



INFLAMMATORY AIRWAY DISEASE IN HORSES (IAD)

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INTRODUCTION

Whilst coughing in an otherwise healthy horse may be quite common, it is not necessarily normal and may be having a negative impact on performance. The culprit could be a lower airway disease such as Inflammatory Airway Disease (IAD) or Chronic Obstructive Pulmonary Disease (COPD).

COPD or "Heaves", typified by obvious laboured breathing at rest, appears to be a frequent development in older horses that have shown signs of IAD in younger years. This means that early detection and management of IAD are highly desirable both for current performance and in the hope of avoiding progression towards COPD.

IAD is a disease of the airways in horses which has 2 main effects:

1. Disruption of the way the lungs work - causing reduced ability to exercise and reduced performance
2. Irritation of the airways - causing coughing

An understanding of IAD begins with a brief review of how horses breath and the structure of the lungs.

EQUINE BREATHING

Oxygen is a vital fuel for the body and delivery of oxygen is often the limiting factor in any athlete's performance. A normal horse at rest will breathe around 20 times per minute and exchange 4 litres of air with each breath (tidal volume). That 80 Litres of air exchanged per minute rises to an incredible 1,500 Litres per minute during peak exercise (that's 7½ average bathtubs full every minute!).

Unlike most animal species, horses cannot breathe through their mouth as their need for air increases. The air must travel in through the nostrils and on through the larynx (voicebox) and trachea (windpipe). The airway then begins splitting into increasing numbers of airways with decreasing diameters - 2 main bronchi lead to thousands of smaller bronchi and then millions of tiny bronchioles, each ending in alveoli (air sacs) where oxygen (O₂) diffusion to, and carbon dioxide (CO₂) removal from, the blood vessels of the lungs take place.



WHAT IS INFLAMMATORY AIRWAY DISEASE?

In IAD the diameter of the bronchioles is partly, if not completely, blocked by excessive mucus and fibrous tissue. This limits O₂ and CO₂ exchange making breathing much less effective and causing an increase in the effort required to achieve each breath.

Whilst viral or bacterial infection may trigger IAD, studies indicate that these infectious agents do not cause ongoing condition. High on the list of IAD causes are agents in the horse's environment such as dust, allergens (e.g. plant pollens, moulds and spores in hay) and endotoxins.

Susceptible horses appear to develop an immune response to certain common substances when inhaled and the lungs mount an attack in an attempt to neutralise these agents. This response is manifest as inflammation of the lung, which involves fluid, cells and debris accumulating in the airways and thus blocking the bronchioles to a variable degree. The severity of the signs of the disease is related to the extent of this blockage.

In horses with IAD, the inflammatory reaction can also trigger a degree of hyper-responsiveness in the airways. The exaggerated constriction of the airways in response to many stimuli, including those usually innocuous such as dust or cold air, is called bronchospasm and occurs in the bronchi. This can further aggravate the airways and set up a vicious cycle of inflammation, hyper-responsiveness and further airway narrowing which can only be broken with careful management and treatment.

SIGNS IF INFLAMMATORY AIRWAY DISEASE

The clinical signs of IAD can range from subtle to quite marked and will vary depending on the changes within the airways and the demands placed upon the horse.

Affected horses are generally younger (up to 6-7 years), with a decreasing risk in older animals. The IAD horse may have more difficulty on hot, humid days and incidence may be seasonal, as for many people with asthma.

Most commonly, horses with IAD cough and show poor performance. The reduced performance may be obvious in racing horses but is not obvious in riding horses, which do gallop and thus not exercise at maximal capacity. Sprinting horses with quite mild IAD may be seen to "fail to finish off" or to "hit a wall". It may not be until IAD has reached a more advanced stage that it causes a jumper to clear less jumps or a dressage horse to be reluctant to commence work.

In a long-term study of racehorses it was shown that coughing, particularly at exercise, is the most useful predictor of airway disease. When both coughing and discharge from the nose were observed in the same month, IAD was extremely likely to be present.



DIAGNOSIS OF INFLAMMATORY AIRWAY DISEASE

The history of your horse may help diagnose IAD and factors to be considered include stabling conditions, feed type and quality, timing and variation in severity of clinical signs, any recent illness, health of other horses in contact, response to any treatments and recent changes in management.

Veterinary assessment will include a routine physical examination however often no abnormalities are detectable and even blood tests may be completely within normal ranges. 3 types of more in-depth investigation are typically undertaken.

1. Endoscopy involves passing a special tube with a camera at the end of it through the nostrils and down into the airways to visualise the tissues. Excessive mucus in the airways indicates inflammation and the next step is to determine the cause.
2. A sample of the fluid/mucus from the lungs is then collected the trachea and the cells are examined under a microscope and a sample to cultured in the lab to see if any bacteria are present.
3. Bronchoalveolar lavage is performed deep in the lung tissue using a specially designed tube. A small amount of saline is flushed through the tube and recollected, now containing cells picked up within the lung which can also be examined under a microscope and a sample to cultured in the lab to see if any bacteria are present.

