

Catch your breath

By Sandy Weltan

Equine asthma is surprisingly similar to human asthma, but pathologists still have a way to go in understanding its diagnosis and treatment.

Respiratory disease is a common cause of decreased performance in horses. Until recently, equine respiratory disease was divided into two syndromes, inflammatory airway disease (IAD) and recurrent airway obstruction (RAO). IAD was regarded as a disease of young racehorses, while RAO related to older horses. In reality, however, there is a considerable overlap and both syndromes now fall under the term moderate to severe equine asthma.

The disease

Human asthma and equine asthma have a number of similarities. Two cell subsets have been identified in the allergic response in both humans and horses: asthma associated with T-helper-2 cytokines and

non-T2 asthma. The former are more allergic and have higher immunoglobulin G levels, with large numbers of eosinophils in the sputum and peripheral eosinophilia. However, they are responsive to treatment with corticosteroids. Non-T2 asthma is clinically less severe but less responsive to corticosteroid treatment. T-cells that express interleukin 17 have been associated with severe neutrophilic asthma. There is also a subset of innate lymphocytes (without common lymphocyte markers) that are also not corticosteroid sensitive.

Severe equine asthma is predominantly neutrophilic, and although T2 cytokines and interleukin 17 have been identified, there is a good response to corticosteroid treatment. The troubling finding in both human and equine asthma is that structural remodelling of the airways takes place as a result of inflammation. It is partially reversed by the removal of the inciting cause.



Equine asthma varies from mild to severe, with clinical signs that are common in all cases. These include chronic cough, sometimes with nasal discharge, excess mucus and poor performance. However, there are variations in cause, severity and pathological lesions. Mild and moderate cases demonstrate subclinical disease characterised only by poor performance. Severe cases have typical signs with dyspnoea, coughing and nasal discharge.

Possible causes of equine asthma include:

- genetic susceptibility to particular bacterial lower-airway infections. No specific genetic risk factors or useful genetic markers have yet been identified
- seasonal factors such as pollen or mouldy feed due to warm, damp conditions

The troubling finding in both human and equine asthma is that structural remodelling of the airways takes place as a result of inflammation.

- persistent environmental conditions such as stable dust or organic dust.

Bacteria and viruses (including *Actinobacillus* spp. and equine influenza) may also play a role in the development of equine asthma. However, this remains poorly understood.

Diagnosis

A 2020 paper proposed a minimum database for practitioners and researchers to use in diagnosing equine asthma (Couëtil et al., 2020). It suggested collecting the following information:

- **The history of the animal.** This can often lead to a tentative diagnosis. It is important to ask about the risk factors outlined above, such as type of feed and heat.
- **Clinical presentation via a clinical scoring measure** such as the Improved clinically Detectable Equine Asthma Scoring System (IDEASS). This particular modified 23-point scoring system has been shown to discriminate mild to severe disease (Lavoie et al., 2019). However, it is more difficult to distinguish mild cases from healthy horses or horses who are in remission.

➤ **Lung function testing.** This is the gold standard in human asthma testing but is not readily available for horses.

➤ **Airway secretions.** This is a primary diagnostic tool for horses. Using bronchoalveolar lavage is more invasive but it is possible to get a better diagnostic sample. It is recommended that at least 250 millilitres of saline be used and at least 500 cells be counted (Couëtil et al., 2020). A trans-tracheal wash is easier to perform in the field, but mucus can interfere with accurate differential counts.

➤ **Endoscopy** is useful both for ruling out upper airway obstruction as a cause of the symptoms and because it allows for mucus grading. Tracheal mucus correlates well with racing performance (Holcombe et al., 2006).

Note that bronchial biopsies and radiography or ultrasound are currently not considered part of the minimum database for practitioners.

Comparisons between human asthma and equine asthma have allowed a better understanding of the pathogenesis of equine asthma, but it still needs further defining. Future research will aim at optimising diagnosis (including developing non-invasive field diagnostic techniques and identifying biomarkers of disease) and the treatment of the disease (including finding alternatives to corticosteroids as well as new therapies). ¹⁹

Sandy Weltan is a clinical pathologist with Gribbles Veterinary.

REFERENCES AND FURTHER READING:

Couëtil LL, Cardwell JM, Gerber V, Lavoie J-P, Léguillette R, Richard EA. ACVIM Consensus Statement – Inflammatory airway Disease of Horses – Revised Consensus Statement. *Journal of Veterinary Internal Medicine* 30, 503–15, 2016

Couëtil L, Cardwell JM, Léguillette R, Mazan M, Richard E, Bienzele D, Bullone M, Gerber V, Ivester K, Lavoie J-P et al. Equine asthma: Current understanding and future directions. *Frontiers in Veterinary Science* 7, 450, 2020

Fraipont A, Van Erck E, Ramery E, Richard E, Denoix J-P, Lekeux P, Art T. Subclinical diseases underlying poor performance in endurance horses: Diagnostic methods and predictive tests. *Veterinary Record* 169, 154, 2011

Holcombe SJ, Robinson NE, Derksen FJ, Bertold B, Genovese R, Miller R, de Feiter Rupp H, Carr EA, Eberhart SW, Boruta D, Kaneene JB. Effect of tracheal mucus and tracheal cytology on racing performance in Thoroughbred racehorses. *Equine Veterinary Journal* 38, 300–4, 2006

Lavoie J-P, Bullone M, Rodrigues N, Germim P, Albrecht B, von Salis-Soglio M. Effect of different doses of inhaled ciclesonide on lung function, clinical signs related to airflow limitation and serum cortisol levels in horses with experimentally induced mild to severe airway obstruction. *Equine Veterinary Journal* 51, 779–86, 2019