International Journal of Zoology and Applied Biosciences **ISSN: 2455-9571**
Volume 8, Issue 6, pp: 33-36, 2023
https://doi.org/10.55126/ijzab.2023.v08.i06.005
http://www.ijzab.com

Research Article (Case Report)

DIAGNOSTIC AND THERAPEUTIC INSIGHTS INTO CYSTITIS IN A PREGNANT MARE

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Article History: Received 2nd October 2023; Accepted 31nd October 2023; Published 18th November 2023

ABSTRACT

Cystitis is relatively uncommon in horses and represents a significant health concern that can severely impact their ability to urinate and overall well-being. Clinical signs often include frequent urination accompanied by blood in the urine and a painful sensation during urination. To establish a definitive diagnosis, a comprehensive examination is imperative, which typically involves physical assessment, ultrasonography, cystoscopy, and rectal examination. Treatment is aimed at relieving bladder distention and preventing potential complications. In this report, a case of a six-year-old late-term pregnant mare was presented at Veterinary Clinics, with a history of voiding blood in urine. Further diagnostic evaluation confirmed cystitis, and appropriate therapeutic measures were taken, resulting in a successful recovery for the mare without complications.

Keywords: Pregnant mare, Hematuria, Urinalysis, Ultrasonography, Veterinary Clinics.

INTRODUCTION

Cystitis refers to the inflammatory condition of the urinary bladder and has various causes across different species (Li and Leslie, 2023). Hemorrhagic cystitis has been observed in cats, humans, Grant's gazelles, and cattle, with inciting factors including environmental or behavioral factors in cats, viral or drug-induced causes in humans, idiopathic factors in Grant's gazelles, and a combination of viral and toxic factors in cattle (Decker *et al*., 2009; Carvalho *et al*., 2006; West 1997; Traxer *et al*., 2001; Forrester and Towell, 2015; Herenda *et al*., 1990). In horses, cystitis can occur as a primary condition, albeit rarely reported (Schumacher, 2007), or as a secondary condition resulting from ascending bacterial infections, periparturient trauma, urolithiasis, injuries, paralysis of the bladder (Ramiro, 2007; Kader *et al*., 2018), or in response to drug administration, such as phenylbutazone (Aleman *et al*., 2011). Horses grazing on pastures dominated by sorghum, Sudan grass, or sorghum-Sudan hybrid grass may also develop cystitis (Schmitz, 2007). Ascending infections from the urinary and/or reproductive tracts are the primary causes for the higher incidence in mares (Reed *et al*., 2004). Less commonly, hematuria has been associated with exercise (Schott *et al*., 1995), idiopathic renal hemorrhage (Schott, 2009; Gracia - Calvo *et al*. 2014), or excessive nonsteroidal anti-inflammatory drug administration (Aleman *et al*., 2011). Clinical evidence of cystitis in horses includes excessive urination, hematuria, dysuria, stranguria, polyuria, dribbling of urine, or urine scalding of the perineum. Diagnosis involves physical examination, urinalysis, urine culture, transrectal palpation, cystoscopy, and ultrasonography (Sprayberry, 2004). An internal examination is typically required, and this can be performed diagnostically by cystoscopy or through radiography or ultrasound imaging to visualize the internal structure of the bladder, bladder stones, or tumorous growth (Abutarbush, 2005; Wilson, 2007). Antibiotic therapy is crucial to control infection, and the choice of antibiotics should be based on the sensitivity of the causative bacteria. Penicillin and trimethoprim-sulfamethoxazole and enrofloxacin are often used for treating affected horses (Schumacher, 2007). Repeated bacterial cultures of urine, at least once during treatment and again within 7-10 days after completing treatment, are essential to assess the success of therapy and address any underlying causes of cystitis (West, 1997).

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Case history and clinical observations

A six-year-old Marwari mare, seven months pregnant, was brought to a Veterinary Clinic with a complaint of passing red-colored urine throughout urination over the past four days, accompanied by a loss of appetite. The mare appeared dull and depressed. Vital signs were assessed, revealing normal resting heart and respiratory rates (45 beats/min and 16 breaths/min, respectively) and a rectal temperature of 99.4°F. The oral mucous membranes were pink and moist, and the capillary refill time was within normal limits. Blood and serum samples were collected for routine hematological and biochemical examinations. Hematological parameters were within the normal range, but serum biochemistry showed a slight increase in creatinine (2.1 mg/dl) and urea nitrogen (24.4 mg/dl). Peripheral blood smear examination showed no presence of hemoparasites. Upon catheterization, urine was obtained, which appeared reddish brown and cloudy (Figure 1). Urinalysis revealed a specific gravity of 1.00 and the presence of protein (300 mg/dl), leukocytes (500 leu/µl), and a pH of 8. Proteinuria can be indicative of lower urinary tract diseases like cystitis (Bagley *et al*., 1991). Microscopic examination of the urine sediment in this case revealed presence of erythrocytes, along with inflammatory cells such as neutrophils, desquamated epithelial cells, and triple phosphate crystals (Figure 2), consistent with findings reported by Saulez *et al*. (2005). Transrectal ultrasound examination of the bladder showed an increase in the thickness of the bladder wall and evident corrugation of the bladder wall (Figure 3).

