



Case Report

Persistent Hematuria as a Result of Chronic Renal Hypertension Secondary to Nephritis in a Stallion



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ABSTRACT

A 13-year-old Lusitano stallion was referred to our institution with a history of severe hematuria for 8.5 months. The origin of the hematuria was determined to be the left kidney. The diagnostic workup failed to identify obstructive, infectious, or neoplastic conditions. The history and ultrasonographic examination suggested a chronic condition. The stallion was subjected to left nephrectomy because of the persistent hematuria and anemia. A histopathological examination detected lesions, which were compatible with chronic nephritis and vascular renal hypertension. It is hypothesized that changes in the normal parenchymal architecture produced a vascular aberration that led to renal hypertension, with subsequent blood extravasation and hematuria. The horse recovered completely after nephrectomy.

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1. Introduction

Hematuria is a sign of several conditions of the urinary tract, including urolithiasis, nonsteroidal anti-inflammatory drug toxicosis, urinary tract infection, proximal urethral rents, neoplasia, verminous nephritis, idiopathic renal hematuria, vascular malformations, bladder hematoma, exercise-associated bladder mucosal trauma, coagulopathy, glomerulonephritis, and cantharidin poisoning [1]. In particular, renal-related hematuria may be associated with nephrolithiasis [2], renal tumors, pyelonephritis, and congenital or acquired vascular disorders [3–5]. Gross hematuria secondary to renal vein hypertension has been reported in humans [6], and several cases of idiopathic renal hematuria have been recorded in dogs and horses [7–10].

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Potential indications of unilateral nephrectomy in horses include renal calculi, neoplasms, hydronephrosis, unilateral pyelonephritis, renal abscess, ureteral ectopia, and renal dysplasia [2,11–19].

This case study describes a stallion with severe hematuria, where the potential etiologies and diagnostic approach are reviewed. The pathologic findings and patient response following nephrectomy are also discussed.

2. Case details

2.1. History

A 13-year-old Lusitano stallion weighing 430 kg was referred to the Veterinary Teaching Hospital at the University of Extremadura (Spain) with a history of intermittent gross hematuria and weight loss for 8.5 months.

The horse was used for pleasure riding and breeding. It was housed in an individual box stall with access to a yard. The diet consisted of hay and a commercial concentrate

feed. The horse had bred normally in the previous breeding season. Eight and a half months before referral, the owner noticed that the horse was slightly apathetic, with less energy than usual. At that point, the horse also had an episode of hematuria, but the owner did not consider it important and it was not related to a specific event. One and a half months before referral, the horse started to exhibit frequent episodes of hematuria, depression, and weight loss. The local veterinarian treated the horse with procaine penicillin (22,000 IU/kg, intramuscularly, every 12 hours) and phenylbutazone (2.2 mg/kg, orally, every 12 hours) for 7 days without improvement, 3 weeks before referral.

2.2. Clinical Examination and Diagnostics

On presentation, the horse was alert with a body condition score 4 of 9 and a rough hair coat. The physical examination detected tachycardia (52 bpm), pale mucous membranes, a temperature of 37.8°C, and the presence of supraorbital, intermandibular, and ventral abdominal edema. Rectal palpation did not reveal any remarkable findings.

Transcutaneous ultrasonography of both kidneys was performed. In contrast to the left kidney, the appearance of the right kidney was normal. Thus, transrectal ultrasonography of the left kidney was performed to obtain better images that detected a generalized increased echogenicity, a loss of corticomedullary differentiation, and heterogeneous areas of the cortex and medulla with focal hyper-echogenicity. Urinary tract endoscopy detected hematuria associated with the left ureter and blood clots in the bladder. The bladder and urethral mucosa had a normal appearance. Radiographs of the thorax were generated to rule out metastases because neoplasia was part of the differential diagnosis, but no remarkable findings were made.

