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EXERCISE INTOLERANCE: Part 2
THE UPPER AIRWAY

As mentioned in the previous installment, second to musculoskeletal disease, respiratory disease is the most common cause of poor performance, interruption in training, and premature retirement among performance horses. Inflammatory airway disease (IAD) and exercise-induced pulmonary hemorrhage (EIPH) are the most common conditions originating from the lower respiratory tract associated with poor race performance. Low-grade chronic obstructive pulmonary disease (COPD) is a common source of exercise intolerance in middle-aged performance horses. The young racehorse population is frequently exposed to viral respiratory pathogens that impair pulmonary defense by damaging mucociliary clearance mechanisms, destroying bronchial-associated lymphoid tissue, and impairing pulmonary macrophage function. Regeneration of the mucociliary apparatus requires approximately three weeks after recovery from viral respiratory disease, and racehorses are rarely permitted sufficient time for convalescence after overt disease. Strenuous exercise and long distance transport impair pulmonary immunity and promote deep inhalation of dust particles. The presence of blood within the lung tissue, as occurs with EIPH, initiates an inflammatory response resulting in bronchiolitis and airway inflammation. Inflamed airways are fragile and are predisposed to further hemorrhage with exercise. Therefore, repeated episodes of EIPH appear to create self-perpetuating lower respiratory tract inflammation and hemorrhage. Impaired pulmonary defense, irritant exposure, and episodes of pulmonary hemorrhage not only predispose racehorses to develop chronic IAD, but promote development of fulminant pneumonia and pleuropneumonia which may result in prolonged recovery, permanent pulmonary damage, premature retirement, or even death.

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Silverado Equine Performance, LLC was established in 2013. With 15 years experience in the performance horse industry, Dr. Hutchins' goal was to create a practice that fulfilled a special niche: provide the absolute best care available for each horse with all necessary diagnostic tools available for your equine athlete and be able to bring it to you in the comfort of your farm or stable. The scope of the practice is primarily lameness and sports medicine although other services are available upon request. This allows Dr. Hutchins to stay on the leading edge of performance medicine. It takes a team to keep a finely tuned athlete going, so when necessary, recommendations and referrals to the most qualified professionals for a given condition are made.

Thoracic auscultation with the rebreathing procedure should be performed in all horses with poor performance or exercise intolerance. The increased depth of respiration caused by the rebreathing bag accentuates abnormal lung sounds, and the rebreathing procedure allows the clinician to subjectively evaluate the time period for induction of and recovery from labored breathing. Listening to the lungs and rebreathing facilitate identification of the abnormal lung sounds characteristic of bronchopneumonia (crackles), pleuropneumonia (silence in the lower lung fields), and COPD (end expiratory wheeze). Horses with IAD and EIPH rarely have abnormalities that can be heard even with rebreathing, but the procedure may induce coughing.

Diagnostic investigation of poor performance should routinely include endoscopic examination of the upper and lower respiratory tract. Endoscopic examination allows for direct visualization of inflammatory exudate or blood in the airway, and eliminates upper respiratory tract disorders as the source of poor performance. Bronchoalveolar lavage (BAL) or a transtracheal wash (TTW) is indicated in horses with endoscopic evidence of lower respiratory tract disease to confirm the source of poor exercise performance, characterize the inflammatory process, and/or quantitate the severity of pulmonary hemorrhage.

Inflammatory airway disease (IAD) occurs in 22% to 50% of thoroughbreds and Standardbred racehorses and is a common cause of impaired performance and interruption of training. Chronic cough and mucoid to mucopurulent nasal discharge are common clinical findings in racehorses with low-grade airway inflammation. Horses with IAD show poor exercise tolerance

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at race speeds and perform several seconds slower than previous performances. Proposed causes of lower airway disease in racehorses include recurrent pulmonary stress, deep inhalation of particulate matter, exposure to noxious gases and atmospheric pollutants (ozone), and/or persistent respiratory viral infections. Chronic IAD often develops after overt viral respiratory tract infection and may result from inability of the immune system to fully eliminate viruses or bacteria from small airways.

Exercise-induced pulmonary hemorrhage (EIPH) occurs in the majority of racehorses and is observed sporadically in many other sports that require strenuous exercise for short periods of time. The incidence of EIPH in racehorses is high but the cause and treatment are controversial. Horseman and track veterinarians generally believe that EIPH adversely affects performance, and one investigation demonstrated positive correlation between poor finishing position and endoscopic identification of blood in the airway. Conflicting data regarding the impact of EIPH on race performance may reflect the difficulty in defining performance and individual performance potential.

Rapid acceleration to high-intensity exercise results in equally rapid increases in pulmonary arterial and capillary pressures. Pulmonary capillary pressures are suspected to exceed the capacity of the pulmonary system to maintain vascular integrity resulting in “stress failure” of capillaries and hemorrhage from the pulmonary vascular system. Some investigators believe that EIPH occurs secondary to IAD which may result in proliferation of vessels originating from the bronchial circulation. This region of new blood vessel formation may be fragile and more prone to rupture during maximal exercise.

Identification of the ideal therapeutic agent for EIPH that will eliminate pulmonary hemorrhage without impairing race performance will not occur until the cause of the disease is understood. Given the universal nature of this disease in horses that maintain a high level of performance, a single agent is unlikely to completely eliminate the problem in horses that perform high-intensity exercise.

Chronic obstructive pulmonary disease (COPD) is a chronic, recurrent allergic respiratory disease in horses exacerbated by exposure to molds in hay and straw. Obstruction to airflow in small airways results from bronchoconstriction, excessive mucus production, and cellular debris. Clinical manifestations of COPD range in severity from exercise intolerance to labored breathing at rest. Chronic obstructive pulmonary disease is uncommon in young racehorses; however low-grade COPD is an important cause of exercise intolerance and poor performance in middle-aged horses.

The single most important principle for treatment of COPD is environmental management directed toward minimizing antigen exposure. Molds present in hay and straw are the most common source of antigen; therefore, affected horses are often successfully maintained in a pasture environment. If this is unsuccessful or infeasible, medical management may be necessary. Standard treatment regimens include anti-inflammatory therapy, bronchodilator therapy, and broad-spectrum antibiotics. Nonsteroidal anti-inflammatory drugs and antihistamines are ineffective in controlling the clinical signs of COPD.

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