology of the ureteral mass was consistent with a papillary transitional cell carcinoma. The patient recovered well post-operatively, but was diagnosed with another tumor three months later, this time in the right kidney. Fine-needle aspiration cytology of the renal mass revealed an epithelial cell tumor with mesenchymal features.

Key words **:** ureteral transitional cell carcinoma, primary ureteral neoplasms, hydronephrosis, hydroureter, abdominal ultrasonography.

Introduction

Transitional cell carcinoma (TCC) is the most common form of canine urinary tract cancer and most often develops in the trigone area of the bladder (21). Papillary lesions and a thickened bladder wall, which are common features of TCC, can lead to urinary tract obstruction (21). Risk factors include breed and female gender, obesity, as well as exposure to flea control products and lawn chemicals (7). The most common clinical signs in dogs with TCC are hematuria, stranguria, and pollakiuria. Definitive diagnosis of TCC requires a histopathologic evaluation of tissue samples obtained by cystoscopy, surgery or a catheter biopsy.

Surgery, radiation and medical therapy may be indicated in dogs with TCC.

In a recent report, the mainstay for TCC therapy in dogs continues to be systemic medical treatment, which consists of chemotherapy, cyclooxygenase inhibitors, and combinations of both (7). The response to a specific treatment is monitored and a different treatment is instituted if cancer progression or unacceptable toxicity occurs. When using this approach, TCC growth can be controlled in about 75% of dogs, and median survival times extend well beyond a year. It is challenging to deliver radiation therapy to the bladder for several reasons: 1) it is not rigidly fixed in place within the abdomen, and 2) complications, which include cystitis, urinary incontinence and colitis, are common (7).

In a series of 102 dogs with TCC of the bladder, the neoplasia also involved the urethra in 56% of dogs and involved the prostate in 29% of male patients (14). Primary ureteral neoplasms are very rare in veterinary patients (17). Only one case of spontaneous ureteral TCC was reported in a dog (9). This case study describes the diagnosis and management of TCC of ureteral origin.

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Case

A 14-year-old, castrated male mixed-breed dog weighing 9 kg was referred for hematuria and dysuria with a presumptive diagnosis of ureteral obstruction and hydronephrosis. Physical examination findings revealed abdominal pain. The remainder of the physical examination was unremarkable. Dipstick urinalysis revealed hematuria and proteinuria. Urine specific gravity was 1.017 and urine cytology showed urinary transitional cell hyperplasia. Complete blood count was unremarkable. Serum biochemistry analysis showed increased blood urea nitrogen (31.2 mg/dl) and creatinine (1.96 mg/dl). Abdominal and thoracic radiographs were unremarkable.

Abdominal ultrasonography showed distension of the left renal pelvis (1.38 cm) and proximal ureter (0.61-0.99 cm) (Fig 1A, B). An obvious ureteral mass lesion was not observed; however, irregular thickening of the proximal left ureteral wall was present and the dilated ureter was filled with echogenic urine (Fig 1C, D). The kidneys showed increased cortical echogenicity and decreased size. An excretory urogram revealed dilation of the left renal pelvis and the proximal ureter (Fig 2), while a fluoroscopic excretory urograph showed decreased peristalsis of the proximal left ureter and the presence of a patent ureter. An obstructive disease of the ureter causing hydronephrosis and hydroureter was suspected. The owner decided on surgical intervention to resolve the patent left ureter and to save the left kidney.

A laparotomy was performed following a ventral midline approach to the abdominal cavity. Surgical exploration demonstrated dilation of the proximal left ureter. At the level of the dilated proximal ureter, there was a pedunculated intraluminal mass (Fig 3). The mass did not extend from either the

