http://dx.doi.org/10.1590/1678-4162-10533

Arq. Bras. Med. Vet. Zootec., v.71, n.3, p.833-836, 2019

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Crossed renal ectopia with fusion in a female feline: case report

[*Ectopia renal cruzada com fusão em uma gata: relato de caso*]

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ABSTRACT

A 3 year old female feline of mixed breed was sent to the diagnostic imaging sector under suspicion of bleeding due to ovariohysterectomy. An abdominal ultrasonography was performed to confirm the initial suspicion. However, no signs of bleeding were found, instead it was observed that the left renal silhouette had two pelvises and was elongated and larger than normal. The right kidney was not found. Excretory urography was requested to evaluate the condition of the ureters. The final diagnosis was crossed renal ectopia with fusion in an asymptomatic cat with no changes in renal function.

Keywords: cat, ultrasonography, excretory urography

RESUMO

Uma gata, sem raça definida, com três anos de idade, foi encaminhada para o setor de diagnóstico por imagem sob suspeita de hemorragia devido à ovário-histerectomia. Foi realizada ultrasonografia abdominal para confirmar a suspeita inicial, mas nenhum sinal de hemorragia foi encontrado; visibilizou-se, entretanto, a silhueta renal esquerda alongada, com presença de duas pelves. O rim direito não foi encontrado. Solicitou-se exame de urografia excretora para avaliação de ureteres. O diagnóstico foi de ectopia renal cruzada com fusão em um felino assintomático e sem alterações na função renal.

Palavras-chave: gato, ultrassonografia, urografia excretora

INTRODUCTION

Kidney ectopia consists of incorrectly located kidney. This congenital condition may be characterized as simple as when both kidneys are in normal locations, but slightly above or below of its usual position. Or crossed when one kidney migrates to the opposite side and ureter crosses the midline before it is implanted into the bladder (Oliveira *et al.,* 2011; Mittal *et al.,* 2016).

This condition has already been reported in humans, swine, dogs, and cats. It is usually rare and asymptomatic (Brückner *et al.,* 2010, Choi *et al.,* 2012; Seo *et al*., 2017).

In Veterinary Medicine only two cases of renal ectopia associated with fusion in the left kidney have been described (Allworth e Hoffmann, 1999; Seo *et al*., 2017). In another case, right kidney ectopia was detected without fusion (Brückner *et al.,* 2010). This case report is the first in veterinary medicine to describe a crossed renal ectopia with fusion of right kidney in a female.

CASE REPORT

A female mixed breed feline of about three years of age was sent to the Veterinary Hospital of Federal University of Minas Gerais (HV-UFMG) Emergency Sector, still in anesthetic state after returning from ovariohysterectomy surgery. The suspicion was hemorrhage originated from the surgical ligature.

Through clinical examination, the patient presented a regular corporal score and normocorated mucosa, respiratory rate of 9mpm,

Recebido em 16 de janeiro de 2018
Aceito em 11 de julho de 2018
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heart rate of 112bpm, rectal temperature of 35.5ºC, and systolic arterial pressure of 110mmHg. Patient was submitted to the ultrasonography AFAST (Abdominal Focused Assessment with Sonography in Trauma) to search for free abdominal fluid as a bleeding sign.

Ultrasound (US) was performed in a Mindray M5 equipment with linear (frequency of 7.5MHz) transducer. The sites hepatodiaphragmatic, splenorenal, cystocholic, hepatorenal were evaluated and no free fluid was detected. However, the right kidney was not seen in its usual topography. The left kidney presented larger in size with regular margins, usual echogenicity and corticomedullary definition was maintained. The patient's two renal pelvises were visualized as the "same kidney" (Figure 1) and its morphology suggested the presence of renal fusion.

The patient was hospitalized for supportive therapy administration and received Ioimbina (Ioimbina, Kaja Vet Veterinary pharmacy, Brazil) at a dose of 0.1mg/kg intramuscularly as an attempt to reverse the effects of previously injected Xilazina (Rompun, xylazine hydrochloride, Bayer S.A., Brazil). Contrasted and non-contrasted radiographic examinations were performed to better define renal alterations found through US. Initially non-contrasted x-ray on ventrodorsal (VD) and laterolateral (LL) projections were made, in which the right kidney was not visualized. The left renal silhouette was elongated at a more caudal location and larger than the limits of normality and measuring 3.3 times the length of L2 vertebral body (Figure 2).

