CASE REPORT

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Surgical correction of bilateral ectopic ureter using the neoureterocystostomy technique

Correção cirúrgica de ureter ectópico bilateral utilizando a técnica de neoureterocistostomia

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ABSTRACT

Ureteral ectopy is a rare disorder in the small animals' clinic. It is characterized as a congenital anomaly, resulting from the ducts differentiation failure during embryogenesis. In this scenario, the ureters present themselves outside the anatomical site, being inserted into the uterus, urethra, urinary vesicle neck, or vagina. The clinical signs are urinary incontinence and perivulvar dermatitis. Surgery is the accepted treatment to correct the anomaly. The surgical procedure is based on relocating the ectopic ureter and treating associated modifications. This report describes a case of intramural bilateral ureteral ectopy, corrected surgically through the neoureterocystostomy technique, making it possible to control the animal's urinary incontinence.

Keywords: Genito-urinary disorders. Urinary incontinence. Ureter. Urinary vesicle.

RESUMO

A ectopia ureteral é uma afecção de incidência rara na clínica de pequenos animais, sendo caracterizada como anomalia congênita resultante de falha na diferenciação dos ductos durante a embriogênese. Neste cenário, os ureteres se apresentam fora do seu local anatômico, sendo inseridos no útero, no colo da vesícula urinária, na uretra ou na vagina. Os sinais clínicos comumente apresentados são a incontinência urinária bem como a dermatite perivulvar. O tratamento de eleição para correção da anomalia é o procedimento cirúrgico, no qual a técnica de escolha é baseada na relocação do ureter ectópico e tratamento das alterações associadas. Neste contexto, o presente relato descreve um caso de ectopia ureteral bilateral intramural, corrigido cirurgicamente por meio da técnica neoureterocistostomia, o que possibilitou controle da incontinência urinária do paciente.

Palavras-chave: Afecções geniturinárias. Incontinência urinária. Ureter. Vesícula urinária.

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Case Report

Ectopic ureter is a condition rarely observed in the small-animal clinical practice (Prado et al., 2014). The condition is described as a congenital anomaly resulting from failure during the differentiation of the mesonefricos and methanofricos ducts during embryogenesis (McLoughlin & Chew, 2000; Prado et al., 2014). Thus, the abnormal location of ureters occurs, being unilateral or bilateral, such as intramural or extramural (Prado et al., 2014). Ectopic insertions include the urinary vesicle neck, proximal or medial urethra, uterus or vagina for females, and males, insertion in the prostatic urethra (McLoughlin & Chew, 2000). In the extramural presentation, the ectopic ureter is characterized by the complete deviation of the urinary vesicle without anatomical fixation. Thus, the ureter connects directly to the urethra, vagina, or uterus (McLoughlin & Chew, 2000). On the other hand, in intramural failure, the ureter attaches to the dorsal surface or dorsolateral of the urinary vesicle but fails to reach the vesicle trine, which occurs in the urinary vesicle neck, urethra, or vagina (Prado et al., 2014). The clinical signs presented by affected animals are urinary incontinence, dermatitis in the vulva or foreskin region due to the uninterrupted presence of urine, secondary bacterial infection, and vulvar eczema with hyperpigmentation (McLoughlin & Chew, 2000). Urinary tract disorders, such as hydronephrosis, a dilated ureter, cystitis, and hydroureter, have been reported in 64% of patients with ectopic ureter (McLoughlin & Chew, 2000). The diagnostic methods for ureteral ectopy are based on findings of the physical examination, clinical presentation, and complementary imaging tests. These tests include excretory urography and abdominal ultrasound, allowing the recognition of the ureter location, size, and morphology (Hoelzler & Lidbetter, 2004; McLoughlin & Chew, 2000).

Neoureterocystostomy is indicated for the correction of the intramural ectopic ureter in cases of a difficult location of the terminal segment or when located cranially to the trine. Thus, the ureter insertion in the urinary vesicle occurs, promoting acceptable results to reduce urinary incontinence levels (Mathews, 2018). Moreover, ureteronephrectomy is used in cases involving the upper urinary tract (Prado et al., 2014). It is highlighted that in the presentation of the extramural ectopic ureter, transection may occur, followed by reimplantation within the urinary vesicle, ureterocystostomy flame, or ureteroneocystostomy. However, such a procedure can damage the urethral blood supply and disrupt the peristaltic activity of the ureter (Taney et al., 2003). In this context, this study reports a case of the bilateral intramural ectopic ureter, with the presence of a hydroureter in the right ureter. Corrective surgery using the neoureterocystostomy technique was performed to treat the condition and demonstrated to control urinary incontinence.

