

Respiratory Diseases

THE MAIN GOAL OF THE RESPIRATORY SYSTEM IS TO transfer oxygen from the air that is breathed to the red blood cells where the oxygen will be transported throughout the body.

In addition, carbon dioxide, a waste product of metabolism, is eliminated from the body via the lungs. If this system is compromised in any way, it severely affects the athletic ability and life of a horse.

The Anatomy

THE LOWER AIRWAY CONSISTS OF THE LUNGS AND bronchi. The air we breathe is not sterile and contains many contaminants such as dirt, dust, pollen and chemicals, as well as bacteria, viruses and fungi. The lungs have protective mechanisms that help prevent infection from these contaminants.

The protection actually starts in the upper airway with filtering, humidifying and warming of the inhaled air. The upper respiratory system, trachea and bronchi are lined with tissue covered with a sticky mucus that traps contaminants.

The tissue lining the trachea and bronchi has cells with extremely small hair-like fibers sticking out into the airway called cilia. The cilia increase the surface area of the filtering surface and play an active role in airway protection.

The debris that is collected on the surface of the airways actually is transported away from the lungs by these cilia. The small cilia fibers move in a coordinated rhythm to move the thin layer of mucus that floats on top of the cilia and the debris that is stuck to it out of the lungs and up the trachea where the horse swallows it.

Anything that decreases the effectiveness of this process increases the chance for the development of respiratory disease. Factors such as cold air, smoke or chemicals in the air, and inflammatory conditions of the airways such as chronic obstructive pulmonary



Diagnosing, treating and preventing common snuffles.

By Dr. Steve Fisch

disease and flu can decrease the cilia defense mechanism. Chemicals like ammonia fumes from poorly cleaned stalls or because of bad barn ventilation are a common cause of decreased ciliary action.

Not allowing a horse to lower its head during transport is another way to decrease the effectiveness of the cilia. Additionally, if the ventilation within the trailer is not good – trapping exhaust fumes or allowing for the buildup of ammonia fumes – it can make all of these negative factors regarding lung health worse.

In fact, research has shown that horses confined with their heads elevated for 24 hours developed an accumulation of inflammatory airway secretions that was associated with

increased numbers of bacteria in the lower respiratory tract.

In one study, a sample of fluid was obtained from within the trachea both prior to and immediately following transport. The post-transport tracheal fluid contained signs of inflammation and an increased number of bacteria, predominantly, a *Streptococcus* bacteria species.

These findings indicate that hauling horses in a manner that prevents them from lowering their heads during transportation and cross-tying may contribute to lower respiratory tract disease.

There are also millions of special cells called neutrophils and macrophages deep within the tissues of the lung that basically eat bacteria and viruses.

An accurate diagnosis is important for an accurate and successful treatment. Here, an equine patient is shown getting his upper respiratory system scoped (left) and another (right) getting his lungs X-rayed to diagnose potential pneumonia.



The Diagnosis

BESIDES BLOOD WORK, ULTRASOUND, RADIOGRAPHY, ENDOSCOPY and respiratory fluid analysis, there are ways to evaluate the respiratory system that include evaluating respiratory rate and character of breathing. And, of course, a physical exam is required to adequately evaluate the respiratory system.

The veterinarian is going to look for nasal discharge (from one or both nostrils), and the characteristics of that discharge (clear and thin? thick and green or yellow? bloody and smelly?). The vet will also look at the amount of air flow from both nostrils, and note swellings on the head, any coughing (and if so, what type) or fever.

Other symptoms include noise while breathing at rest, at work, on inspiration or expiration; any extra abdominal movement while breathing; and if any other horses on the farm are showing similar signs.

The clinical signs for most of the viral respiratory diseases are very similar. In many cases, the exact cause does not have a significant impact on the treatment, but knowing the specific cause can provide information as to how to prevent the disease.

The most common way to make a diagnosis is by acquiring a nasal swab to identify the virus via DNA in the laboratory. In addition, there are several laboratory techniques used in identifying a virus present in a lab sample. Another diagnostic tool is to evaluate the concentration of antibodies in the blood for the suspected virus.

Bacterial, Viral Problems

HERE IS A RUNDOWN OF THE MOST COMMON bacteria-and virus-based problems.

