

## Iatrogenic hydronephrosis after ovariosalpingohysterectomy therapeutic correction

Correção de hidronefrose iatrogênica após ovariosalpingohisterectomia terapêutica

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### Abstract

The ovariosalpingohysterectomy (OSH) is a relatively safe procedure. However, an iatrogenic is described to accidental ligation or traumatic of ureter, which could result to hydronephrosis, a disease due to superior urinary tract. The article has a objective to describe the case of a canine submitted to ureteroneocystostomy due to iatrogenic hydronephrosis after OSH. Was attend a canine, female, eight years old weighing 22kg, presenting urinary incontinence and nocturia. The patient underwent to a procedure of OSH five months ago, started to manifest symptoms of heat cycle after surgery. At the ultrasound exam found a remnant ovary syndrome and pyometritis in uterine colon, being subjected to a therapeutic approach OSH. Past some days, with new symptoms the ultrasonic exam has revealed a hydronephrosis of the right kidney and right hydroureter. The procedure was successfully done with no intercurrence. In spite of OSH has a very low casuistry of complications, when then occurs, the correct diagnosis due to right treatment is primordial to health and stabilization of the animal.

**Keywords:** Castration; Procedure; Urinary incontinence; Nocturia; Ureteroneocystostomy.

### Resumo

O procedimento de ovariosalpingohisterectomia (OSH) é relativamente seguro. Todavia, uma iatrogênia descrita é a ligadura acidental ou traumática do ureter, podendo resultar em hidronefrose, uma afecção decorrente da obstrução do trato urinário superior. O presente relato tem como objetivo descrever o caso de um canino submetido a um procedimento de ureteroneocistostomia devido a hidronefrose iatrogênica após OSH. Foi atendido um canino, fêmea, 8 anos e pesando 22kg, apresentando incontinência urinária e noctúria. O paciente havia realizado OSH há 5 meses, e começou a manifestar sinais de cio após o evento. Ao exame ultrassonográfico, constatou-se síndrome do ovário remanescente direito e piometrite no coto uterino, sendo submetido a OSH terapêutica. Decorrido alguns dias, com novos sinais ao exame ultrassom revelou hidronefrose renal direita e hidroureter direito. Sendo assim, realizado ureteroneocistostomia com cateterização ureteral direita. O procedimento foi efetuado com êxito e sem intercorrências. Apesar da OSH ter uma casuística de complicações consideravelmente baixa, quando ocorrem, o correto diagnóstico, associado ao tratamento correto é primordial para saúde e estabilização do animal.

**Palavras-chave:** Castração; Procedimento; Incontinência urinária; Noctúria; Ureteroneocistostomia.

### Resumen

El procedimiento de ovariosalpingohisterectomía (OSH) es relativamente seguro. Sin embargo, una iatrogenia descrita es la ligadura accidental o traumática del uréter, que puede resultar en hidronefrosis, una condición que resulta de la obstrucción del tracto urinario superior. El presente reporte tiene como objetivo describir el caso de un canino sometido a un procedimiento de ureteroneocistostomía por hidronefrosis iatrogénica posterior a OSH. Se atendió un canino, hembra, de 8 años y 22 kg de peso, que presentaba incontinencia urinaria y nocturia. La paciente había sido sometida a

SST 5 meses antes, y comenzó a presentar signos de celo tras el evento. El examen de ultrasonido reveló síndrome de remanente de ovario derecho y piometritis en el muñón uterino, y la paciente se sometió a SST terapéutica. A los pocos días, con nuevos signos, la ecografía reveló hidronefrosis renal derecha e hidrouréter derecho. Por lo que se realizó ureteroneocistostomía con cateterismo ureteral derecho. El procedimiento se realizó con éxito y sin incidentes. Aunque la SST tiene un número considerablemente bajo de complicaciones, cuando se presentan, el correcto diagnóstico, asociado al correcto tratamiento, es fundamental para la salud y estabilización del animal.

**Palabras clave:** Castración; Procedimiento; Incontinencia; Nicturia; Ureteroneocistostomía.

## 1. Introduction

The hydronephrosis is a disease due to obstruction of the superior urinary tract. After the obstruction, the renal tubules became dilated, resulting in the increasing of hydrostatic pressure intraluminal. However, the glomeruli keep producing glomerular ultrafiltrated (Santos & Alessi, 2016). The obstruction can be sudden or insidious, partial or completed, uni or bilateral. Besides it can occur at any level of the urinary tract, since urethras to renal pelvis (Alpers, 2005). Could be the resulting from iatrogenic lesions, abdominal trauma or renal obstruction from ureterolithiasis or neoplasm (Smith, 2014; Balakrishnan & Drobatz 2013).