A 4-year-old sterilized female dog weighing 6.8 kg was assessed by the endocrinology service at the Animal Hospital in São Roque. The owner complained of the animal's intermittent urinary incontinence since its acquisition. On general physical examination, the animal was conscious and alert, hydrated, with the normal oral mucosa, and colored eyes. The rectal temperature was 38°C, heart rate of 128 bpm, and respiratory rate of 36 mpm, and capillary filling time of 2 sec. However, perivulvar dermatitis was observed. Requested exams were abdominal ultrasound, urinalysis, blood count, and complete biochemical examination (creatinine, urea, alkaline phosphatase, and glutamic-pyruvic transaminase), as well as a glycemic test. No changes in kidneys were observed in the abdominal ultrasound. In the urinalysis, the animal presented proteinuria (++) and the presence of leukocytes, in contrast to non-differentiated hematological tests, within reference values, blood glucose value of 140mg/dL. The animal was treated for 10 days with estriol, administered at a dose of 0.25mg/kg, and enrofloxacin 25mg/SID. After the 10-day treatment, since the animal still presented urinary incontinence, excretory urography and an urethrocystography exam were requested. These exams showed bilateral ectopic ureter, without adequate filling of the urinary vesicle and also ectopically in the pelvic canal. Moreover, the ureter in the right renal pelvis presented an obstructive process (Figure 1). Therefore, surgical treatment was proposed.

The pre-anesthetic medication was methadone (0.3/kg), midazolam (0.1mg/kg), and acepromazine (0.01mg/kg), and induction was performed with ketamine (2mg/kg), and

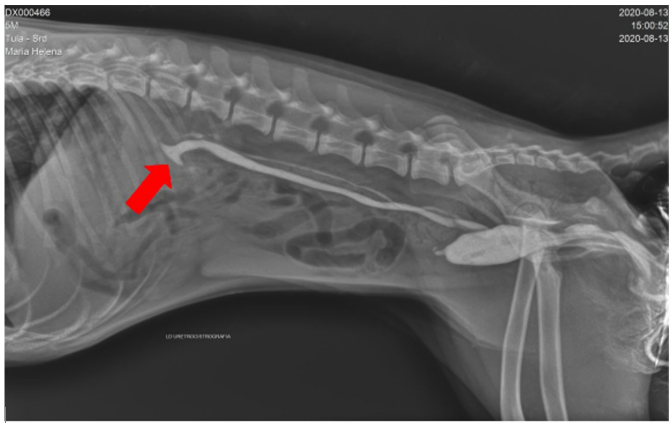

Figure 1 – Right lateral radiography in a female dog affected by ectopic ureter. Excretory urography was evidenced after 60 min, demonstrating dilation of the right pelvis and ureter throughout its extension, suggesting obstructive process, and dilation of the left ureter (Red Arrow).

propofol (4mg/kg). Subsequently, an epidural block using Weiss needle with bupivacaine was applied (0.5m/kg) and followed by maintenance with isoflurane. The animal was placed in the supine position. An incision of the ventral midline was performed, starting at the retro umbilical region up to the pubis. The abdominal observation revealed a bilateral intramural ectopic ureter, observed in the right ectopic ureter (Figure 2), but it was not possible to probe the ureters (Figure 3), so the surgical technique of choice was neoureterocystostomy. The terminal segment of the ureter has been dried out of the surrounding tissues to the urinary vesicle neck and distal connection of the ureter was performed with 3.0 absorbable wire. Subsequently, an upper ventral cystostomy was performed, with two incisions in the urinary vesicle mucosa for ureter insertion. Then, the ureter mucosa was sutured to the urinary vesicle mucosa with polyglycolic wire 5.0 in separate simple stitches (Figure 4). After this procedure, the suture of the urinary vesicle was performed with polyglycolic 3.0 with solid simple stitches. Finally, abdominal omentalization and suture were performed in muscles with continuous simple stitches, subcutaneous with modified Cushing, and skin according to a continuous Wolff pattern with nylon 3.0.

