

## Total Resection of the Lower Urinary Tract without the Need of Pelvic Osteotomy in the Treatment of Urethral Neoplasia in a Dog

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### ABSTRACT

**Background:** Urethral neoplasias are rare in small animals and normally have slow growth, but tissue invasion and urethral obstruction are frequent. Prognosis usually is poor due to the high degree of malignancy of the main neoplasias involved. Surgical excision is the main form of treatment, but it should be complete with wide safety margins, making partial or complete removal of the bladder with transplantation of the ureters necessary. This report aims at describing a surgical technique, used in a bitch with urethral tumor, which involved complete resection of vulva, vagina and bladder, followed by ureterocolic anastomosis without pelvic osteotomy.

**Case:** A 10-year-old female White Swiss Shepherd dog, weighing 35 kg, was presented with partial ischuria and haematuria for approximately 30 days, with final development of complete ischuria, vomit and anorexia. Urethral swab was performed, and the material obtained was fixed for cytological examination, which revealed the presence of malignant epithelial neoplasias, giving the case a direction. Staging was achieved through thoracic radiographs in two recumbent views, and metastatic lesions were not found. A radical surgery was proposed to the owner for the treatment of the patient. The surgical procedure involved complete removal of the lower urinary tract, vagina and vulva, followed by reimplantation of the ureters in the colon (ureterocolic anastomosis). The patient recovered well from surgery, and urinary continence was maintained, along with quality of life. Transitional carcinoma in the urethral mucosa was characterized by histological diagnose, which revealed safe margins. Clinical evaluations were made daily, with detailed observation of urination, urine volume and color. From the second postoperative day on, fecal consistency from pasty to liquid and fetid odor were observed. Control of urination was only achieved after the fifth day. Ten days after the surgery, the patient was discharged, when the external sutures were removed. The patient lived well for six months, when it died of an indeterminate cause. Necropsy was not allowed by the owner.

**Discussion:** Although primary urethral neoplasias are considered to be rare in dogs, its incidence is higher in females with age around 10 years, as was observed in this case report. Surgery may be the most promising treatment for urethral neoplasias in dogs, since they are not considered chemosensitive and the results of radiotherapy do not seem satisfactory. Urethral reimplantation on the digestive tract is an old technique described in the literature with satisfactory results, but with a lot of reports of postoperative complications which did not occurred in this case. Cystectomy followed by ureterocolic anastomosis allows the bladder to be completely excised while maintaining urinary continence and quality of life. The technique used was proved suitable for the treatment of urethral neoplasias that require complete removal of lower urinary tract so that wide margins are achieved. The approach used, as described, is less complicated than the ventral approach with pubic osteotomy. The described technique, without pelvic osteotomy, may benefit patients with urethral neoplasias, once it is a less painful procedure, with fewer post-operative complications. Good patient recovery and wide margins obtained are sufficient to valorize this surgical technique.

**Keywords:** urethra, transitional cell, carcinoma, ureterocolic anastomosis.

## INTRODUCTION

Neoplasias of the urinary tract of dogs and cats are rare, and urethral neoplasias are, in most cases, extensions of bladder or prostatic tumors with a malignant behavior, and transitional carcinoma is the most frequently reported type of cancer of the urinary tract and urethra of small animals [4,5,9,12].

Urethral carcinomas have slow growth, but tissue invasion and urethral obstruction are frequent. In about 40% of cases metastasis occurs, especially to regional lymph nodes, lungs, liver, pelvic bones and vertebrae [4,9,11].

Prognosis usually is poor due to the high degree of malignancy of the main neoplasias involved [9,11]. Treatment options include surgical excision, radiotherapy and chemotherapy [4,9]. Surgical excision should be complete with wide safety margins, making partial or complete removal of the bladder with transplantation of the ureters necessary.

Complete cystectomy followed by ureterocolic anastomosis is a surgical technique that consists of permanent urinary diversion, indicated when complete removal of the bladder and urethra is necessary, when the neoplasia involves the bladder trigone, or when obtaining clean surgical margins in lower urinary tract tumors is desired [7,9,13,14].

This report aims at describing a surgical technique, used in a bitch with urethral tumor, which involved complete resection of vulva, vagina and bladder, followed by ureterocolic anastomosis without pelvic osteotomy.

## CASE

A 10-year-old female White Swiss Shepherd dog, weighing 35 kg, was presented with partial ischuria and haematuria for approximately 30 days, with final development of complete ischuria, vomit and anorexia.

During clinical evaluation, it was detected full bladder and painful abdominal palpation, challenging progression of the catheter and bleeding during urethral catheterization.

Complete blood count was normal, while serum biochemical analysis revealed increased values of serum urea and creatinine featuring azotemia. Urinalysis showed hematuria and bilirubinuria, although there was no bacterial growth in the urine culture. Ultrasonography revealed only gas in the bladder.

