TITLE: BETA ADRENERGIC SENSITIVITY IN THE LUNG PERIPHERY OF BASENJI-GREYHOUND (BG) AND MONGREL DOGS

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Introduction. A beta adrenergic agonist is the most effective therapy for intraoperative bronchospasm. However, in vitro studies demonstrate impaired relaxation in response to beta adrenergic agonists in smooth muscle from asthmatic subjects. We questioned whether this beta deficit was important in vivo, and whether this was reflected in the very small peripheral airways. Thus, we studied the ability of albuterol to attenuate calcium chelator- and acetylcholine (Ach)-induced bronchoconstriction in the lung periphery of mongrel dogs and BG dogs, which have nonspecific airway hyperresponsiveness.

Methods. A wedged bronchoscope technique was used to measure collateral system resistance (Rcs) before and after aerosol challenges with a calcium chelator (Na_2EDTA) and Ach. In dogs anesthetized with thiopental and fentanyl, baseline Rcs was measured. A one min challenge with either 4% Na_2EDTA or Ach (10 mcg/ml) was performed, and Rcs was measured postchallenge. When Rcs returned to baseline, albuterol (1 mcg/kg IV) was administered, and second consecutive identical challenge was performed. Data were analyzed using Wilcoxon rank-sum test. We used $p<0.05$ to indicate significance.

Results. Initial responses to Na_2EDTA and Ach were similar in magnitude between the two groups of dogs. Albuterol attenuated Na_2EDTA-induced bronchoconstriction by 61±6 (mean±SE)% ($p<0.01$) in mongrel dogs and by 70±15% ($p<0.01$) in BG dogs. Albuterol attenuated Ach-induced constriction by 43±10% ($p<0.01$) in mongrel dogs (Fig. 1), but did not significantly ($p=0.75$) alter responses to Ach in BG dogs (Fig. 2).

Discussion. We concluded that an impairment in beta adrenergic-cholinergic interaction exists within small airways of BG dogs, in vivo, which may be very important in the pathogenesis of asthma. Finally, larger doses of beta agonists may be required to treat the reflex-induced (cholinergic) bronchospasm in asthmatic subjects during anesthesia.

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Fig. 1 MONGREL DOGS

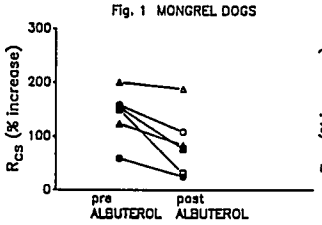

Fig. 2 BG DOGS