In the immediate post-surgical period, pain control was performed with intravenous tramadol hydrochloride 3mg/kg/SID and intravenous dipyrone 25mg/kg/SID. After 3 days of surgical procedure, abdominal ultrasound, blood count, and biochemical profile (creatinine, urea, alkaline phosphatase, and glutamic-pyruvic transaminase) were performed. On ultrasound, the urinary vesicle was absent from liquid repletion, the walls little delimited on its internal surface and echogenic. The kidneys were preserved in shape with slightly enlarged dimensions in the right kidney (left

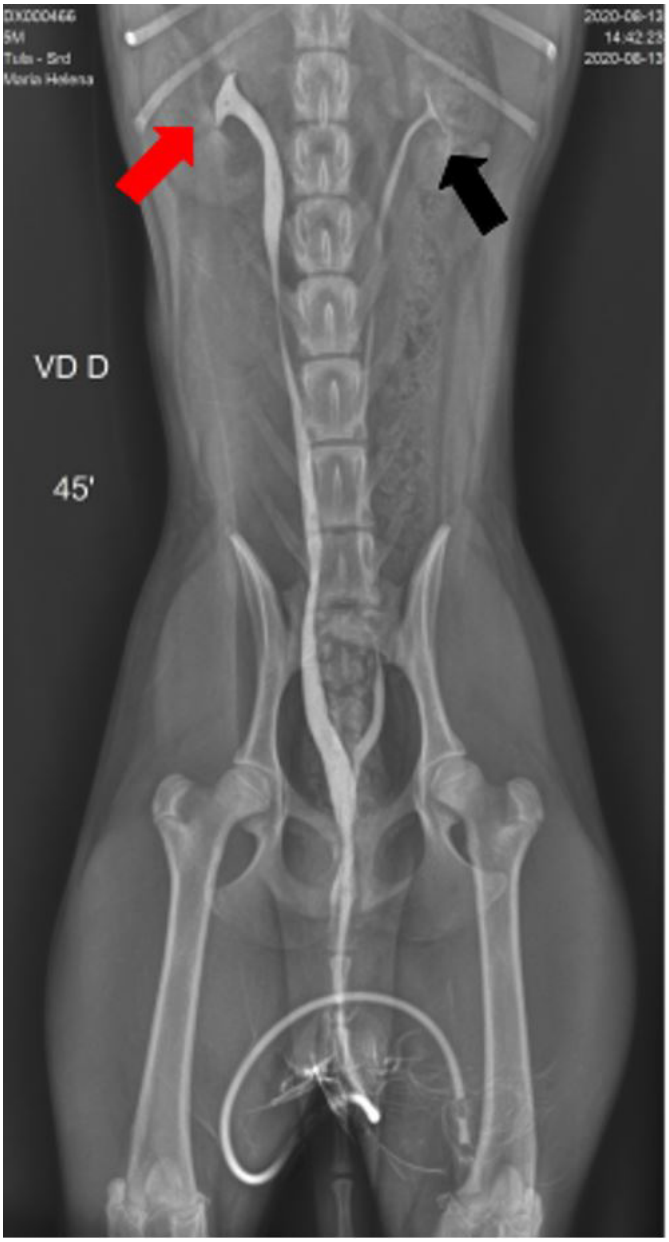

Figure 2 – Ventrodorsal radiography in a dog affected by an ectopic ureter. Excretory urography was observed after 60 min, visualizing dilation of the right renal pelvis with dilation in all its extension (Red Arrow) and using contrast media in the left ureter (Black Arrow).

kidney length: 3.82cm and right kidney: 5.61cm) being asymmetrical. The renal parenchyma was thinly coarse, both with reduced delimitation, bilateral dilation of the pelvis, and urethral lumen dilatation along its entire path, bilaterally measuring up to 0.85cm in diameter in the left ureter and 0.9cm on the right ureter, characterizing the hydroureter condition. No changes were observed in the blood count. The biochemical examination showed increased levels of urea (228mg/dL), creatinine (8.3mg/dL), and alkaline phosphatase (404IU/L). Treatment with fluid therapy was performed at the rate of 2ml/kg/hour and antibiotic with intravenous cephalotin 30/mg/kg/IDB for 10 days.

