Stabling, Airway Inflammation, and Dorsal Displacement of the Soft Palate in Young Horses

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Introduction

Inflammatory airway disease (IAD) affects 25% to 30% of horses in training. These animals also frequently have upper airway inflammation that may predispose them to dorsal displacement of the soft palate (DDSP). The etiology of this airway inflammation remains obscure, but exposure to organic dusts may play a major role. Organic dusts originate from hay and bedding, and stabled horses can be exposed to dust levels capable of inducing airway inflammation. Using a group of young Arabian horses kept at pasture and in a stable, we asked the following questions. 1) Is stabling associated with inflammation of the upper and lower airways? 2) Do upper and lower airway inflammation occur concurrently? 3) Is a clinical mucus score correlated with the severity of neutrophilic inflammation in the lower airway? 4) Is inflammation of the upper airway associated with dorsal displacement of the soft palate?

Materials and Methods

Fourteen yearling Arabian horses (7 mares and 7 geldings) kept on a pasture since weaning were divided into two groups of seven. One group was stabled and the other kept on pasture. After three months, the groups were switched and followed for another three months.

Upper and lower airway examinations were performed monthly. Horses were twitched, endoscopic examination of the nasopharynx and larynx was performed, and the nares were occluded to observe soft palate function. Guttural pouches and trachea were examined after sedating the horses. Examinations were videotaped. Upper airway inflammation was graded by 2 observers and horses could earn up to 12 points based on the degree of pharyngeal lymphoid hyperplasia (1–4 pts) and guttural pouch inflammation (0–4 pts/pouch). The amount of mucus visible in the trachea was graded on a scale from 0 to 5. Bronchoalveolar lavage was performed to assess lower airway inflammation, and total and differential cell counts were determined.

Results were analyzed by Repeated Measures ANOVA, Friedman’s Repeated Measures ANOVA on ranks, Fisher’s Exact test, and Spearman Rank Order Correlation as appropriate. A significance level of p < 0.05 was chosen.
Results
Stabling was associated with higher total neutrophil count in bronchoalveolar lavage (8.3 vs. 3.5 cells/μl, SEM = 1.1), a greater percentage of neutrophils (10.4 vs. 3.6, SEM = 1.0), and a lower percentage of lymphocytes (37.0 vs. 42.6, SEM = 1.5). In all horses, the highest percentage of neutrophils occurred during stabling. Mucus scores were generally low, but surprisingly the mucus scores were higher in horses at pasture (1.6) than when stabled (0.7, SEM = 0.2). Upper airway inflammation scores decreased (6.2, 5.4, 4.4, SEM = 0.5) over the three months while horses were at pasture but stayed constant (5.8, 5.8, 5.4, SEM = 0.5) in the stable. There was no correlation between BALF cytology and either upper airway inflammation score or mucus score. There was a trend (p = 0.059) to suggest that horses displaced their soft palate more commonly while in the stable compared to the pasture.

Discussion
In the lower airway, stabling was associated with a level of neutrophilic inflammation similar to that reported for racehorses with IAD.1 Despite low level inflammation, our resting horses showed no overt signs of respiratory disease. A similar level of inflammation may be associated with impaired performance in racing horses. Mucus scores remained low. Scores may have been slightly higher in pastured horses because they were chased while being caught before examination.

In the upper airway, all horses had lymphoid hyperplasia, and in many it extended into the guttural pouches. The inflammation scores based on these changes progressively improved on pasture but did not in the stable. Although upper and lower airway inflammation were both associated with stabling, there was no direct correlation between the two. Our results demonstrate an association between stabling and inflammation of the lower and upper airway. Most racing and performance horses are stabled and are frequently affected with upper and lower airway inflammation. Minimizing dust exposure should be the aim of management for all horses but especially those such as racehorses that place high demands on their respiratory systems. Repeated stable-induced airway inflammation may predispose to the development of more severe lower airway disease such as heaves or performance-limiting upper airway dysfunction.

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References