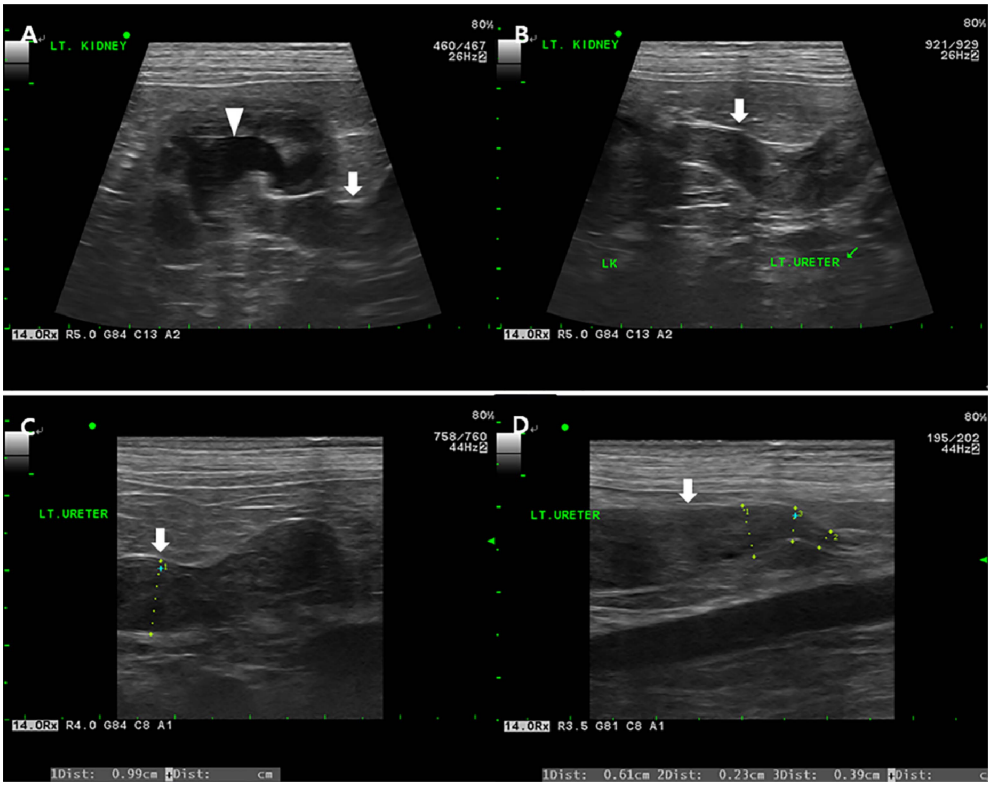

Fig 1. Abdominal ultrasonographs of the left kidney and proximal ureter. (A, B) The left renal pelvis (1.38 cm) (arrow head) and proximal ureter (0.61-0.99 cm) (arrow) were severely dilated. (C, D) An irregular thickening of the proximal left ureteral wall was present and the dilated ureter was filled with echogenic urine.

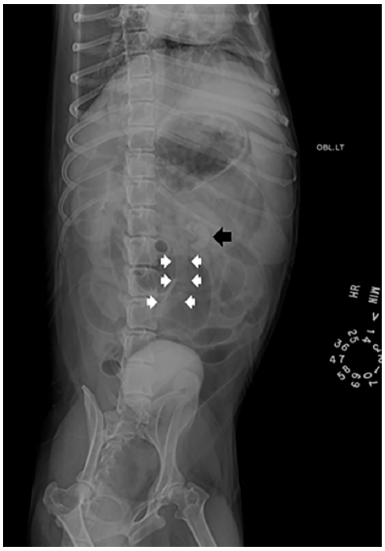

Fig 2. Excretory urogram. Note the dilated left renal pelvis (black arrow) and proximal ureter (white arrow).

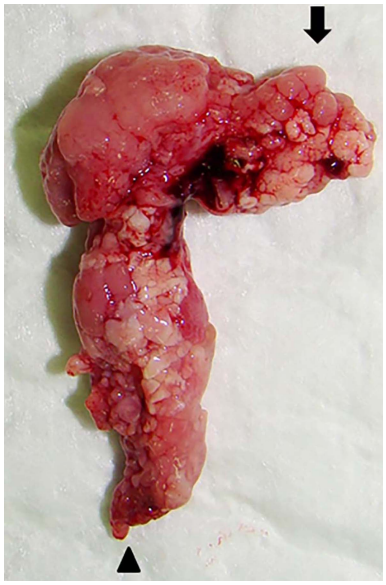

Fig 3. Ureteral papillary transitional cell carcinoma forms a pedunculated intraluminal mass. The cranial part (arrow) and caudal part (arrow head) of the mass.

bladder or the kidney, and the distal ureter appeared normal in diameter. The ureter was transected and the mass was removed. The patient made an uneventful recovery with a simple therapy of enrofloxacin and IV fluids.

Histopathological evaluation of the resected ureteral mass showed a neoplasm associated with the ureteral mucosa (Fig 4). The mass was characterized by papillary features with prominent proliferation of the surface transitional epithelial cells. These cells were well-differentiated, uniform, and polygonal, with pale eosinophilic cytoplasm and round to ovoid more open nuclei with minimal amounts of coarsely stippled chromatin, and a single nucleolus. The mitotic index was 8. The tumor appears to be more papillary with growth extending into the lumen of the ureter with little actual infiltration of the wall.