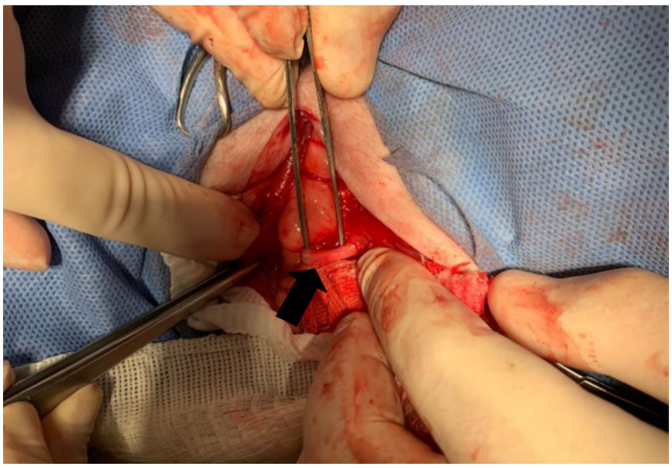

Figure 3 – Surgical aspects observed were the dilated right ectopic ureter (Black Arrow).

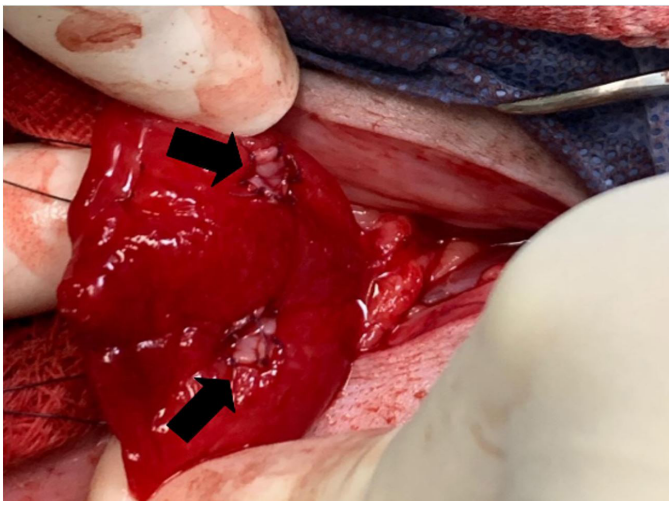

Figure 4 – Surgical aspects observed. Right and left ectopic ureter inserted in a new urethral ostium in the region of bladder vesical trigone (Black Arrows).

An ectopic ureter is a renal anomaly associated with continuous urinary incontinence or intermittence, but in young animals, this symptom is insufficient to confirm the diagnosis (McLoughlin & Chew, 2000). Therefore, urinary tract infections, such as cystitis or urethral calculus, neurogenic disorders, incompetence of the primary urethral sphincter, endocrine abnormalities, liver or kidney dysfunction, and neoplasia are differential diagnoses (McLoughlin & Chew, 2000). In the current case, the female dog was young, presenting signs of cystitis and renal dysfunction. Although ectopic ureter is a congenital renal anomaly, it is a rare condition, not commonly diagnosed. But its observation in young females is common due to the identification of clinical manifestations consisting of urinary incontinence from birth. Moreover, bilateral ectopic urethral presentation is more frequently observed (Prado et al., 2014). As described in this case, the bilateral ectopic ureter was presented, and females presented clinical manifestations from birth. Furthermore, according to McLoughlin & Chew (2000), urinary incontinence associated with bacterial infection of the urinary tract, as well as perivulvar dermatitis, are common clinical signs found in patients affected by this condition, as evidenced in this case report.

Excretory urography is considered an efficient diagnostic method for obtaining information on the size, location, and morphology of the ectopic ureter, as proposed by Hardie & Kyles (2004). However, McLoughlin & Chew (2000) showed that other diagnostic methods can be indicated, such as cystoscopy, presenting a better approach for the ectopic ureter classification. Moreover, Hoelzler & Lidbetter (2004) reported computed tomography as extremely important and is currently the most indicated. However, in this case, only excretory urography was used and it was possible to reach the final diagnosis (Oliveira et al., 2013). McLoughlin & Chew (2000) pointed out that the results from the hematological and serum biochemistry will usually be within normal limits unless the patient has upper urinary tract-associated abnormalities that reduce renal function. The patient presented altered values related to creatinine and urea due to renal parenchyma alteration caused by renal pelvis dilation. Initial treatment using estriol, estrogenic homonym can be performed to control urinary incontinence, restoring the normal function of the urethra and urinary vesicle (Nickel et al., 1998). Enrofloxacin, an antimicrobial and bactericidal drug, can be adopted for treatment due to clinical suspicion of the occurrence of cystitis (Westropp et al., 2012). Both drugs were used in the present case.