Increased resistance during progression of the urethral catheter allowed the clinicians to suspect of obstruction due to a neoplasia in the middle portion of the urethra. Urethral swab was performed, and the material obtained was fixed for cytological examination, which revealed the presence of malignant epithelial neoplasias, giving the case a direction. Staging was achieved through thoracic radiographs in two recumbent views, and metastatic lesions were not found.

The patient was submitted to the hospital so that surgery could be performed, with a 12 h fasting and 6 h without water. Prophylactic antibiotics were used 24 h prior to the surgical procedure, with metronidazole<sup>1</sup> (15 mg/kg every 12 h) and enrofloxacin<sup>2</sup> (2,5 mg/kg every 12 h), along with the administration of an enema. Anesthetic premedication consisted of intramuscular acepromazine<sup>3</sup> (0,05 mg/kg) and meperidine<sup>4</sup> (3 mg/kg). Induction was obtained with intravenous propofol<sup>5</sup> (5 mg/kg) allowing intubation, followed by maintenance with isoflurane.

Surgical technique was performed according to the aseptic principles [6]. The abdominal cavity was explored through a retro-umbilical midline incision of approximately 15cm, allowing the identification and exteriorization of the bladder (Figure 1). Ureters were sectioned and dissected from their retroperitoneal connections.

Two Doyen intestinal forceps were applied to the descending colon, and the ureters anastomosis site were coordinated in different sites of the antimesenteric border. A 3 cm longitudinal incision was performed in the colon, so that intestinal lumen could be visualized. A 5 mm fragment of intestinal mucosa was removed, allowing the passage of a Halsted hemostatic forceps that progressed between the mucosa and submucosa layers for approximately 3 cm, towards the ureterocolic anastomosis site. An 1 cm incision was performed in the intestinal site where the tip of the hemostatic forceps was. The ureter was fixed to this forceps and gently pulled between the mucosa and submucosa layers of the colon to the site where an intestinal mucosa defect was created. Due to trauma caused by the hemostatic forceps, the ureteral distal extremity was sectioned and sutured to the intestinal mucosa using a simple interrupted pattern with a 6-0 caliber polyglecaprone-25 violet stained<sup>6</sup> suture. The same procedure was performed in the contralateral ureter (Figure 2). The intestinal defect was corrected with a simple in-

errupted seromuscular suture pattern with 4-0 caliber poliglecaprone-25 violet stained<sup>7</sup> sutures (Figure 2).

An elliptic incision was made surrounding the vulva. Perivulvar and perivaginal tissue were divulsed accordingly to the elliptical contour until abdominal cavity was reached through the pelvic cavity. The entire lower urinary tract (bladder and urethra) was removed by an en block resection along with the vagina and vulva through the pelvic cavity, which assured that the urethral neof ormation was continuously removed, with wide margins (Figure 3).

A three-plane suture was then performed, with closure of the abdominal wall and dead space obliteration using a 2-0 caliber poliglecaprone-25 violet stained<sup>7</sup> and skin sutures with 3-0 caliber monofilament of nylon .

Perineal surgical defect was also corrected with reconstruction of the pelvic musculature, dead space obliteration and skin sutures.

Removed tissues were fixed in 10% formalin and submitted to histopathological examination. His-

topathological evaluation revealed the presence of a tumoral fragment compatible with transitional carcinoma in the urethral mucosa. The examined fragment had margins free of neoplastic cells (safe margins).

The patient was maintained under intravenous saline infusion at the dose of 100 mL/kg during 24 h following the surgical procedure, and liquid diet for five days. Antibiotics were given for a period of ten days.

Post-operative analgesia was obtained with the use of 0,1 mg/kg of maxicam<sup>8</sup> every 24 h subcutaneously and 4 mg/kg of tramadol<sup>9</sup> every 8 h subcutaneously, for five days. Clinical evaluations were made daily, with detailed observation of urination, urine volume and color. From the second postoperative day on, fecal consistency from pasty to liquid and fetid odor were observed. Control of urination was only achieved after the fifth day. Ten days after the surgery, the patient was discharged, when the external sutures were removed.

The patient lived well for six months, when it died of an indeterminate cause. Necropsy was not allowed by the owner.



Figure 1. Bladder's exteriorization.



Figure 2. Ureterocolonic anastomosis accomplished. Note ureters sutured in different sites of the colon's antimesenteric border.

