Efficacy of an Intranasal Delivery of an Avian-Derived Antibody Preparation Against Respiratory Pathogens in Prevention of Morbidity and Mortality of Newly Received Feedlot Cattle

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Introduction

Avian-derived immunoglobulins are resilient molecules resistant to extreme changes in pH, temperature, and exposure to proteolytic enzymes. Application of avian-derived polyclonal antibody preparations (PAP) against specific rumen bacteria have resulted in reduction of target rumen bacteria populations, and greater rumen pH at 4 h post-feeding. An intra-nasal PAP against various respiratory pathogens, including, but not limited to Mycoplasma bovis, Haemophilus, Pasteurella multocida and Mannheimia haemolytica, is produced by CAMAS, Inc. (Le Center, MN) under the trade name of NPCoat®. The product results from immunizing hens with these antigens, and harvesting, pasteurizing, processing and preserving eggs in a proprietary carrier and buffers. The product is administered intranasaly to form a mucosal protectant consisting of a film of specific, avian antibodies.

Materials and Methods

Seven studies with incoming feedlot cattle were conducted to determine the effects on morbidity or mortality of including a sequential treatment (1.5 mL in each nostril on arrival, and 1.5 mL in each nostril 7 to 9 days later) concurrent with common standard operating procedures for receiving calves (4-way MLV on arrival, a 7- or 8-way bacterin, on arrival or 7 to 9 d later, endectocide, except in one study, and, in some experiments, metaphylactic doses of antibiotics). In one of the experiments, an NPCoat® formulation was also offered via a lick tank formula (3 mL/lb). All observations were confirmed and finalized by at least 30 days on feed. In all experiments, cattle were procured from at least one sale barn in the southeast US, Kansas or California. Cattle were processed within 24 h from arrival. Data were analyzed within each experiment using Chi-square procedures. Where respiratory and non-respiratory data were indicated, they were thus analyzed; otherwise, morbidity and mortality data represent both respiratory and non-respiratory causes.

Results

In six out of the seven studies, feedlot morbidity (respiratory and other included) was lower ($P < 0.05$) for cattle treated with NPCoat®. Four out of the seven studies reported respiratory morbidity, and three out of these studies reported respiratory morbidity lower ($P < 0.05$) for cattle treated with NPCoat®. In these studies, non-respiratory morbidity was not affected ($P > 0.05$) by treatment with NPCoat®. In the study where morbidity was not affected, morbidity reached the highest value reported for all studies (149 head/233 head), yet respiratory mortality was 38% lower ($P = 0.08$) in cattle treated with NPcoat®. Across experiments that reported respiratory morbidity and mortality (1,157 control vs 1,320 treated cattle), treating cattle with NPCoat®, once on arrival and again 7 to 9 days later led to 42% lower morbidity (16.7% vs 28.9%; $P = 0.00001$) and 49% lower mortality (1.9% vs 3.7%; $P = 0.0056$)

Significance

Thus, NPCoat® is effective at reducing respiratory disease incidence and resulting death loss when it is a component of an integral health program for receiving feedlot cattle.