Even though ovariosalpingohysterectomy (OSH) is consider a simple and safe procedure there are some risks and complications (Pollari et al., 1996). The commons forms are hemorrhage, the accidental ligature or ureter trauma, a fistula formation and uterine colon granuloma (Santos et al., 2023). The accidental ligature or ureter trauma can occur at the moment of ligature pedicle ovarian or uterine colon, resulting in hydronephrosis (Howe, 2006).

A precocious intervention with surgical procedure is indicated to maintain a kidney function. The laying of double j-stent has been realized frequently to treatment of ureteral obstruction (Grimes et al., 2018). Rarely is realized a nephrectomy when the arch and the kidney vascular supply are normal (Rosin et al., 1996).

The present article has the objective to describe the case of a canine that was submitted to an ureteroneocystostomy with double j-stent aid in sequence of a hydronephrosis iatrogenic due to ovariosalpingohysterectomy therapeutic.

## 2. Case Report

An 8-year-old female canine weighting 22kg without a defined breed was admitted presenting urinary incontinence and nocturia. The animal has realized an OSH elective procedure 5 months ago. Later it manifested symptoms of heat cycle, was realized an ultrasound exam that verify a right ovaries reminiscent syndrome and pyometrits in uterine colon. Therefore, was submitted to a new intervention of therapeutic OSH. After two procedures it started presenting urinary incontinence and nocturia. At a new ultrasound exam was observed right kidney hydronephrosis and right hydroureter almost total obstruction, showing an interruption of flow on the distal extremity besides moderate azotemia and a discrete leukocytosis in hematologic exam.

At the clinical exams the patient presents normocorated mucosa and normal hydration, heart rate, respiratory rate and lymph nodes are also in normal parameters of the specie. Furthermore, was alert, active, with body score 6/9 and rectal temperature normal (38,3°C). At abdominal palpation was without any apparently pain and some rash into vulva.

Consequently, the individual was submitted to fasting of solid food of 8 hours and without water of 3 hours was guide to an exploratory laparotomy procedure to realization of ureteroneocystostomy with right ureteral catheterization.

The patient was classified as ASA II, according to the American Society of Anesthesiologists. For preanesthetic agent was an association of methadone (0,3mg/kg) and dexmedetomidine (0,15mg/kg) both IM. To induce general anesthesia was slowly given propofol bolus (3mg/kg), fentanyl (2mcg/kg) both IV and ketamine (1mg/kg SC). Continuously the animal was intubated and for maintence of the general anesthesia as used inhalatory anesthesia with isoflurane at the effect, when was necessary has been administrated fentanyl bolus (2mcg/kg IV). The anesthetic procedure duration was 2 hours, within the

constantly monitoring of the heart rate, respiratory rate, blood pressure noninvasive, oxygen saturation and temperature, remained as expected range for the species, without interurrence.

After the induction, the animal was put into dorsal decubitus and realized the skin antiseptis with alcohol 70% and chlorhexidine 4%, followed by alcohol 70%. In the procedure was realized a midline longitudinal incision, used a scissor to extend the incision cranial to caudal until get closer the skin extension, placing wet compresses into the incision margin.