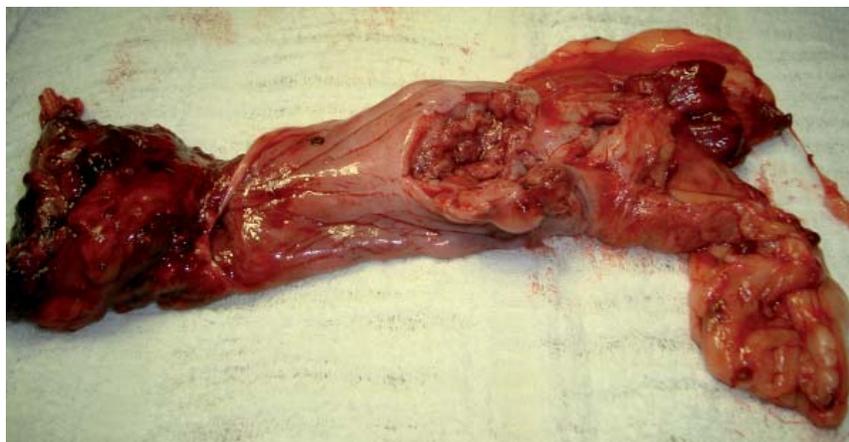


Figure 3. Total resection of the lower urinary tract, vagina and vulva.

## DISCUSSION

Although primary urethral neoplasias are considered to be rare in dogs, its incidence is higher in females with age around 10 years [4,5,9,12], as was observed in this case report. Clinical signs presented in this case are compatible with post renal azotemia due to the progressive obstruction of the urethra by the neoplastic growth. Haematuria is justified as a consequence of tumoral exfoliation and inflammatory process of the bladder [4,9].

Surgery may be the most promising treatment for urethral neoplasias, since they are not considered chemosensitive and the results of radiotherapy do not seem satisfactory [4]. Use of cytostatic agents and non-steroidal anti-inflammatory drugs may cause stabilization of the disease and retard its progression but it is not curative [3,9,10].

Urethral reimplantation on the digestive tract is an old technique described in the literature with satisfactory results, but with a lot of reports of postoperative complications [2,13,15].

Large intestine, as well as small intestine, are viable alternatives to the diversion of ureters, although the colon seems to be more appropriate, since it is the most distal portion of the digestive tract, allowing a shorter contact time between urine and intestinal mucosa, whose consequences are not known in worldwide literature [1,13].

Occurrence of pasty to liquid feces, with strong odor, observed postoperatively was expected due to the drainage of urine to the intestinal lumen [14]. In contrast other authors, neurologic abnormalities, nausea or vomit were not observed during the postoperative period as a consequence of hyperammonemia, uraemia and metabolic acidosis [15].

Problems related to the surgical procedures that involve permanent diversion of the urinary flow to the intestine include stenosis or dehiscence in the site of the anastomosis [2,13], resorption of urine components with development of azotemia or metabolic acidosis [2,14,15], deleterious effect in the ureter peristaltic

activity with the development of hydroureter until ureteral peristalsis is reestablished [8] and occurrence of feces contaminated urine reflux to the ureter, resulting in pyelonephritis, compromised renal function and progressive hydronephrosis [2,8,13-15], which were not observed in this case.

Cystectomy followed by ureterocolic anastomosis allows the bladder to be completely excised while maintaining urinary continence and quality of life [13,14].

Radical surgical treatment with ureterocolic anastomosis is viable, once it allows longer time without the disease while maintaining the patient's quality of life [13-15]. The technique used was proved suitable for the treatment of urethral neoplasias that require complete removal of lower urinary tract so that wide margins are achieved. The approach used, as described, is less complicated than the ventral approach with pubic osteotomy.

The good recovery of the patient and the wide margins achieved on the case reported is enough to valorize this surgical technique. Postoperative enteral diet was efficient, once it prevented the patient's nutritional debility, and did not compromise the intestinal anastomosis.

## SOURCES AND MANUFACTURERS

<sup>1</sup>Metronidazol 0,5%, Isofarma®, Eusébio, CE, Brazil.

<sup>2</sup>Flotril® 2,5%, MSD Saúde Animal®, São Paulo, SP, Brazil

<sup>3</sup>Acepran® 1%, Vetnil®, São Paulo, SP, Brazil

<sup>4</sup>Cloridrato de petidina 50mg/mL, União Química®, São Paulo, SP, Brazil.

<sup>5</sup>Propovan® 10 mg, Cristália®, São Paulo, SP, Brazil.

<sup>6</sup>Caprofyl®, Ethicon®, São Paulo, SP, Brazil.

<sup>7</sup>Nylon®, Ethicon®, São Paulo, SP, Brazil.

<sup>8</sup>Maxican® 0,2%, Ourofino®, Cravinhos, SP, Brazil.

<sup>9</sup>Cloridrato de tramadol 50 mg/mL, União Química®, São Paulo, SP, Brazil.

**Declaration of interest.** The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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