Subsequently, iohexol (Omnipaque ™ - GE Healthcare 300mg/ml) non-ionic iodinated contrast agent was administered 600mg/kg (2ml/ kg) intravenously in bolus. Sequential radiographs on right and left VD projections were performed at times: immediate (Figure 3 A and B) 15 minutes using compressive abdominal bandage and 20 and 40 minutes after contrast injection.

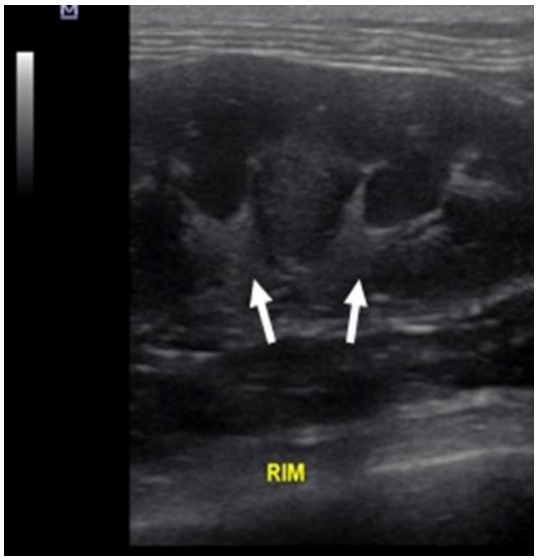

Figure 1. Ultrasonographic image in longitudinal plane of a 3 years old mixed breed feline. In the left lateral abdominal region an elongated structure compatible with the kidney was observed. Preserving the cortical echogenicity and maintaining the corticomedullary definition however with two pelvises (arrows). Diagnostic Imaging Sector EV-UFMG, 2016.

Figure 2. Radiographic image of a 3 years old mixed breed feline on ventrodorsal projection. The right renal silhouette is not visible. The left renal silhouette (key) is elongated at a more caudal location than usual, with size above the limits of normality for the specie, measuring 3.3 times the length of L2 vertebral body. Diagnostic Imaging Sector EV-UFMG, 2016.