The dog was re-examined 10 days postoperatively. The

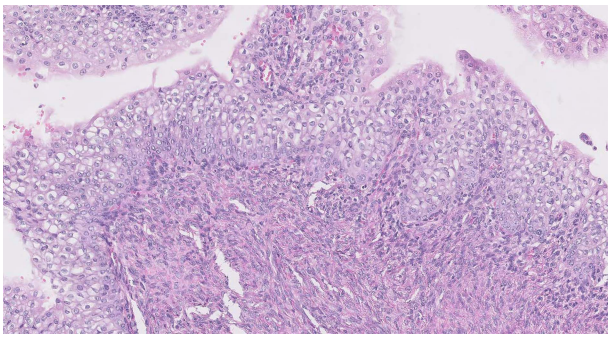

Fig 4. Microscopic appearance of the ureteral papillary transitional cell carcinoma. The mass is typically exophytic, or papillary with prominent proliferation of the surface transitional epithelial cells. × 200 objective.

dog was proved to be healthy without hematuria and dysuria. An abdominal ultrasound showed decreased distension of the left renal pelvis (0.92 cm) and proximal ureter (0.44-0.53 cm); however, the thickened ureteral wall still remained (Fig 5). Thoracic and abdominal radiographs were unremarkable. No chemotherapy or medications were given, and only serial monitoring was recommended for the patient. Also renal diets were recommended to relieve uremia. Abdominal ultrasound, abdominal radiographs and thoracic radiographs were performed at monthly intervals. There were no remarkable changes on all occasions.

Three months after surgery, the patient presented with diarrhea. Serum biochemistry analysis revealed increased creatinine (2.00 mg/dl). No other abnormalities were detected on complete blood count, coagulation parameters, and thoracic radiographs. Abdominal ultrasonography showed a heterogenous echogenic mass (2.2 × 1.5 cm) in the right renal cortex (Fig 6).

Ultrasound-guided percutaneous fine needle aspiration was performed. Cytological findings were consistent with an epithelial cell tumor with mesenchymal features. The dog was treated at the referral hospital. Survival of the patient was verified by telephone 6 months after surgery; however, he was presented with azotemia and increased size of the renal mass. There has been no follow-up since then.

Discussion

Transitional cell carcinoma (TCC) is the most common form of urinary tract cancer in dogs and comprises 2% of all canine malignancies (21). TCC represents 90% of all bladder cancers and is usually detected in the trigone area of the bladder (11). Only one case of TCC originating from the ureter has been reported in a dog (9).

Primary ureteral neoplasms are a rare finding in dogs (17). More frequently, ureteral neoplasia is due to the invasion of a neoplasm from the urinary bladder, which can be TCC (12). Ureteral neoplasms that have been reported in dogs include

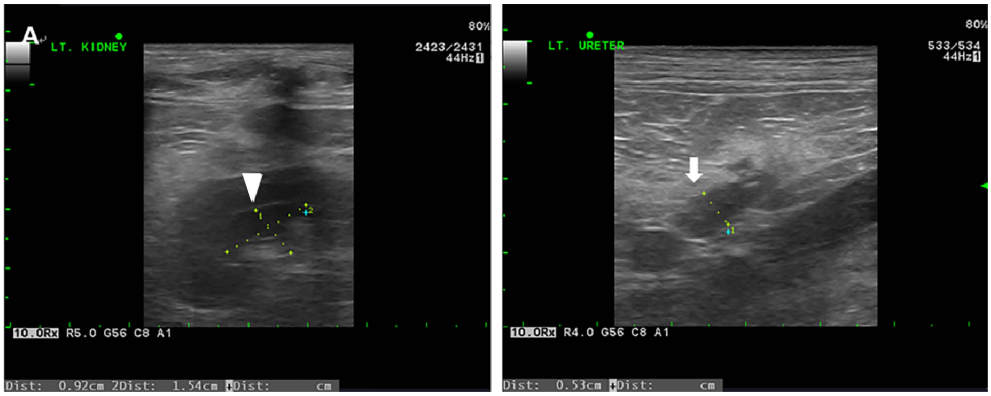

Fig 5. Abdominal ultrasonographs of the left kidney and proximal ureter. (A) Distension of the left renal pelvis (0.92 cm) (arrow head) was decreased. (B) Distension of the proximal ureter (0.44-0.53 cm) (arrow) was decreased.

