Pulmonary Fibrosis, Multinodular

BASIC INFORMATION

DEFINITION

Multinodular pulmonary fibrosis (MPF) is a respiratory disease of adult horses that is characterized by interstitial and nodular pulmonary infiltrates of collagen and inflammatory cells. It has been associated with equine herpesvirus-5 (EHV-5).

EPIDEMIOLOGY

SPECIES, AGE, SEX Affects adults

CONTAGION AND ZOONOSIS

- Despite the association with EHV-5, there have been no clusters of MPF reported, suggesting that it is minimally to noncontagious.
- EHV-5 is not known to be zoonotic.

CLINICAL PRESENTATION

HISTORY, CHIEF COMPLAINT Horses with MPF typically have a history of respiratory distress, tachypnea, cough, increased rectal temperature, and chronic weight loss with hyporexia.

PHYSICAL EXAM FINDINGS

- Affected animals are usually thin and have an increased respiratory rate (20–30 breaths/min), mild to moderate tachycardia, and rectal temperatures up to 105° F.
- Thoracic auscultation may reveal either loud bronchovesicular sounds or widely dispersed crackles and wheezes.

ETIOLOGY AND PATHOPHYSIOLOGY The cause of MPF has not been fully elucidated. However, EHV-5 was obtained from the bronchoalveolar (BAL) fluid or biopsies of all cases included in a recently published series and is found only rarely in unaffected horses. Despite this strong association, a causative relationship has not yet been established.

DIAGNOSIS

DIFFERENTIAL DIAGNOSIS

- Infectious lung disease such as bacterial, viral, or fungal pneumonia. In addition to bacterial pleuropneumonia, these include diseases such as EHV-1 and -4, blastomycosis, coccidiomycosis, histoplasmosis, cryptococcosis, and aspergillosis
- Inflammatory disease such as recurrent airway obstruction ("heaves")
- Toxicoses, including inhaled toxins (silicosis, various gases) as well as systemically ingested substances such as perilla mint
- Neoplastic disease, including primary tumors of the respiratory tract or, more commonly, distant metastases
- Other forms of idiopathic pulmonary fibrosis

INITIAL DATABASE

- The complete blood count usually demonstrates a moderate neutrophilic leukocytosis with hyperfibrinogenemia. Significant (<1000/μL) lymphopenia and mild anemia are often seen.
- Arterial blood gas analysis reveals hypoxemia consistent with the severity of the disease.
- Airway sampling (bronchoalveolar lavage or transtracheal aspirate) shows nonspecific degenerate or nondegenerate neutrophilic inflammation and mucus. Bacterial and fungal cultures are unremarkable but may reveal the presence of secondary bacterial infection.

ADVANCED OR CONFIRMATORY TESTING

- Radiography is extremely helpful in characterizing the disease and reveals diffuse nodular interstitial disease. With this result in hand, the differential diagnoses are typically narrowed

to fungal, neoplastic, or idiopathic pulmonary fibrosis.
- Ultrasonography is nonspecific and may show pleural roughening or small nodules contiguous with the surface of the lung. Dense consolidation and abscessation of the ventral lung fields (as would be seen with pleuropneumonia) are absent.
- Lung biopsy can prove to be useful in differentiating between MPF and other potential diagnoses. Histopathology is characterized by interstitial collagen deposition, neutrophil and macrophage accumulation within the alveoli, and type II pneumocyte hyperplasia. Occasional alveolar macrophages may contain intranuclear inclusion bodies believed to be associated with EHV-5.
- Polymerase chain reaction for EHV-5 may be performed on BAL fluid or lung biopsy samples; a positive result is highly suggestive of MPF.
- On postmortem examination, the lungs show multiple 1- to 10-cm firm, white or tan nodules that may be discrete or coalescing. The lungs do not collapse upon opening the thorax.

TREATMENT

THERAPEUTIC GOAL(S)

- Immediate goals include stabilizing the patient by ensuring adequate oxygenation.
- Longer term goals involve reduction of inflammation and antiviral therapy to treat the suspected cause of MPF.

ACUTE GENERAL TREATMENT

- Intranasal oxygen at 15 L/min should be provided if the patient appears distressed, and a goal of maintaining arterial oxygen tension at >60 mm Hg is desirable.
- Therapy with acyclovir (15–20 mg/kg PO q4–8h or 10 mg/kg IV q12h) and prednisolone (1 mg/kg PO q24h) have been used successfully in some cases.
- Secondary bacterial bronchitis or pneumonia are possible comorbidities and should be treated based on culture results with the appropriate antimicrobial regimen.

RECOMMENDED MONITORING

Patients should undergo radiographic (or less ideally, sonographic) monitoring until the disease is resolved.

PROGNOSIS AND OUTCOME

- Prognosis for MPF is fair, with two of five horses from a published report surviving and returning to their previous level of work. The remaining horses were euthanized because of poor response to treatment.
- Because response to therapy is often slow, treatment should ideally be continued for at least 6 weeks before considering further treatment futile.

PEARLS & CONSIDERATIONS

Interstitial pneumonia of donkeys has recently been linked to asinine herpesvirus (AHV)-2 and -5. The exact role of gamma Herpesviridae in equids is still unclear.

SUGGESTED READING

Williams KJ, Maes R, Del Piero F, et al: Equine multinodular pulmonary fibrosis: a newly recognized herpesvirus associated fibrotic lung disease. *Vet Pathol* 44(6):849–862, 2007.

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