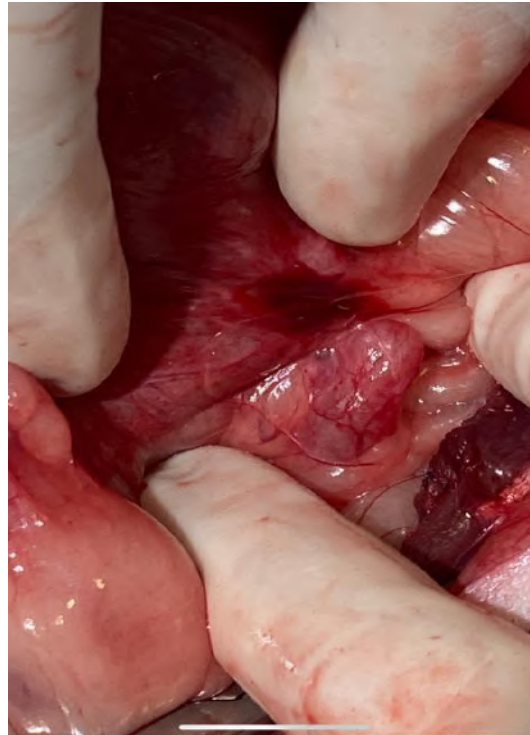
At the exposure of urinary vesicle (UV) was observed a significantly adherence between that and the small intestine (Figure 1) and fibrosis of the tissue. Was done four anchor stitches into UV, visualizing the ureter was done the ligature of right ureter into the ureterovesical join with synthetic suture material (Figure 2), possible a polyglactin and the impossible catheterization of ureter besides ureteral ostium. Then was realized the ligature, resection and reimplant of ureter in new implementation in UV. Was execute an incision into central portion of UV of approximately 4 centimeters along with a little incision at the organ wall and a suture of 5 stitches with simple interrupted suture and poliglecaprone 5-0 to fix the ureter, passed a ureteral probe (size 8) by the ureter and being removed 40ml of urine of the right kidney.

**Figure 1** - Urinary vesicle with adherence.



Source: Authors (2021).

**Figure 2** - Urinary vesicle with signals of irritation and, right ureter dilatation and, synthetic suture stitches.



Source: Authors (2021).

Posteriorly was placed double j-stent to maintain the patency of the new ostium and in the cystotomy closure was done two layers one of simple continuous and cushioning with poliglecaprone 4-0, could be observed the presence of urine into UV. Moreover, was done omentalization in order to not occurs new adherence. The celiorraphy was realized through myorrhaphy of medial muscle line, using Polydioxanone 4-0 into zig zag continuous and the skin with nylon 4-0 intradermal. The animal was kept with urinary probe size 8 to be possible to evaluate urinary output.

The immediately post operation was administrated cephalothin (15mg/kg IV) and methadone (0,3mg/kg SC). The patient kept hospitalized for two consecutively days, with urinary output 1 – 2 ml/kg/h, receiving tramadol (5mg/kg SC), dipyrone (25mg/kg IV) and bepanthol topic into vulva.

At the discharged was stable, with normal appetite, normal urine flow, into previous venous hemogasometric the urinary parameters (creatinine and urea) were on the edge of the species, being prescribed for the postoperative cefalexin (15 mg/kg, BID, VO), tramadol (5mg/kg, TID, VO), dipyrone (25 mg/kg, TID, VO), and Bepanthol ointment into vulvas. Besides the indication of keep the surgical cloths, clean the wound incision and into 10 days do the revision, and after 20 days raise the remotion of the ureteral stent by cystoscopy. The patient was considered grade 2 chronic kidney disease and was indicated do the revision with the nephrologists every 6 months.

### 3. Results and Discussion

The OSH is one of the most realized surgical procedures in the clinical routine of small animals, which has the goal of the birth control, heat and pseudopregnancy prevention as to prevent and treat affection of the female reproduction tract (Trompowsky et al., 2007). Is considered a simple surgery, although, as in any procedure, there are risks of complications, this could be classified as transoperative, immediately postoperative, mediate and late (Santos et al., 2023). The patient in this article has been submitted to two OSH, one elective, which resulted in right remain ovary syndrome, as according to Van Goethem et al. (2006), the remain ovary tends to be the right because of the position location. The syndrome consists of having the presence

of functional ovarian tissue after OSH, and about function into the production of estrogen and progesterone resulting in estrus and pro estrus signals (Howe, 2006). Resulting from this it presents uterine colon pyometra, once the OSH realization doesn't remove all the uterine tissue and the animal has increasing of the progesterone concentration in cases of remain ovarian tissue, can occur this illness (Howe, 2006).

After the therapeutic procedure, it came to present hydronephrosis, a possible iatrogenic surgical complication after OSH (Mesquita et al., 2015). The accidental ligature or ureter trauma can occur into ovarian pedicle ligature procedure or uterine body, being cause of hydronephrosis, and predisposing to pyelonephritis. This is an intercurrency that could be easily prevent by a cautious identification of the uterine horns, body of uterus and cervix before ligature procedure (Howe, 2006), which probably wasn't realized into procedure moment. Furthermore, the animal manifested urinary incontinence, which is not much common after OSH. However, the frequency can increase when it's about elderly female dogs or within less than three months old (Fossum, 2021), but in this case, the animal has 8 years old. The urinary incontinence consists in the uncontrolled urinary act, causing hygiene problems (Reichler, 2009). According to Corrada and Gobello (2004), the female over 20kg is more predisposed to present urinary incontinence (in this case the patient has 22kg).