Neoureterocystostomy is the technique of choice for the correction of the bilateral intramural ectopic ureter due to its anatomical presentation (Fossum, 2015). According to Fossum (2015), this treatment can also be performed through ureteroneocystostomy or laser ablation techniques. However, neoureterocystostomy was used in this case due to the routine and experience of surgeons. The surgical treatment of the ectopic ureter demonstrated good results, with reduction of urinary incontinence levels, promoting stability for the affected patient, and reducing secondary diseases. In this case, after 15 days of surgical treatment, the dog showed positive patterns for urination control.

In conclusion, young animals with urinary incontinence may present ectopic ureter, so this suspicion should be included during the clinical evaluation. It is a rare condition and still poorly diagnosed. Thus, abdominal ultrasonography is important for analyses of urinary tract disorders. However,

it is not sufficient for the final diagnosis, and thus it is essential to perform other examinations, such as excretory urography. The choice of surgical technique should aim to promote greater stability for the animal, with better quality of life. Neoureterocystostomy achieved these objectives, leading to a high recovery rate in the postoperative period.

Conflict of Interest

The authors declare no conflict of interest.

Ethics Statement

The authors declare no Institutional Animal Care and Use Committee or other approval was needed.

References

Fossum TW. Cirurgia do rim e do ureter. In: MacPhail, CM. Cirurgia de pequenos animais. Rio de Janeiro: Elsevier; 2015, p. 719-21.

Hardie ME, Kyles EA. Management of ureteral obstruction. Vet Clin North Am Small Anim Pract. 2004;34(4):989-1010. http://dx.doi.org/10.1016/j.cvsm.2004.03.008. PMid:15223212.

Hoelzler MG, Lidbetter DA. Surgical management of urinary incontinence. Vet Clin North Am Small Anim Pract. 2004;34(4):1057-73, viii. http://dx.doi.org/10.1016/j.cvsm.2004.03.003. PMid:15223216.

Mathews K. Ureters. In: Johnston S, Karen M. Veterinary surgery small animal. Rio de Janeiro: Elsevier; 2018, p. 5954-6002.

McLoughlin MA, Chew DJ. Diagnosis and surgical management of ectopic ureters. Clin Tech Small Anim Pract. 2000;15(1):17-24. http://dx.doi.org/10.1053/svms.2000.7302. PMid:10911681.

Nickel RF, Wiegand U, van den Brom WE. Evaluation of a transpelvic sling procedure with and without colposuspension for treatment of female dogs with refractory urethral sphincter mecha-nism incompetence. Vet Surg. 1998;27(2):94-104. http://dx.doi.org/10.1111/j.1532-950x.1998.tb00104.x. PMid:9525023.

Oliveira DMMC, Reusing MSO, Silva DM, Sanson BC, Oliveira DR, Froes TR, Guérios SD. Bi-lateral ureteral ectopia in female dogs: diagnosis, surgical treatment, and clinical outcomes. Acta Sci Vet. 2013;41(1):1-4.

Prado TD, Gouveia CT, Amaral ZSA, Ribeiro GR. Ectopic ureters in dogs. Agra Acad. 2014;1(2):171-6.

Taney KG, Moore KW, Carro T, Spencer C. Bilateral ectopic ureters in a male dog with unilateral renal agenesis. J Am Vet Med Assoc. 2003;223(6):817-20, 810. http://dx.doi.org/10.2460/javma.2003.223.817. PMid:14507098.

Westropp JL, Sykes JE, Irom S, Daniels JB, Smith A, Keil D, Settje T, Wang Y, Chew DJ. Evalua-tion of the efficacy and safety of high dose short duration enrofloxacin treatment regimen for uncomplicated urinary tract infections in dogs. J Vet Intern Med. 2012;26(3):506-12. http://dx.doi.org/10.1111/j.1939-1676.2012.00914.x. PMid:22486931.

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