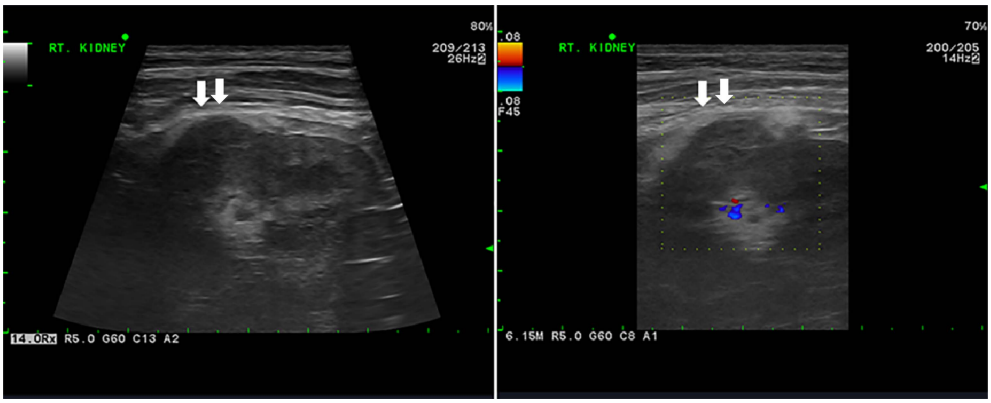

Fig 6. Abdominal ultrasonographs of the right kidney. Three months after surgery, a heterogenous echogenic mass (2.2 × 1.5 cm) in the right renal cortex was observed (arrow).

leiomyomas (6,16), fibropapilloma (10) and fibroepithelial polyps (3,18), leiomyosarcoma (2), transitional cell carcinoma (9), mast cell tumor (20), poorly differentiated sarcoma (5), spindle cell sarcoma (8), and giant cell sarcoma (13).

Clinical signs in the present study, which included hematuria and dysuria, were consistent with those previously reported. In the case of ureteral TCC, the dog was presented with pyrrhexia, anorexia and a palpable abdominal mass (9). In most cases, clinical signs may be minimal or absent until significant size is attained or clinical signs attributable to ureteral obstruction occur (4). Only one case of ureteral neoplasia without obstructive hydronephrosis and hydroureter has been reported (6).

Definitive diagnosis of ureteral neoplasia is difficult without biopsy. In the present case, diagnosis of papillary transitional cell carcinoma originating from the ureteral wall was made based on histopathological examination of the ureteral mass biopsy. Diagnostic imaging techniques, such as intravenous excretory urography (10), ultrasonography (15), computed tomography (19), and scintigraphy (1), can be used to reveal ureteral obstruction. Intravenous excretory urography may show renomegaly, hydronephrosis and hydroureter (10, 18,20). Ultrasonography is a sensitive method for confirming hydronephrosis and hydroureter (15), and, as in the present case, it can reveal ureteral lesions (18). Computed tomography and scintigraphy can be used to confirm ureteral obstruction (1,13,19). If diagnostic imaging cannot lead to a diagnosis, laparotomy can be performed to confirm the ureteral tumor, hydroureter and renomegaly (2,5,9).

Most benign neoplasms of the ureter in dogs were located in the proximal portion of the ureter (3,10), while all of the reported malignant ureteral neoplasms were located in the distal ureter (2,5,9,13,20). However, in the present case, the malignant ureteral neoplasm was located in the proximal ureter.

Treatment options for primary ureteral tumors in dogs include unilateral ureteronephrectomy or partial ureterectomy with ureteroneocystostomy (20). Including the present study, no chemotherapy has been performed in cases of reported malignant ureteral neoplasms in dogs (5,8,13).

The prognosis of dogs with benign ureteral tumors is good because of the possibility of complete resection of the tumor (5). The prognosis for malignant ureteral neoplasms is variable (5). In the case of ureteral TCC, the dog was still alive 10 months after surgery (9). Another dog with ureteral spindle cell sarcoma was euthanized 6 months after surgery (8). Presumed metastatic diseases have been described in two cases of ureteral neoplasms in dogs (5,8). In the present case, the patient was still alive 6 months after surgery.

Conclusion

Primary ureteral neoplasms are rare in veterinary medicine. Including the present case, only two cases of ureteral TCC have been reported in the dog. Transitional cell carcinoma should be included in the differential diagnosis of canine ureteral neoplasms.

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개에서 발생한 원발성 요관 이행세포암종 증례

김성수 · 이저순 · 윤수경 · 김수연 · 오현정 · 손정민 · 정선영 · 김보은 · 지서연 · 김대용 · 김완희 · 윤정희 · 최민철[1]

서울대학교 수의과대학

요 약 : 14살령의 중성화 수컷 개가 혈뇨와 배뇨통으로 내원하였다. 복부초음파 검사에서 편측성 수신증과 요관 벽이 국소적으로 두꺼워진 수뇨관증이 진단되었다. 수술적 탐색으로 좌측 근위 요관에서 요관 유래의 관내 종괴가 확인되었으며, 종괴 절제술이 실시되었다. 요관 종괴는 조직학적 검사를 통해 유두상 이행세포암종으로 진단되었다. 환자는 안정적으로 회복되었으나, 수술 3개월 후 또 다른 종괴가 우측 신장에서 발견되었다. 신장 종괴에 대한 세포학적 검사 결과 간엽세포종양으로 진단되었다.

주요어 : 요관 이행세포암종, 원발성 요관 종양, 수신증, 수뇨관증, 복부 초음파