American Association of Equine Practitioners

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Recurrent Airway Obstruction (RAO) in the Horse

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Recurrent airway obstruction (RAO, also known as heaves, broken wind, and chronic airway reactivity) is a common respiratory disease of horses characterized by airway narrowing (bronchoconstriction), mucus production, and bronchospasm. The most common signs are chronic cough, nasal discharge, exercise intolerance, and respiratory difficulty. The classic “heave line” that can be seen along the bottom edge of the ribs is due to hypertrophy of the abdominal muscles, which are assisting in breathing and become large from excess work. Severely affected horses may also exhibit weight loss, anorexia, and exercise intolerance. Most affected horses do not have a fever unless a secondary bacterial pneumonia has occurred. The term COPD is no longer used to describe this condition in horses, because many aspects of the disease are different from human chronic obstructive pulmonary disease. Two different forms of RAO are recognized in the horse: the barn associated type often seen in stalled horses fed hay, and summer pasture-associated obstructive pulmonary disease (SPAOPD, also called summer heaves and pasture-associated heaves) seen more commonly in horses living on pasture in the Southeast.

Most evidence suggests that RAO is the result of the lung’s hypersensitivity to inhaled antigens, although multiple theories exist regarding exactly why it occurs. RAO is similar to asthma in people, and has allergic and inflammatory components to the disease. The most common allergic triggers for RAO are mold, organic dust, and endotoxin present in hay and straw. RAO occurs worldwide, with the highest prevalence in stabled horses fed hay in the northeastern and midwestern United States. The average age of onset in RAO affected horses is 9 to 12 years, and both genders are commonly affected. Winter and spring appear to be the most common seasons for exacerbation of barn-associated RAO, while pasture-associated appears to have the most severe symptoms in the summer or early fall. There does appear to be a heritable component to the etiology of this condition. The incidence of RAO in horses with healthy parents is approximately 10 percent, which increases to 44 percent if two parents are affected.

Diagnosis of RAO can be done by your veterinarian on the basis of history and characteristic clinical examination findings in the majority of horses. Additional diagnostic tests to confirm and characterize the lower airway inflammation include transtracheal aspiration (TTA), bronchoalveolar lavage (BAL), lung function testing, thoracic radiographs (X-rays) and ultrasound examination. Bronchoalveolar lavage is indicated in horses with poor performance and coughing, and is not compulsory in horses with severe disease and suggestive clinical signs. Excess white blood cells called neutrophils are seen on cytology and confirm the presence of lower airway inflammation suggestive of RAO. Radiographs are recommended for horses that fail to respond to standard therapy, or to further characterize inflammation in the lungs.

The most important treatment for RAO is environmental and dietary management to reduce exposure to organic dusts and mold. RAO is a chronic disease that will require life-long management changes for the horse. Unfortunately, it is not a disease that can be treated for a short time and resolved forever. Many horses with mild to moderate disease can be successfully managed with environmental and dietary changes alone, without additional drug therapy. As previously

mentioned, the most common triggers for RAO are organic dusts, mold, and endotoxin present in hay and straw. Round bale hay is high in endotoxin and organic dust content, and the presence of round bale hay is a potential cause of treatment failure in horses on pasture. Maintaining horses on pasture full-time is generally recommended for those with barn-associated RAO. Horses with pasture-associated RAO should avoid access to pasture except for the winter months. Horses that must be stalled or have pasture-associated RAO should be kept in a clean, well-ventilated environment. Try to avoid storing hay above the stalls in a barn loft, and minimize sweeping the floor when affected horses are stalled. Straw is not recommended, as bedding for RAO affected horses, and low dust bedding such as chopped paper or cardboard should be considered. Soaking hay and feed in water prior to feeding may alleviate the signs in mildly affected individuals, however, soaked hay may still exacerbate respiratory signs in more severely affected cases. Moderate to severely affected horses should have all hay removed from the diet and be transitioned to a complete pelleted feed. It is important to remember that although medications will alleviate the clinical signs of RAO, respiratory disease will return if the horse remains in a mold/dust-filled environment once the medications are discontinued.

Systemic corticosteroids and aerosolized bronchodilators are the most immediately helpful therapy for a horse in respiratory distress. Intravenous administration of Dexamethasone should improve lung function within two hours of administration. Dexamethasone may be continued for one to several weeks at a tapering dose (usually quarter the dose every three to five days) for severe cases. For management of less severely affected cases of RAO, prednisolone is generally considered to be less potent drug that may have fewer side effects. Oral prednisone is poorly bioavailable, and not recommended for treatment of RAO in horses. Consult your veterinarian for more specific dosages and a treatment schedule for your horse.

Corticosteriods will not provide immediate relief of acute, severe airway obstruction, and rapidly acting bronchodilators (such as albuterol) are indicated for treatment in those cases. Aerosolized albuterol improves lung function and breathing by 70 percent within 5 minutes of administration; however, the beneficial effects last only one to three hours. Administration of albuterol will improve the pulmonary distribution of other aerosolized medications, such as aerosolized corticosteroids, and speed mucus clearance from the lungs. Clenbuterol is an oral bronchodilator that provides long-acting bronchodilation in horses with moderate to severe RAO. Since bronchodilators have minimal to no anti-inflammatory activity, they should not generally be used alone for the treatment of RAO.

Aerosolized corticosteroids are effective in horses with mild to moderate RAO, and can be used in conjunction with systemic therapy in severe cases. The two aerosolized preparations for administration to horses via the Equine AeroMask (http://www.aeromask.com/Animal_Health/ah_aeromask_es.asp) or the Equine Haler (http://www.jorvet.com/pdf/Literature/2/Equinehaler.pdf) are beclomethasone diproprionate and fluticasone propionate. Inhaled therapies are beneficial because of reduced side effects from the corticosteroid administration (such as laminitis in rare cases on systemic steroids). However, inhaled therapies tend to require an upfront financial investment to purchase the mask and medications. Despite the financial costs, inhaled treatments target inflammation and allergy directly at the site of the problem, in the lungs. Additionally, horses in apparent “remission” from RAO may benefit from low dose, long term, aerosolized corticosteroid treatment.Depending on the clinical signs and severity of RAO, horses with this condition can be managed successfully for much if not most of their lives. Many of these horses are able to be excellent pleasure, trail riding, or even competition horses with dedicated owners that understand that it is a considered a chronic condition that will require life-long management.

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