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RESPIRATORY COMORBIDITIES IN AN EQUINE ATHLETE: CASE REPORT

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ABSTRACT

There was clinical care for a Thoroughbred English foal, in training for horse-speed sports, who presented mucopurulent exudate, fever, anorexia and exercise intolerance, characterizing acute respiratory infection. This complex clinical condition exemplifies the overlapping of frequent symptoms in equine respiratory diseases, aggravating the general health status and poor sports performance. The animal was submitted to clinical examination and collection of material for blood count and antibiogram. Staphylococcus sp. in tracheal secretions, with sensitivity to azithromycin, ciprofloxacin, doxycycline, enrofloxacin, and gentamicin, while amoxicillin, ampicillin, and penicillin demonstrated resistance. The therapeutic approach adopted included antibiotic therapy, anti-inflammatories, and inhaled therapy, with promising results, emphasizing the importance of accurate diagnoses and appropriate environmental management.

Keywords: Equine. Infection. Pneumonia.

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INTRODUCTION

Inflammatory diseases of the airways and respiratory infections cause obstructive processes that limit the passage of oxygen, resulting in respiratory failure. These conditions not only reduce the horse's aerobic capacity, but also decrease the efficiency in eliminating CO2, impairing post-exercise muscle recovery. This leads to lower athletic performance, premature fatigue, and increased susceptibility to injury. Athletic horses, in particular, rely on efficient respiratory function to achieve high levels of performance in sporting activities. Any impairment in this system, whether from inflammatory diseases of the airways or infections, can have a significant impact. Chronic inflammation and infections can cause permanent damage to respiratory tissues, further exacerbating lung dysfunction. Obstruction of the upper and lower airways directly interferes with the horse's ability to reach its maximum potential during competitions, becoming a significant source of economic loss for owners and trainers (DAVIDSON and MARTIN, 2003).

The equine respiratory system plays a crucial role in the transport and exchange of gases, ensuring continuous oxygen support to the blood. This physiological process is essential for the oxygenation of skeletal muscle, which in turn maintains muscle contraction processes. In addition, the respiratory system is also responsible for the expulsion of gaseous waste, such as carbon dioxide (CO2), ensuring homeostatic balance in the animal's body (PIKNOVA et al., 2002).

In the present study, the case of an equine with acute respiratory infection, with concomitant inflammation, and associated pharyngitis is reported in detail. This complex clinical condition illustrates the overlapping symptoms that often occur in equine respiratory diseases, aggravating their overall health status. Identification and proper treatment are essential for the recovery and maintenance of the equine's health and performance. According to Toledo (2019), Equine Asthma Syndrome (EAS) is a set of chronic inflammatory lung disorders, including Inflammatory Airway Disease and Recurrent Airway Obstruction, phenotypic variables that affect the health and performance of horses. The two conditions have overlapping clinical, cytological, and functional features that arise from the pulmonary response to allergens found in the environment. Among the pathophysiological mechanisms of pulmonary inflammatory diseases is the direct association between pulmonary and systemic oxidative stress with the presence of extracellular neutrophil networks (TENs) in respiratory secretions of horses kept on pasture with a diagnosis of NCS. These mechanisms are pointed out as important contributors to chronic inflammation and lung tissue damage.

CASE REPORT

An English Thoroughbred foal, aged eighteen months and with brown fur, was treated by the Veterinary Service at the Jockey Club of Paraná in November 2024, presenting anorexia, apathy and respiratory noises. It is an animal used for speed equestrian sports, with promising results at the beginning of its career in competitions.

ANAMNESIS AND PHYSICAL EXAMINATION

The clinical picture was mucopurulent nasal discharge of the mucopurulent type, high body temperature (Table 1), sweating, tearing, anorexia, and exercise intolerance.

Table 1. Physical examination of PSI foal

PHYSICAL EXAMINATION	Colt	Reference values
Heart rate (bpm)	36	24 to 28
Respiratory rate (mpm)	38	8 to 16
Hair Filling Time (sec)	3	1 to 2
Temperature (oC)	39,8	37.5 to 38.5
Mucous membranes	Normocored	Normocored

An Olympus GIF-PQ 20 fiberscope with an external diameter of nine millimeters, a diameter of 2.8 mm in the working canal, and a total length of 100 cm was used for the detailed evaluation of the respiratory tract, ranging from the nasal meatuses, bilaterally, to the bifurcation of the carina in the trachea. The trachea had a bright, intact and hyperemic mucosa, with concomitant pharyngitis, with moderate presence of exudate. The changes observed were classified as intense, demonstrating the severity of the inflammatory process. Endoscopic examination showed inflammation accompanied by the presence of secretions along the tracheal canal, extending to the bifurcation of the carina. In addition, detailed endoscopic analysis allowed the identification of specific areas of hyperemia in the tracheal mucosa. The presence of secretions along the tracheal canal and at the carine bifurcation indicated the need for immediate therapeutic intervention to prevent additional respiratory complications and promote patient recovery.

