

Research Summaries

Investigating risk factors associated with passive immunity, health, and growth and the effects of administering non-steroidal anti-inflammatory drug to beef calves assisted at birth

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Introduction

Assisted calves are often born weak, injured, or oxygen deprived, and have a higher risk of morbidity and mortality (Ferguson et al, 1990; Wittum and Perino, 1995; Bleul and Gotz, 2013). Practical, evidence-based strategies that can mitigate the impacts of a difficult calving and improve transfer of passive immunity (PI) are important to ensure calf health. Non-steroidal anti-inflammatory drugs (NSAIDs) are increasingly used in cattle management (Murray et al, 2015, Moggy et al, 2016) and could potentially be a useful tool for reducing pain and inflammation associated with an assisted delivery. Therefore, the objective of this study was to investigate the impact of implementing pain mitigation at birth to calves born with assistance and to investigate risk factors associated with PI, health, and growth.

Materials and Methods

This study was conducted from January to June of 2017. Two-hundred and thirty cow-calf pairs requiring assistance at calving were enrolled from 15 cow-calf operations in southern Alberta. Information recorded at birth included calving date, dam parity and body condition score (BCS), calf birthweight and sex, calving ease score (easy or difficult), presentation (anterior or posterior), meconium staining, and vigour assessment (tongue withdrawal, suckle reflex, and mucous membrane color). At birth, calves were randomized to either the meloxicam or placebo group, stratified by calving ease score. Ranch personnel were blinded to the treatment group. Calves received a subcutaneous injection of meloxicam (0.5 mg/kg) or an equivalent volume of placebo. Type of colostrum consumed (dam colostrum or replacement product) and route of administration (nursed from dam, or bottle or tube fed), were recorded. Blood samples were collected from calves at 1 to 7 days of age to determine serum immunoglobulin (IgG) concentration. Preweaning data collection included treatment for disease, mortality, and weaning weights. Data was analyzed with Stata 14.1 software using multilevel linear or logistic regression modeling, accounting for clus-

tering of herds, to determine the effect of treatment with meloxicam at birth. Significant covariates (i.e. dam parity and BCS, calf sex, presentation, meconium staining, vigour assessment, birthweight, time to stand and nurse, and route or type of colostrum consumed) were offered to the models. Outcomes included: serum IgG concentration, adequate PI (serum IgG concentration > 24 g/L), preweaning treatment for disease and mortality, and average daily gain to weaning.

Results

There was no association between treatment with meloxicam at birth and serum IgG concentrations, adequate PI, treatment for disease, mortality, or average daily gain ($P>0.05$). Bottle or tube-feeding calves was associated with decreased serum IgG concentrations ($P=0.01$) compared to those that nursed. Calves with weak suckle reflex had 0.7 higher odds of inadequate PI ($P=0.05$) compared to those with a strong suckle reflex. Calves with incomplete tongue withdrawal had 1.8 higher odds of being treated for disease compared to those with complete tongue withdrawal ($P=0.009$). Meconium stained calves had 5.4 higher odds of mortality compared to those without meconium staining and decreased serum IgG concentrations were associated with an increased risk of mortality ($P=0.03$). Being born of a mature cow, having a higher birthweight, and increased serum IgG concentrations were associated with greater average daily gain at weaning ($P<0.05$).

Significance

In this study, there was no effect of giving an NSAID at birth to assisted calves on PI, health and growth. Several factors that can be identified at birth were associated with an increased risk of failed transfer of PI, treatment for disease, mortality, and reduced growth. Vigour assessment at birth along with good colostrum management may be important management tools to improve PI and health in high risk calves such as those that are assisted at birth.