Pneumonia: Pneumonia means infection of the lung. It does not indicate the cause or the exact location of the infection in the lungs.

Viral Pneumonia: Many of the viral entities affecting the lungs also affect the upper airway. Some of these are equine influenza, equine herpes virus and equine viral arteritis.

Pleuropneumonia: The pleura is the thin covering of the lungs or the thin lining of the thoracic cavity. Pleuritis is an inflammation of the space between the body wall and the lung. Pleuropneumonia is inflammation both within the lungs and within the pleural cavity. In most cases, pleuritis is secondary or occurs in conjunction with pneumonia.

All of the factors that predispose a horse to the development of pneumonia also are thought to predispose it to the development of pleuritic. The development of pleuritis in

conjunction with pneumonia can greatly complicate and prolong treatment. A variety of bacteria can infect the pleural space. The type of individual bacteria that cause disease can have a great impact on the overall outcome.

The clinical signs of pleuritis/pleuropneumonia include fever, depression, nasal discharge and being off feed. Pleuritis is an extremely painful disease. Because of the chest and rib pain caused by the disease, a horse is often reluctant to walk.

One of the main clinical signs of pleuritis is the buildup of fluid within the thoracic cavity. This fluid muffles the lung sounds in such a way that there are no audible lung sounds below the fluid line. There are sounds heard with the stethoscope called pleural friction rubs. These abnormalities can be confirmed with the aid of ultrasonography. The fluid within the pleural cavity generally can be cultured and evaluated microscopically for the presence of bacteria.

The treatment of pleuritis can be very difficult and relies on long-term antibiotics, supportive therapy and drainage of the fluid from the thoracic cavity, should it become necessary. There are numerous complications that can occur during recovery from pleuritis. If there are no complications, treatment can be successful.

Equine Influenza: Equine flu viruses contain a chemical that damages the mucociliary transport mechanism and allows for evasion of the immune system. The damage to the mucociliary transport system can take several days or longer to repair. This leaves the defense mechanisms decreased and exposes the horse up to the possibility of a secondary bacterial infection. The disease can be extremely contagious, especially in conditions of crowding and poor ventilation.

Influenza most commonly affects 2- and 3-year-olds. Stresses on the respiratory tract's immune system and poor vaccination programs are predisposing factors. The incubation period is one to three days. The virus usually affects the upper respiratory tract more than the lungs.


Clinical signs that usually appear three to five days following exposure include fever, anorexia, depression, a clear nasal discharge and a deep, dry cough. The course of infection is typically from two to 10 days if there are no complications.

Secondary bacterial infection is a common complication of equine influenza. Horses can shed the virus for three to six days after the last signs of illness and should be kept in isolation for that period of time.

The treatment generally involves symptomatic care and

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the use of antibiotics only if a secondary bacterial infection is suspected.

The virus causes a significant amount of tissue damage that requires time to regenerate and heal. If the horse is placed back in work too soon, it is highly likely that complications will develop. In some horses with severe infections, there might be the need for one to two months of rest prior to resuming training.

A recovering horse should be rested at least 21 days past the last sign of infection. Young foals can suffer more severely from equine influenza, which can develop into extensive and fatal pneumonia. That's why it's important to give young horses more time to recuperate.

Regular vaccinations can significantly reduce the population at risk. Younger athletic horses that might be at greater risk should be vaccinated at three- to four-month intervals, as opposed to the older horses, which should receive their boosters at six- to 12-month intervals.

Equine Herpesvirus (Rhino, Rhinopneumonitis): "Rhino" means the upper airway and "pneumonitis" means inflammation of the upper airways and lungs. There are four currently known strains of the equine herpesvirus known as 1, 2, 3 and 4. Strains 1 and 4 are associated with respiratory disease in the horse.

Respiratory disease related to the herpesvirus most commonly occurs in foals, weanlings and yearlings. The immunity to herpesvirus infection is short-lived and reinfection is thought to reoccur.

In broodmares, there can be abortion related to infection. The equine herpesvirus Type 1 has the ability to cause respiratory disease, abortion and neurologic disease. Foals can be born suffering from extensive pneumonia and die within 72 hours.

The infection occurs via the inhalation of the virus. The virus does not survive well outside of the body for extended periods of time. Transmission occurs from close contact with an infected animal or tissues. The clinical signs appear one to three days following infection and include fever, anorexia, depression, a clear nasal discharge, and a deep, dry cough that cannot be distinguished from influenza.

