Comparative efficacy of a combination of florfenicol and meloxicam with a combination of florfenicol and flunixin meglumine in young calves experimentally challenged with *Mannheimia haemolytica*

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Objectives

Bovine respiratory disease (BRD) continues to be a major health and economic issue for farmers raising young cattle around the world. Treatment of acute BRD rely on the administration of a systemic antimicrobial targeting Gram-negative bacteria such as *Mannheimia haemolytica* together with a nonsteroidal anti-inflammatory drugs to mitigate the inflammatory response and therefore to rapidly improve the clinical condition of affected animals. Florfenicol, meloxicam and flunixin are commonly used by bovine practitioners in the field for BRD treatment with documented efficacy and recently, a florfenicol and meloxicam combination (FMC) was developed (Zeleris®, Ceva). In order to evaluate the efficacy of this new combination and to precise the benefits of meloxicam over flunixin meglumine, an experimental study was performed that compare the efficacy of FMC with a florfenicol and flunixin meglumine combination (FFC, Resflor®, MSD) and with a control group.

Materials and methods

A randomized and blinded challenge study was performed in calves according to the principles of Good Clinical Practice. Assessment of the clinical condition of calves was based on rectal temperature (RT) and a combined total clinical score (TCS) aggregating evaluation of 4 different clinical parameters associated with respiratory disease (demeanor, nasal discharge, coughing, respiration pattern). At day 0, 90 young calves (mean age = 40 days) were challenged by intra-tracheal deposition of 300 mL of *M. haemolytica* M7/2 diluted broth culture with a challenge dose concentration of 2.33×10^8 colony forming units per calf to the bifurcation of the main bronchus by means of a fiber-optic bronchoscope. Eighty-four calves were finally enrolled based on a rectal temperature (RT) > 39.5 °C and a combined total clinical score (TCS) ≥ 3. Calves were then randomly allocated to one of the three study groups and promptly treated with FMC, FFC or saline. Following allocation and treatment, calves were clinically observed for 4 days. Calves were considered 'cured' if the sum of the clinical signs where ≤ 1 and rectal temperature (RT) < 39.5°C. Calves were considered 'in relapse' if cured on a specific day and then not cured on the following day. Calves were observed for 4 days. At the end of the study, all calves were humanely euthanized and the lungs of each calf were removed, assessed and scored for the presence of lesions and/or consolidation based on a standard scoring system (Jericho and Langford, 1982).

Results

RT and TCS of calves treated with a FMC or FFC were consistently lower than RT and TCS of calves belonging to the control group ($P<0.01$). Moreover at the end of the study, a high clinical cure rate was observed in calves treated with FMC (100%) or FFC (96.6%) whereas cure was limited for calves receiving saline (29.6%). Lung lesions scores were significantly lower for calves treated with FMC (6.7%) or FFC (7.2%) compared to calves in the control

group (23.5%, P<0.0001). Interestingly in this study, calves treated with FMC presented higher rates of clinical cure without relapse compared to calves treated with FFC (P<0.05) and lower risk of clinical relapse due to pyrexia (3.6% vs 24.1%, P=0.05). Additionally, a tendency was observed for a higher bodyweight gain at the end of the study for calves in the FMC group compared to calves in the FFC group (+2.3kg vs. +1.2kg respectively, P=0.06).

Conclusions

In this experimental study, the florfenicol and meloxicam combination (Zeleris®) was found to be highly effective for the treatment of BRD (cure rate = 100%). Calves treated with this new combination were moreover at lower risk for clinical relapse and presented a higher bodyweight gain compared to calves receiving the florfenicol and flunixin meglumine combination. These results are in line with the pharmacokinetic properties of florfenicol and meloxicam.

References

Jericho, K.W., Langford, E.V., 1982. Aerosol vaccination of calves with pasteurella haemolytica against experimental respiratory disease. Can. J. Comp. Med. Rev. Can. Med. Comp. 46, 287–292.