

# EquineReview

**Introduction:** The *Equine Review* highlights three recently published papers from other journals. This issue's edition describes three studies regarding the role of herpesvirus in pulmonary fibrosis in both horses and humans; the role of symmetric dimethylarginine levels in kidney function analysis in dehydrated horses and the feasibility of balloon catheter occlusion of the maxillary artery, internal and external carotid artery in standing horses.

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## The role of herpesviruses in pulmonary fibrosis

Equine multinodular pulmonary fibrosis (EMPF) is a chronic, progressive, interstitial lung disease of adult horses that has a guarded to poor prognosis. Human idiopathic pulmonary fibrosis (IPF) is a prevalent interstitial lung disease that resembles EMPF in its progression and treatment response. The mainstay of treatment for both conditions is corticosteroids and the pathogenesis is poorly understood. In IPF a familial association has been identified. Holley and Medina-Torres (2021) undertook a systematic review to address the question of whether herpesvirus plays a role in the pathogenesis of either disease. Pulmonary fibrosis is likely mediated by an abnormal cytokine response to epithelial injury. An association between EMPF and equine herpesvirus 5 (EHV5) has been demonstrated in horses. Human IPF lacks an experimental model with a natural host infected with a gammaherpesvirus ( $\gamma$ HV). A relevance screening identified 16 articles. All human studies investigated virus detection and tried to find a causal relationship between  $\gamma$ HV and pulmonary fibrosis. Statistical differences between patients with HIPF and control groups or other lung diseases, have been found in association with Epstein-Barr virus, cytomegalovirus and human herpesvirus 8. In EMPF, a significant difference in polymerase chain reaction detection of EHV5 between diseased horses and control groups has been identified, which is not the case with EHV2. Epstein Barr virus was found frequently in patients with IPF, although there was inconsistency in its

detection within lung tissue. Findings support the use of EMPF as a model to study IPF.

## Symmetric dimethylarginine and renal function

Symmetric dimethylarginine (SDMA) has better diagnostic value than creatinine for detecting decreased glomerular filtration rate (GFR) as a percentage. The prevalence of acute kidney injury in hospitalised horses was 14.8% in one study, with the severity found to be lower than in other animal species. The risk could be higher in diseases that lead to dehydration and hypovolaemia. Lo et al (2021) compared the concentration of SDMA with traditional renal biomarkers to establish its relationship with kidney function analysis in dehydrated horses. Serum SDMA, urea, creatinine, urine renal markers and short-term prognoses were assessed in clinically dehydrated (>6%) horses. A total of 41 horses were included; 26.8% had increased SDMA at admission, compared with 22% with increased creatinine and 26.8% with increased urea. Of the horses, 45.5% with increased SDMA had creatinine within the reference range and 12.2% of the horses had increases in all three markers. There were no significant correlations between urine specific gravity or gamma-glutamyl transferase:creatinine ratio and SDMA. Moderately dehydrated animals had the highest SDMA concentration, differing significantly from mildly dehydrated horses. There was no statistically significant difference between SDMA on admission and survival. The authors concluded that SDMA is significantly correlated with creatinine concentrations in dehydrated horses.

## Balloon catheter occlusion of the maxillary, internal and external carotid arteries

Haemorrhage related to guttural pouch mycosis is managed surgically by arterial occlusion, performed with ligation, embolisation or both. Balloon catheter occlusion has not been reported in the standing horse and horses with haemorrhage are at high risk during general anaesthesia. Genton et al (2021) conducted a study to determine the feasibility of balloon catheter occlusion of the internal carotid artery (ICA), external carotid artery (ECA) and maxillary artery (MA) in standing horses. The approach was the same as those previously reported and conducted under general anaesthesia. In the first part of the study, the feasibility of the technique on experimental horses was evaluated. Either the internal or external carotid artery was occluded in a total of eight horses; the other procedure was then performed on the horse's other side. The horses were euthanased and dissection was performed. Internal carotid artery occlusion was successful in 7/8 arteries. For ECA and MA occlusion, this was successful in 7/7 and 5/7 arteries respectively. In the second part, the technique was applied in 11 clinical cases. In 5/7 cases, occlusion of the ICA was successful, as well as in 2/2 cases with ECA involvement. A further two horses underwent ICA and ECA occlusion. The authors noted that the technique was faster and that there was excellent exposure of the surgical site, with increased surgeon comfort. It is a huge advantage to avoid the complications from general anaesthesia in a horse that has suffered severe blood loss. Blood accumulation in the guttural pouch was ventral so the view with the endoscope during surgery was improved. The authors concluded that this is a feasible standing procedure. Some neurological complications, such as transitory facial paralysis related to local anaesthesia, should be expected.

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## References

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