A properly designed vaccination program is an important part of preventing respiratory disease.

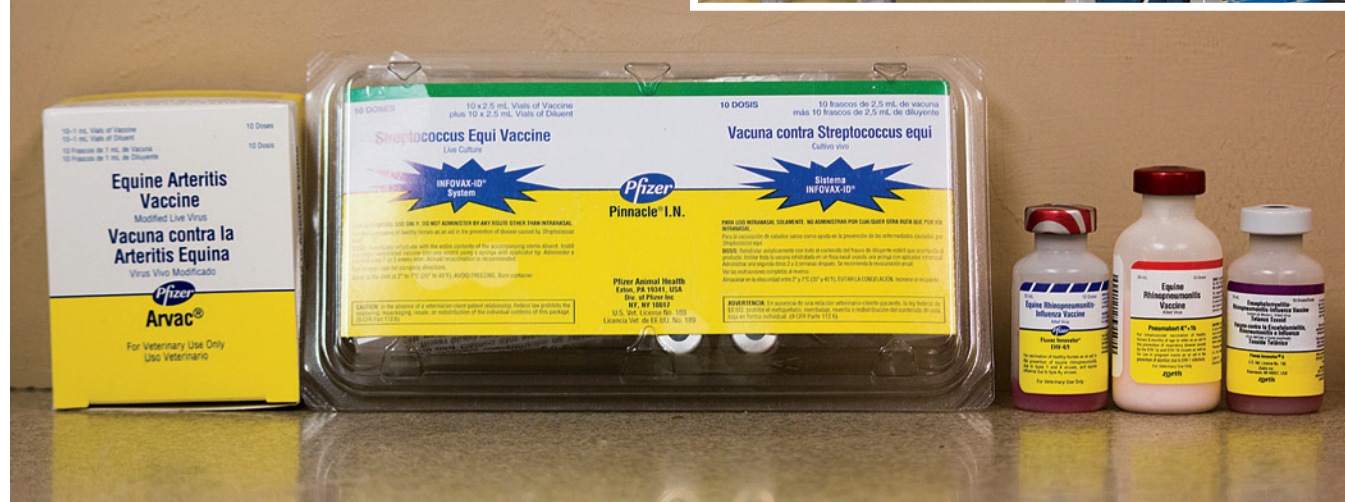
The treatment is largely supportive, and a period of rest is extremely important for reducing the complication rate. Vaccination will not always prevent the disease, but can reduce the severity of it. Pregnant mares need to be vaccinated to prevent abortion.

Equine Viral Arteritis: The equine arteritis virus causes inflammation of the blood vessels. Transmission of this virus can occur via inhalation or sexual contact. The virus rapidly spreads throughout many of the body's organs, and the disease can produce signs of respiratory distress. The disease can also cause abortion.



Ultrasound is one diagnostic tool that can aid in the diagnosis of pleuritis and pneumonia.

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The incubation period is three to 14 days. The main clinical signs include fever, loss of appetite, depression and possibly a cough. A clear nasal discharge, a bright reddening of the nasal and ocular tissue, and excessive tear production can also be associated with EVA.

The treatment consists mainly of supportive therapy and treatment for any secondary bacterial infection. Rest is very important. Isolation should be maintained for three to four weeks past the last observation of clinical signs to prevent transmission. Most horses recover uneventfully but there can be fatalities.

Bacterial pneumonia: Many types of bacteria have been identified as being involved in pneumonia in the horse. Most of these bacteria are either in the environment of the horse or are a normal inhabitant of the upper airway or throat area. Bacterial pneumonia often follows viral pneumonia, due to the damage to the normal protective mechanisms and disruption of the local immune system. This situation often is the result of not giving a horse the proper amount of rest after having a viral respiratory disease. Other stressful events that can lead to the development of bacterial pneumonia include intense athletic exercise, transportation, poor nutrition and overcrowding.

The clinical signs associated with bacterial pneumonia include fever, depression, poor appetite, nasal discharge, coughing, respiratory distress and the presence of abnormal lung sounds. In more chronic cases, the onset can be slow and vague, with exercise intolerance and weight loss being the main clinical signs.

