Therapeutic Efficacy of Inhaled Fluticasone Propionate in Horses with Chronic Obstructive Pulmonary Disease

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Chronic obstructive pulmonary disease, or heaves, is an allergic respiratory condition characterized by airway inflammation, excess mucus formation and bronchospasm. Although the clinical signs, cough and purulent nasal discharge, mimic those of a respiratory infection commonly treated with antibiotics, corticosteroids still remain the treatment of choice. This study demonstrates that inhaled fluticasone propionate administered over 3 weeks is highly effective in the treatment of acute heaves. Authors' addresses: Dept. of Clinical Studies, University of Guelph, Guelph, ON, Canada (Viel, Celly, and Staempfli); Glaxo Wellcome Inc. Mississauga, ON, Canada (Tesarowski). © 1999 AAEP.

1. Introduction

Heaves is a naturally occurring disorder in horses that is known to develop after long-term exposure to airborne environmental allergens such as mold and dust from hay and bedding. The disease is characterized pathologically by small-airway infiltration of inflammatory cells, particularly neutrophils; by deterioration in lung function caused by airway constriction and mucopus accumulation; and by bronchial hyperresponsiveness. Clinically the disease is often diagnosed as an infectious (bacterial or viral) respiratory problem with the discharge of mucus. However, horses afflicted with this condition do not present the classic signs of fever, inappetence and recovery within a week of antibiotic treatment. Rather, persistent cough of more than 2 weeks' duration and wheezing heard on auscultation are the clinical hallmarks. An effective therapeutic approach to alleviation of allergy-induced inflammation is administration of corticosteroids. In recent years, studies have demonstrated that administration of corticosteroids and bronchodilators by inhalation is as effective as the parenteral administration of these agents. Therefore, the purpose of this study was to assess the therapeutic effects of fluticasone propionate (FP) compared with placebo treatment in horses with acute heaves.

2. Materials and Methods

The study was conducted on five characterized heavy horses using a double-blind, placebo-controlled, crossover design. The following tests were performed during the remission phase of the disease: endoscopy, pulmonary function testing, histamine challenge, serum cortisol analysis and bronchoalveolar lavage fluid (BALF) cellular analysis. The horses

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were then challenged with moldy hay in an environmental chamber until their maximum change in pleural pressure ($\Delta P_{\text{pl}}$) exceeded 20 cm H$_2$O (normal, <8 cm H$_2$O); all measurements were repeated. The horses were fed normal hay and housed in the chamber for 3 weeks during treatment with FP (2000 µg g$^{-1}$ h$^{-1}$) or placebo (g 12 h) from a metered dose inhaler via an equine AeroMask$^\text{a}$.

3. Results and Discussion

All animals were in clinical remission when they were brought in from the paddock, as evidenced by clinical score, pulmonary function testing values and cellular count of BALF. After challenge with dusty moldy hay, all animals went into the phase of exacerbation as suggested by high clinical and endoscopic scores, high $\Delta P_{\text{pl}}$ values (20–50 cm H$_2$O) and increased numbers of total cells and neutrophils in BALF. A significant ($p \leq 0.02$) decrease in total lung resistance ($R_L$) and $\Delta P_{\text{pl}}$ and a significant increase in dynamic compliance ($C_{\text{dyn}}$) were seen after treatment with FP. Histamine challenge, which assesses airway hyperreactivity, showed a 35% decrease in $C_{\text{dyn}}$ at a low dose (<0.5–2 mg/mL) of histamine after hay challenge. However, after FP treatment, horses did not react to even the highest dose of histamine, i.e., 32 mg/ml. In addition, a significant decrease in total cellular and neutrophil count was also seen after FP treatment. On the other hand, no improvement was seen after placebo treatment. On the contrary, deterioration was noticed in the cellular contents of BALF, clinical and endoscopic scores and pulmonary mechanics variables. No systemic effects of FP, as expressed by cortisol concentration, were seen after any treatment; this is in contrast to another topical steroid, beclomethasone dipropionate, which induce a significant decrease in cortisol concentrations after 2 weeks of treatment. In summary, FP could be considered an effective drug in the management of acute heaves or chronic obstructive pulmonary disease and did not appear to have systemic effects.

References and Footnotes


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