Updates in Corticosteroid Therapy for Inflammatory Pulmonary Diseases

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This presentation reviews the evolving role of corticosteroids in managing inflammatory pulmonary disease in dogs and cats, Beginning with the underlying pathophysiology and progressing through traditional systemic therapy to modern inhaled options, the goal of this presentation is to clarify when and why corticosteroids work, how different delivery routes influence efficacy and safety, and what recent research tells us about optimizing treatment.

We start with the pathophysiology of chronic airway inflammation, emphasizing that these diseases - bronchitis, asthma, eosinophilic bronchopneumopathy, interstitial lung disease, and tracheopathies - share a common cascade of immune dysregulation that culminates in an ongoing, progressive, inflammatory process. As will be discussed, chronic inflammatory diseases reflect a shift from "resolved innate immune responses" to "chronic inflammation," characterized by mucus hypersecretion, airway narrowing, epithelial injury, and secondary bacterial colonization. Once this cycle is established, the mantra of *"we don't cure… we control,"* underscores the need for long-term anti-inflammatory therapy. Systemic corticosteroids such as prednisone and prednisolone have historically been the mainstay of treatment. Their broad effects - blocking prostaglandins and leukotrienes, reducing PMN chemotaxis, decreasing mucus production, and enhancing β_2-receptor activity - make them highly effective across inflammatory airway diseases. However, the use of these drugs is highlighted by their well-known drawbacks: iatrogenic hypercortisolemia, weight gain, impaired mucociliary clearance, and increased susceptibility to opportunistic infections. It is stressed that careful tapering ("if you go fast… they will relapse") and avoidance of long-acting injectable steroids in cats should be remembered. The presentation will then shift to a discussion on inhaled corticosteroids (ICS), which have become standard in human pulmonology and increasingly relevant in veterinary medicine. Metered-dose inhalers (pMDIs) deliver high local drug concentrations with minimal systemic absorption, improving safety while maintaining efficacy. Early feasibility studies in dogs and cats demonstrated successful pulmonary deposition of radiolabeled fluticasone, validating the use of chambers such as AeroDawg and AeroKat. Fluticasone remains the most widely used veterinary-used ICS. Experimental feline asthma studies showed that even low doses (44 µg BID) significantly reduced airway eosinophilia without suppressing the hypothalamic–pituitary–adrenal axis. A pilot trial comparing inhaled fluticasone with oral prednisolone in naturally occurring feline asthma found both treatments equally effective in improving lung function and radiographic appearance, supporting ICS as a viable first-line or steroid-sparing option. Budesonide offers another promising inhaled alternative. Because it undergoes extensive first-pass hepatic metabolism, systemic exposure is low with fewer systemic side effects noted. In dogs, inhaled budesonide did not suppress ACTH-stimulated cortisol, unlike prednisolone and fluticasone. In cats with chronic bronchial disease, budesonide significantly improved clinical signs and Penh scores, with only mild adrenal suppression in a minority of patients. The presentation concludes with emerging inhaler science, particularly the importance of particle size. Traditional inhalers deliver particles in the 3–5 µm range, depositing primarily in larger airways. Newer "small-particle inhalers" (1–2 µm), such as ciclesonide and HFA-beclomethasone, achieve deeper penetration into bronchioles and alveoli—critical for small airway disease. Ciclesonide, a pro-drug activated by airway esterases, shows high receptor affinity with minimal oropharyngeal deposition and no HPA-axis suppression in human studies.

Together, these findings illustrate a clear trend: inhaled corticosteroids are becoming central to long-term management of chronic airway disease in veterinary patients, offering targeted anti-inflammatory control with fewer systemic risks