In some cases, the infection might be localized and walled off in the form of an abscess such as with *Rhodococcus Equi* in foals. If the development of the abscess is slow enough, the first recognition of the disease can be severe acute respiratory distress during exercise or a foal that is acutely depressed and febrile. The clinical signs of the disease occur when the lung abscess ruptures or leaks, due to the stress of exercise.

The diagnosis of bacterial pneumonia often is made based on history, clinical signs and lung sounds. Ultrasound and radiographs might be necessary to assess the extent of the infection. A transtracheal wash can provide very important information and might help direct therapy.

The treatment of bacterial pneumonia generally consists of long-term antibiotic therapy, supportive therapy and rest. The outcome of bacterial pneumonia can be extremely variable and depends on the causes, duration of infection, amount of lung tissue involved, the specific types of bacteria involved, and the existence of additional complications.

Shipping Fever: The disease “Strangles” is also commonly called shipping fever or distemper. It’s basically a *Streptococcus* bacterial infection of the upper respiratory tract.

Strangles can be prevented or at least have the affects lessened by vaccination.

Other Respiratory Ailments

COPD: CHRONIC OBSTRUCTIVE PULMONARY DISEASE, OTHERWISE known as heaves, chronic obstructive lung disease or lower airway inflammatory disease, makes it difficult to expel the air from the lungs, hence the tell-tale “heave line” on the horse’s body where the muscles hypertrophy from the extra effort to push the air out.

COPD is caused by a variety of allergic reactions to, for example, dusts and mold. There are two categories of affected horses: horses that react to allergens within the barn and that get better when kept outside; and horses that react to allergens in the pasture and that get better when kept inside.

The clinical signs include a chronic cough, a cloudy nasal discharge, difficulty in expiring air, exercise intolerance, weight loss and not eating. These horses usually take in air relatively well. Because COPD is primarily an allergic reaction without the presence of infection, there is generally no fever unless there is a secondary bacterial infection. Sometimes these horses can get into trouble because they are so focused on breathing that they will not take the time out from the effort of breathing to eat or drink.

The diagnosis is based on history and examination of the respiratory system. Sometimes other diagnostic tests, including a transtracheal washing, might be necessary to rule out other secondary problems. However, a bronchoalveolar lavage is preferred to a transtracheal wash for diagnosis of COPD. Allergy testing is another good aid in diagnosing the allergens.

Treatment involves altering the horse’s environment. If a horse is worse outside, then keep him inside, and vice versa. Often wetting the hay or complete removal of hay from the diet is necessary, along with controlling the dust in the stall.

Medical therapy involves making sure there is no secondary bacterial infection. The main focus is to use corticosteroids and/or bronchodilators to decrease the inflammation associated with the allergic reaction in the lungs. Steroids decrease inflammation and bronchodilators relieve respiratory distress by opening obstructed airways.

Although corticosteroids help the condition, they suppress the immune system and can predispose the horse to infection. The use of corticosteroids also has been associated with the development of founder or laminitis.

EIPH: Exercised-induced pulmonary hemorrhage is a disease of athletic horses in which there is hemorrhaging from within the lungs. It is caused by the small capillaries breaking from the high blood pressure resulting from exercise. The hemorrhage can be subtle enough to be seen only by microscope evaluation of a bronchial aspirate or volumous enough to be observed pouring from the nostrils.

Some additional clinical signs include exercise intolerance, respiratory distress, coughing and excessive swallowing. The diagnosis is made by evaluation with the endoscope after exercise.

Treatment involves ruling out the presence of infection. Diuretics are used to lower the capillary blood pressure in the lungs. Rest after an EIPH episode is critical.

See the Vet

A HEALTHY RESPIRATORY SYSTEM IS A COMPLEX SYSTEM THAT IS vital to the life and athletic ability of the horse. Prevention is the best medicine. When a respiratory ailment occurs, a quick and accurate veterinary diagnosis is paramount to a good outcome. In the case of the respiratory system, sooner is better. ■

Dr. Steve Fisch owns AVS Equine Hospital, a full-service hospital and reproductive center in Tallahassee, Florida, where he, Drs. Patrick First and Chad Baumawart operate a hospital for surgery and performance-related lameness for their clients and referring veterinarians. To comment, write to jrnlracing@aqha.org.



A foal receives hyper-immune plasma for the treatment of pneumonia.