The patient was kept in a closed stable, with poor ventilation and a wood shavings, with exits restricted to daily training and afternoon walks. Complementary physical examination revealed a capillary filling time of 3 seconds, normal-colored mucous membranes, hyperpnea associated with pulmonary noises (wheezing), mild degree of dehydration, and intestinal motility within normal parameters. The evolution of clinical signs over three days showed a picture of acute respiratory infection, a condition frequently observed in horses subjected to intense training and competitive stress.

LABORATORY TESTS

Following endoscopy, nasal secretions were collected for bacterial culture and antibiogram, and blood was collected for blood count. Blood samples were obtained by puncture of the jugular vein. Samples of anterior respiratory tract secretion were collected in the nasopharyngeal cavity with the aid of a sterile swab in a tube with Stuart medium during the transfer to the Veterinary Microbiology Laboratory of UniCuritiba, located in Curitiba, Paraná. They were sown in PCA (Plate Count Agar) medium and remained in the greenhouse at 24°C for 24 hours, for bacterial identification.

They were then seeded on Muller-Hinton agar with antibiogram discs containing the following antimicrobial agents: amoxicillin, ampicillin, azithromycin, ciprofloxacin, doxycycline, enrofloxacin, gentamicin and penicillin. The plates were incubated at 37º C for 18 hours and the inhibition halos were measured for the reading.

RESULTS

The blood count showed leukocytosis, with 16.8 x 103 cells x µL-1 and red blood cell count, 5.2 x 106 x µL-1, corresponding to anemia. Gram staining showed that they were Gram-positive cocci compatible with *Staphylococcus sp*. This microorganism is often found in the epidermis and mucous membranes of several animal species. Under proper conditions, it can cause a wide variety of infections, from superficial skin lesions to more serious infections like pneumonia, endocarditis, osteomyelitis, and septicemia. Under the microscope it can be seen that they are grouped in a characteristic shape, similar to bunches of grapes when observed. This bacterium has the ability to produce a variety of toxins and enzymes that contribute to its virulence. These include toxins that destroy cells and tissues, such as Panton-Valentine leukocidin, and enzymes that facilitate the spread of the bacteria throughout the body. Bacteremia can cause infections in distant anatomical sites, such as endocarditis, osteomyelitis, pyoarthritis, and metastatic abscess formation, particularly in the skin, subcutaneous tissues, lungs, liver, kidneys, and brain. It is the second major causative agent of meningitis associated with ventriculoperitoneal shunts, and is one of the many agents responsible for peritonitis in patients undergoing continuous peritoneal dialysis (QUINN et al. 2005).

This agent can develop resistance to many antibiotics, including methicillin-resistant (known as MRSA - methicillin-resistant *Staphylococcus aureus*), which makes treatment more challenging. Therefore, it is essential to perform an antibiogram to accurately identify the etiological agent responsible for the infection and determine the most effective

antibiotic, thus avoiding the development of bacterial resistance in the patient (CONCEIÇÃO et al., 2007).

In the present study, the results of the antibiogram demonstrated sensitivity for 5 of the 8 principles used, as shown in Table 1.

TABLE 1. ANTIMICROBIAL SUSCEPTIBILITY TEST RESULTS

Agent	Sensitivity
amoxicillin	resistant
ampicillin	resistant
azithromycin	sensitive
ciprofloxacin	sensitive
Doxycycline	sensitive
enrofloxacin	sensitive
gentamicin	sensitive
penicillin	resistant

The criteria for resistant and sensitive are in accordance with the standards of the Brazilian Committee on Antimicrobial Susceptibility Testing (2019).

TREATMENT

Based on the results obtained, the administration of specific drugs was initiated, with the objective of achieving remission of the clinical signs that until now were compromising the performance of this patient, including essential functions such as locomotion and feeding. In view of the antibiogram result, gentamicin sulfate was administered, and concomitantly, flunixin neglumine and bromhexine hydrochloride.

1) Antibiotic therapy: Gentamicin sulfate was administered intramuscularly at a dose of 20 mL once daily for 5 days. Gentamicin is an aminoglycoside antibiotic with bactericidal action, indicated for the treatment of bacterial infections. This drug acts against various Gram-positive and Gram-negative bacteria, inhibiting protein synthesis and, consequently, bacterial growth.