Horses with IAD tend to have increased inflammatory cells in the lungs, and often trachea, such as neutrophils and mast cells, and possibly excessive eosinophils also.

While awaiting the results of laboratory tests the veterinarian will usually give the horse antibiotics in case of infection, and treat the symptoms with bronchodilators, while generally avoiding corticosteroids until the presence of infection is ruled out.

MANAGEMENT AND TREATMENT OF IAD

Effective treatment options can be simplified into 3 categories:

1. Elimination of the Offending Agent

This management aspect is the most important in the treatment of IAD because the aim should be (as with any health condition) to reduce the medications required to a minimum.

Complete removal of IAD horses from the source of the allergens which cause the disease, such as dust and mould, will resolve the clinical signs, however this is usually not practical where those sources include stabling, feed and/or bedding. Attempting to identify the specific agents responsible is virtually impossible too.



Airborne dusts found in stables are variable, complex mixtures, which may contain feed and plant components, fungal spores, insect parts, faeces, animal-derived components and various living organisms. Horses stabled indoors are likely to be exposed to continuously high dust levels and these can rise by around 8 - 12 times when horses submerge their noses in hay feed or straw bedding. While normal horses can tolerate this, the IAD horse cannot.

Tips to manage the IAD horse include:

- Select low-dust materials - hay and straw can be highly dusty; wood shavings, coarse sawdust, rice hulls, shredded paper and pelleted feeds are generally less dusty
- Provide good quality feed and bedding with no evidence of mould, rot or contamination
- Consider dampening feed or hay, with water, water/molasses mix or oil
- Feed hay from below chest height (ground or floor feeder)
- Change bedding regularly to reduce the build-up of irritating ammonia from urine
- Handle bedding with care to minimise the dust thrown around when changing and mucking out stalls. Leave the door open and, if feasible, remove the horse until the dust has settled (literally !)
- Maintain good ventilation within the stable area. Stalls with windows are preferable
- Regularly remove dirt, dust, cobwebs, mould etc, that accumulate around stalls and feed rooms
- Be aware of seasonal changes in humidity, temperature, plants and pollen
- Maintain vaccination against respiratory diseases e.g. Equine Herpes Virus 1, Equine Influenza
- Invest in flooring systems (e.g. Corbro www.corbro.com) which allow reduced quantity of loose bedding
- Keep the horse outdoors when possible, or at least with yard access
- Avoid working your horse behind others or in dusty conditions - it all adds up!

Despite the very best management, the reality is that most horses will require medication to control IAD at some stage.

2. Bronchodilation

Bronchospasm involves contraction of the muscles in the walls of the airways, which reduces the airway diameter and subsequent air flow. Bronchodilators are agents which relax the muscle and are best administered via inhalation. A well known bronchodilator is Ventolin which is widely used by people with asthma.

It is important to remember that bronchodilators reverse some of the effects of IAD but do not fix the underlying problem, which is inflammation of the airways. They can be considered a "band-aid" type treatment used for quick relief but not long-term therapy.



As horses will not inhale from a tube like Ventolin a specially designed device need to be used in horses to administer bronchodilators including nebulisers (generally large and awkward), pressurised canisters for use with metered-dose inhalers (including the Aeromask®) and, recently, dry powdered inhalers. Your veterinarian will select the best type of bronchodilator and show you how to administer it to your horse.

3. Control of Inflammation

As the name Inflammatory Airway Disease implies, inflammation is the fundamental cause of the coughing, airway obstruction and nasal discharge associated with IAD, so controlling this immune response is critical.

By far the most effective anti-inflammatories are corticosteroids, which will be selected and administered by your vet. Corticosteroids can be given by intramuscular or intra-venous injection to effectively treat IAD. Injection frequency and duration of effect varies, and oral corticosteroids may also be considered. Corticosteroids administered via aerosol mask are also widely used. A combination of injectable and aerosol products is often employed.

Corticosteroids are usually part of the long-term plan for IAD horses and monitoring for side effects such as laminitis or immune system suppression is essential. Ideally, use of any drugs is kept to a minimum by management strategies.

SUMMARY

Inflammatory Airway Disease is a frustrating condition affecting many horses in all sectors of the horse industry and to varying degrees. The primary cause is inhalation of allergens from the environment, which trigger inflammation within the airways leading to reduced lung function.

The most vital aspect of treatment is management of the environment to reduce the allergens which trigger the inflammatory reaction. Where elimination of these allergens is incomplete then bronchodilators and/or anti-inflammatories may be utilised to help manage the signs of IAD.