But hydronephrosis is an illness that affects the kidney pelvis, causing a dilatation and gradual atrophy of kidney parenchyma, resulting of obstruction on the urinary flow, being determinate, mainly, by increasing of pressure into kidney pelvis (Christie & Bjorling, 1998; Confer & Panciera, 1998; Jones et al., 2000; Newman et al., 2011). There are many factors that can cause hydronephrosis highlighting these: the ureter, urethra and bladder obstruction by kidney stone; chronic inflammation; renal pelvis tumor; hyperplasia; tumor and prostate inflammation in males, rectal tumors; abscess and bruise; stenosis; urinary system parasite; trauma; inflammation and diverticulum in bladder; retroperitoneal disease; accidental ligature of ureter, perineal hernia, complications in partial nephrectomy or renal biopsy; abdominal tumors (Christie & Bjorling, 1998; Nascimento et al., 2009; Newman et al., 2011). The individual on this article has a ureter obstruction by an accidental ligature during OSH therapeutic procedure.

The hydronephrosis can be by a partial or total obstruction at any segment of urinary tract, could be uni or bilateral. When bilateral, it is alleged an acute condition and the survival time can be really short, but, when this is unilateral or partial obstruction, the condition tends to be chronic. The clinical signals, when it present, commonly are emesis, sialorrhea, hyporexia, anorexia, oliguria or anuria and abdominal pain (Guimarães, 2018). In this present report the patient was diagnosed with total obstruction of right ureter and hadn't clinical signals besides urinary incontinence and nocturia.

For the diagnoses of hydronephrosis can be realized by ultrasound and radiographic abdominal exam. The excretory urography can be used, but the contrast is nephrotoxic (Kealy et al., 2012). The animal has showed a renal pelvis dilatation but without losing the characteristic contours and ureter dilatation. The unilateral nephrectomy of the stricken kidney is indicated only in advanced cases of hydronephrosis (Christie, 1998), with total loss of the renal parenchyma.

Into the present report was realized the ureteroneocystostomy, which is the implementation of the distal ureter into bladder lumen (Hardie & Kyles, 2004). The distal ureter is removed and clamped by hemostatic tweezers, being subsequently pulled for the inside of the bladder and being realized a longitudinal incision into the ureter of approximately 0,5 cm of spatulation. The ureter mucosa is sutured to the bladder mucosa (Adin & Scansen, 2011), which turns progressively swollen during the procedure, that turns more difficult to visualize and suture, contributing to ureteral obstruction into post operative (Hardie & Kyles, 2004).

The placement of urethral stents tends to decrease considerably the complications arising from surgery (as the leak of urine, which is a principal tutor complaint, stenosis and new obstruction) and can stabilize the patient as the decrease of the renal pelvis pressure (Berent, 2011; Palm & Westropp, 2011). The placing of a double J-Stent allows an immediately decompression of the Kidney (Milligan & Berent, 2019). The double J-Stent is a flexible tube that can be introduced into the ureter lumen during

the surgical procedure to avoid obstruction and stenosis into post operative (Santos et al., 2019); and the collocation allow a decompression immediately of the kidney (Milligan & Berent, 2019) anyway promoting the patient quality of life.

The unilateral hydronephrosis, completed or partial, can remain silent for years, once the kidney not affected can maintain the normal renal function. So, the cystic dilation of the kidneys can be extended before the lesion is recognized. The hydronephrosis can occurs asymptomatic which is a factor that difficult the success of the treatment, that's why is showed that in the initial stages, maybe the first few weeks, the relief of the obstruction leads to reversal to the normal kidney function (Alpers, 2005). In this case, after 2 days, the animal presents obstruction, and the tutors went in search of care. The clearance surgery was realized 15 days after the diagnosed, because initially was tried the clinical approach. Therefore, the fast action of the tutor was essential and decisive to the success of the case. The patient received medical realize after 2 days from the procedure.

#### 4. Conclusion

The present report describes the case of an iatrogenic hydronephrosis correction after the OSH therapeutic procedure. The ultrasound exam showed an effective method into the diagnosis of hydronephrosis even when the common signals of the disease was nonexistent. The surgical treatment was efficient, once carried out right after the obstruction, doing that the animal keeps both kidneys functional.

#### 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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