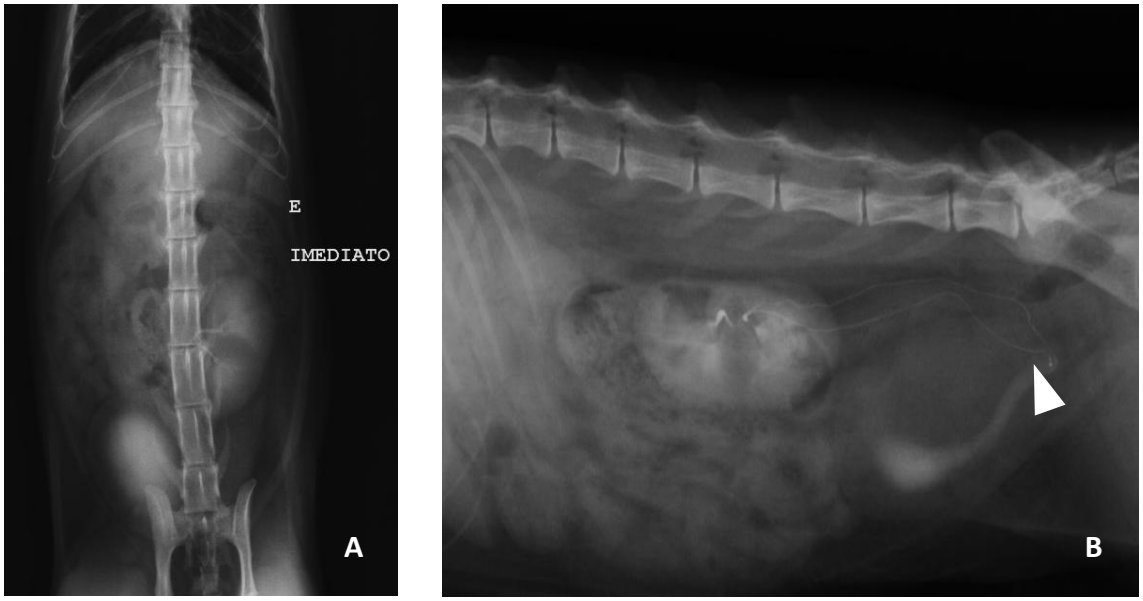

Figure 3. Contrasted radiographic image obtained immediately after intravenous contrast injection. Part of a 3 years old mixed breed feline excretory urography study. A**:** In ventrodorsal projection, the right renal silhouette remains unidentified. On the left side are visible two pelvises originating from a single kidney. B: In laterolateral projection is possible to identify two independent ureters and both inserting normally into the bladder trogone (arrowhead). Diagnostic Imaging Sector EV-UFMG,2016.

Radiographic examinations demonstrated a unique renal silhouette on the left abdomen with two pelvises and two independent ureters that inserted normally on vesical trigone, thus confirming the diagnosis of crossed renal ectopia with fusion.

Fifteen hours after hospitalization the animal was alert, normohydrated with respiratory and cardiac frequencies, and rectal temperature within the normal parameters for the specie. Hemogram showed leukocytosis due to neutrophilia and presence of platelet aggregates.

The values of urea and creatinine were respectively 45.19mg/dL and 1.47mg/dL, demonstrating normal renal function (reference intervals for urea: 40-60mg/dL and creatinine: 0.8 - 1.8mg/dL).

Fifteen days after leaving the hospital, the owner reported that the animal was clinically well and had no behavioral changes.

DISCUSSION

Congenital alterations can be diagnosed incidentally when the patient is submitted to imaging exams due to other conditions mostly not related to the urinary system. The patient of this report did not present clinical symptomatology or renal dysfunction. Diagnosis was incidental during ultrasonography examination of post ovariohysterectomy bleeding suspect corroborating with the literature (Brückner *et al.,* 2010, Seo *et al*., 2017).

This alteration was described in males (Allworth and Hoffman, 1999; Seo *et al*., 2017), however sexual and racial predilection is not well defined in veterinary literature (Lulich *et al.,* 1987; Brückner *et al.,* 2010). In this report the renal ectopia occurred in a female the opposite to what was said by Allworth and Hoffmann (1999) and Seo *et al*. (2017).

In this report a large fused kidney with two ureters was visualized on the left side of abdomen. Imaging was essential for the diagnosis of crossed renal ectopia with the fusion in the case reported. Through non-contrasted radiographic exam made it possible to visualize enlarged left renal silhouette with no visualization of the right kidney. The renal ectopia diagnosis was suggested in corroboration

with the literature (Oliveira *et al.*, 2011; Mittal *et al.*, 2016).

The excretory urography showed that the right kidney was not found in its usual topography and two kidneys fused by their poles were visible on the left side, with two pelvises and two ureters (Oliveira *et al*., 2011; Mittal *et al*., 2016). The obtained images by excretory urography and US were similar to those observed in a report that described a case of right renal ectopia associated to renal fusion on the left abdomen in a feline (Allworth and Hoffman, 1999). However, a recent study used ultrasonography and computed tomography images to diagnose ectopia and renal fusion on the right side of the abdomen (Seo *et al*., 2017).

The contrasted radiographic exam was easy to execute with no need for general anesthesia. The iodinated non-ionic contrast (Iohexol) administered through intravenous bolus injection of 600mg/kg was sufficient for an adequate contrast and kidneys and ureters localization as suggested by the literature (Brückner *et al.*, 2010).

Although some authors have suggested that contrasted computed tomography should be performed to identify abnormalities in renal blood supply and ureteral drainage (Seo *et al*., 2017), the present report corroborates with the literature through contrasted radiography and ultrasonography was possible visualize clearly the presence of both organs fusion. Some authors consider US and excretory urography as the most appropriate exams for detection of crossed renal ectopia with fusion (Allworth and Hoffman, 1999; Brückner *et al.*, 2010; Oliveira *et al., 2011*; Choi *et al.*, 2012; Mittal *et al.*, 2016). Ultrasonography and excretory urography of the urinary system were effective at diagnosing crossed renal ectopia with fusion, and no advanced imaging techniques were required.

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