RESULTS AND DISCUSSION

Hemorrhagic cystitis can be associated with various factors, including urinary tract infections, urolithiasis, nephritis, and bladder neoplasia. These potential causes can be investigated and ruled out through radiography, ultrasound, and cystoscopy techniques. In the current report, based on the patient's history, clinical examination, urinalysis, and ultrasound assessment, a tentative diagnosis of cystitis due to a lower urinary tract infection was made. Treatment involved the administration of enrofloxacin at a dose of 5 mg/kg intravenously, flunixin meglumine at 1.1 mg/kg intravenously, fluid therapy with Ringer's lactate solution (3 liters) for five days. Additionally, a single-day intravenous dose of ascorbic acid at 30 mg/kg was administered. After this treatment duration, it was assumed that a bacterial infection was at least a contributing factor in the etiology of the condition. One week following the initial presentation, the owners reported that the hematuria had resolved, and the mare remained in good health.

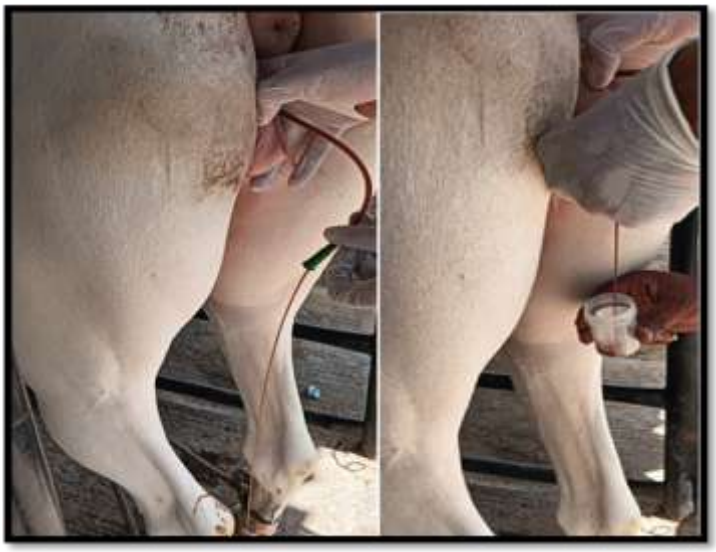

Figure 1. Reddish brown urine collected by catheterisation

Cystitis is an uncommon condition in horses and may not always present with obvious hematuria, although this can vary depending on the underlying cause and disease severity. Older horses, especially mares, are particularly susceptible to cystitis. Equine species excrete urine with a high mineral content, notably calcium carbonate (Diaz Espineira *et al*., 1997), which were identified in the urine examination of this case. Ultrasonographic examination plays a crucial role in distinguishing hemorrhagic cystitis from bladder tumors. Selecting an appropriate antibacterial agent based on urinalysis and urine culture, along with subsequent sensitivity testing, is of utmost importance. Commonly isolated bacteria in horses with ascending cystitis include; *E. coli*, *Proteus*, *Klebsiella*, *Corynebacterium*, *Staphylococcus*, *Streptococcus*, and *Pseudomonas* (Schott, 2004). Treatment typically involves antimicrobial agents that are excreted in high concentrations in urine, such as penicillin, gentamicin, amikacin, enrofloxacin, or potentiated sulfa drugs (Schumacher *et al*., 2002). The effectiveness of

enrofloxacin in treating cystitis has also been reported by several researchers (West, 1997; Traxer *et al*., 2001). Given that the mare in this case was in late-term pregnancy, the use of enrofloxacin was considered safe (Ellerbrock *et al*., 2020). Clinical improvement following antibiotic treatment provides indirect evidence of bacterial involvement, although urinary culture and cystoscopy can be used for a differential diagnosis. Unfortunately, these additional diagnostic procedures were not performed in this particular case.

Figure 2. Microscopic examination of the urine sediment showing presence of desquamated epithelial cells, and triple phosphate crystals**.**

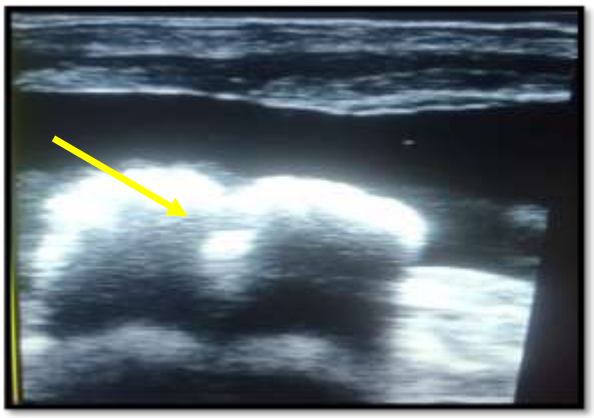

Figure 3. Transrectal Ultrasound: Thickened and Corrugated Urinary Bladder with Sedimentation.

CONCLUSION

In conclusion, cystitis in horses, though rare, is a significant concern, particularly in pregnant mares. Ultrasonography plays a vital role in distinguishing cystitis from bladder tumors. Diagnosis relies on urinalysis and culture, guiding the use of suitable antibacterial agents with a favorable prognosis. It should be included as a differential diagnosis for cases of hematuria, with confirmation typically requiring cystoscopy and biopsy

ACKNOWLEDGMENT

Authors would like to acknowledge the helpful feedback received during the peer-review process, which significantly improved the quality of this case report.

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