Evidence Related to the Use of Ancillary Drugs in Bovine Respiratory Disease (Anti-Inflammatory and Others): Are They Justified or Not?

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KEYWORDS

- Ancillary drugs • Bovine respiratory disease
- Anti-inflammatory drugs • Immunomodulators • NSAIDs

Bovine respiratory disease (BRD) remains a major problem in dairy cattle,[1] cow-calf operations,[2] and the feedlot industry.[3] The major costs of this complex are due to mortality, treatment costs, and an adverse impact on growth, milk production, or average daily gain (ADG) of the affected animals.[4–6] Nonresponders or chronic animals can also maintain respiratory pathogens within the herd or the pen, thus potentially acting as a source of future BRD outbreaks.[7]

Since the etiology of BRD is complex and primarily associated with mixed infections of both viral and bacterial agents, classic recommendations concerning naturally occurring BRD treatment are based on systemic antimicrobial treatment.[8,9] Antimicrobial treatment can be used in cattle acutely affected by BRD but can also be used for control of BRD in cattle with a high risk of developing the disease.[9]

One of the major pathophysiologic consequences of BRD is lung damage caused by inflammatory cells, endotoxin release due to gram-negative bacteria, and cytokines that may lead to the classic signs of BRD: fever, depression, anorexia, and abnormal respiratory function.[10] Even if therapy is a success, chronic lung lesions are a common sequelae of BRD. Chronic lung lesions found at slaughter are associated with

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decreased performance of affected animals.[4,5] For these reasons the concomitant use of an anti-inflammatory drug (AID) has been recommended by some authors to decrease the severity of clinical symptoms,[11,12] increase appetite,[13] and decrease inflammation-induced lung damage,[14] thereby limiting the impact of BRD on weight gain or milk production. Decreasing clinical sign severity or their duration may also be viewed as a way to improve cattle welfare and therefore can be of interest from this perspective.

Transient or permanent depression of the immune system has also been documented as a predisposing factor for developing BRD. Immunosuppressed cattle are more susceptible to viral infection.[15,16] Virus-induced immunosuppression is also a predisposing factor for secondary bacterial infection.[17] For these reasons, several compounds have been used to improve immune function and recovery of cattle afflicted with BRD.[8]

Despite the theoretical potential of these different ancillary drugs to improve recovery of cattle affected by BRD, a summary of the scientific evidence concerning the efficacy of ancillary therapy is not available for naturally occurring BRD.

The objective of this article was therefore to conduct a systematic review concerning the efficacy of ancillary drugs for treating naturally occurring BRD concurrently with an antimicrobial.

MATERIAL AND METHODS

After consultation among the current authors, the Patient/Population, Intervention, Comparison, and Outcome of clinical importance (PICO) strategy was used. The clinical question we tried to answer was, In cattle with naturally occurring BRD, are there any beneficial effects of adding an ancillary drug to antimicrobial treatment? Parameters to be evaluated for a beneficial effect were rectal temperature, the relapse rate, failure of treatment, the short- to long-term ADG or feed efficiency, the lung lesions, and production data, all of which were considered between treated and untreated groups.

Search Strategy

In reference to the question, these keywords were selected by the authors: bovine respiratory disease; pneumonia; lung disease; steroids; dexamethasone; isoflupredone; NSAIDs; flunixin; meloxicam; acetylsalicylic acid; ketoprofen; antihistamines; tripelennamine; immunostimulants; interferon; levamisole; vitamin C; concurrent vaccination; cattle; calf; bovine; veterinary.

The initial web search was conducted independently by 2 of the authors using the database MEDLINE (1966–2010) and CAB abstract (1984–2010). The search did not include regulatory document databases, which may have included reports of trials conducted during the approval process and which were not subsequently published. No restrictions were applied. For the web search in PubMed, the equation used was: bovine respiratory disease or pneumonia or lung disease and (steroids or dexamethasone or isoflupredone or NSAIDs or flunixin or meloxicam or acetylsalicylic acid or ketoprofen or antihistamines or tripelennamine or immunostimulants or interferon or levamisole or vitamin C or concurrent vaccination) and (cattle or calf or bovine) and veterinary. A similar equation was used in the CAB abstract database: (“bovine respiratory disease” or “pneumonia” or “lung disease”).mp. and (“steroids” or “dexamethasone” or “isoflupredone” or “NSAIDs” or “flunixin” or “meloxicam” or “acetylsalicylic acid” or “ketoprofen” or “antihistamines” or “tripelennamine” or “immunostimulants” or “interferon” or “levamisole” or “vitamin C” or “concurrent vaccination”).mp and (“cattle” or “calf” or “bovine”).mp.