The action of gentamicin is verified by binding to bacterial ribosomes, specifically to the 30 S subunit, interfering with the reading of messenger RNA and causing errors in protein synthesis, resulting in the production of defective proteins, which leads to the death of the bacterium. In addition, gentamicin also causes disruption of the bacterial cell membrane, increasing permeability and leading to osmotic collapse of the bacterial cell (PELEG et al., 2007).

2) Anti-inflammatory: Flunixin meglumine was administered at a dose of 10 mL intravenously, once daily, for 5 consecutive days. This non-steroidal anti-inflammatory drug (NSAID) is widely used to reduce inflammation, control pain, and minimize infection-related symptoms, providing clear benefits to clinical status. Anti-inflammatory drugs are important for the treatment of acute respiratory infections,

especially in horses. The main function of these drugs is to reduce inflammation, which is a natural response of the body to infection, favoring the unblocking of the airways (KATZUNG and VANDERAH, 2022).

In addition to reducing inflammation, anti-inflammatories relieve the painful process by inhibiting the synthesis of prostaglandins, which are inflammatory mediators responsible for pain and fever. In this way, these medications provide remission of discomfort, allowing the animal to recover more quickly and return to its normal activities. The reduction of hyperthermia also contributes to the improvement of the animal's general condition, due to its debilitating and harmful nature to well-being (RANG et al., 2016).

3) Inhaled Therapy: Bromhexine hydrochloride was used to promote the elimination of airway secretions. Inhalation results in a decrease in the viscosity of the mucus and provides a bronchodilator effect, improving respiratory function. There is an improvement in the permeability of the alveolar-capillary barrier, increasing the concentration of immunoglobulins in pulmonary secretions. The solution was prepared at 5%, with 1 mL of bromhexine hydrochloride diluted in 20 mL of saline solution, with inhalation sessions of approximately 20 minutes, a procedure that usually demonstrates efficiency in clearing the airways and favoring the elimination of mucus (GOLAN et al., 2018).

TAKEAWAY

In the two days following administration, the foal showed evident signs of recovery. Initially, the body temperature, which was elevated, returned to normal levels, indicating a positive response to the treatment. The mucopurulent exudate-type nasal secretion, which had been observed during the clinical examination, ceased completely, suggesting resolution of the respiratory infection.

In addition, he started to eat normally, with recovery of his weight and vigor. It was observed that the exercise intolerance observed previously progressively decreased.

There was a gradual return to light training, without showing signs of discomfort or exhaustion. After two weeks of treatment and continuous monitoring, he recovered his body condition, returning to normal grazing activities.

DISCUSSION

Respiratory diseases represent the second largest cause of decreased athletic performance in horses. Among them, inflammatory diseases that affect the posterior respiratory tract stand out, with different manifestations, from a mild and brief way to chronic

cases that definitively compromise the animal's sports career (SERAFINI FILHO, 2019). Due to its efficacy against a wide range of pathogens, gentamicin is often used in severe infections, such as respiratory infections, where the presence of Gram-positive and Gram-negative bacteria can promote worsening of the clinical picture. In the case of the treated horse, the administration of gentamicin proved effective against bacterial infection, reducing clinical signs and promoting the animal's recovery.

In addition, the action of corticosteroids, bronchodilators, mucolytics, and changes in environmental management, in cases of recurrent lower airway obstruction in horses, results in benefits due to the reduction of inflammation, improving pulmonary ventilation.

After two months, it can be observed that there was no loss in their performance during training, showing promising results.

CONCLUSION

The integrated therapeutic approach for the treatment of respiratory disorders in horses, especially those used in high-performance activities, is of interest to veterinarians engaged in equestrian sports. With reference to the present report, the use of antibiotic therapy with gentamicin sulfate, anti-inflammatory drugs such as flunixin meglumine, and inhaled therapy with bromhexine hydrochloride has been shown to be effective in remission of clinical signs and in improving performance.

Laboratory tests proved to be essential for the identification of the etiological agent and clinical management, avoiding the development of bacterial resistance. According to Toledo (2019), inflammatory conditions of the airways in horses involve complex pathophysiological mechanisms, such as oxidative stress and neutrophil activity, which contribute to chronic inflammation and tissue damage. Understanding and controlling these processes are critical to maintaining the respiratory health of sport horses.

The integration of laboratory diagnostics, drug treatment and appropriate environmental management is an effective strategy for the management of respiratory diseases in horses. Future research should focus on better understanding the mechanisms underlying chronic inflammation and developing new therapies to optimize the health and performance of these animals.

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