The hematological and biochemical analysis detected anemia and hypoproteinemia. The blood urea nitrogen (BUN) and creatinine values were within the reference range (Table 1). Urine was collected from both ureters by individual catheterization. The urine sample from the left ureter contained 15% red blood cells. The sediment from the urine originating from the left ureter mainly contained erythrocytes, and rare lymphocytes, neutrophils, and normal uroepithelial cell clusters. There were also no

neoplastic cells. The urine cultures to identify bacterial and antibiotic susceptibility were negative. The analysis of the urine collected from the right ureter was unremarkable.

The diagnostic findings failed to support the presence of neoplasia, urinary tract infection, laceration of the bladder or urethral mucosa, nephrolithiasis, or ureterolithiasis. Given the severity of the blood loss, a vascular condition of the kidney was suspected. Therefore, nephrectomy was recommended as a treatment after it was demonstrated that the problem was unilateral. Thus, the horse underwent a surgery 5 days later.

2.3. Treatment and Follow-up

The horse received antibiotics and anti-inflammatory drugs preoperatively and for 5 days after surgery (procaine penicillin [Depocillin; Intervet, Boxmeer, the Netherlands], 10 million IU, intramuscularly, every 12 hours; gentamycin [Gentavex; S.P. Veterinaria, S.A. Rindoms, Spain], 6.6 mg/kg of body weight, i.v., every 24 hours; and phenylbutazone [EQ Zona; Salvat, Barcelona, Spain], 2.2 mg/kg of body weight, i.v., every 12 hours). Vitamin B₁₂ (Catosal; Bayer, Viladecans, Spain), iron (Zelferrón-304; Cooper Zeltia, Porriño, Spain), and nandrolone (Laurabolin; Intervet, Salamanca, Spain) were also administered to promote hematopoiesis. General anesthesia was performed, and the horse was placed in a right lateral recumbent position. The horse was sedated with romifidine (Sedivet; Boehringer Ingelheim, Barcelona, Spain) (0.04 mg/kg of body weight, i.v.), and anesthesia was induced with diazepam (Valium; Roche, Madrid, Spain) (0.01 mg/kg of body weight, i.v.) and ketamine (Imalgene; Merial, Barcelona, Spain) (2.2 mg/kg of body weight, i.v.). Anesthesia was maintained using isoflurane (Forane; Abbott, Madrid, Spain) (End-Tidal_{iso}, 1.3%–1.4%) in 100% oxygen with spontaneous ventilation. Fluid administered included lactated Ringers and hydroxyethyl starch 6% solutions. During anesthesia, the mean blood pressure (measured with a tail cuff) was around 65 mm Hg. The induction, maintenance, and recovery of the anesthesia were free of complications.

A 40-cm incision was made in the skin over the 17th rib. Following periosteal elevation, the rib was excised from 5 cm proximal to the costo–chondral junction to 5 cm distal to the costo–vertebral junction. The parietal peritoneum

Table 1
Hematology, biochemistry, and urine specific gravity values

Hematology, biochemistry and urinary parameters	T0	T1	T8	T11	T13	T16	T19	T68
WBC × 10 ⁹ cells/L (rr, 5.5–12.1)	7.3	12		7.3		8.1	8.4	7.3
RBC 10 ¹² cells/L (rr, 6–10.4)	4.5	4.7		3.9		4.5	5.7	7.9
PCV % (rr, 30–45)	24	24.9		20.3		23.7	28.3	36
TP g/L (rr, 53–73)	40	38	40	38	50		54	66
MCV fl (rr, 40–50)	53.2	51.7		52.7		52.3	52.5	
MCH pg (rr, 15.2–19)	14.9	17		15.8		16.5	16.9	
McHc g/dL (rr, 33.5–38.7)	27.9	33		30		31.5	32.1	
Platelets (×10 ⁹ /L)	231	167		208		163	269	
BUN mg/dL (rr, 7–28)	11.3	9.82		11.6	10.35	50	8.56	16.06
Creatinine mmol/L (rr 85–165)	125	117	114.9	238.9	185.5	176.8	132.6	150.2
Urine specific gravity (left ureter; rr, 1008–1045)	1032							
Urine specific gravity (right ureter; rr, 1008–1045)	1020	1017	1020	1020				

BUN, blood urea nitrogen; RBC, red blood cell; rr, reference range; T, days after surgery; WBC, white blood cell.

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