

A prudent approach to antibiotic treatment of high-risk calves at arrival to a dairy beef facility

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Introduction

The veal and dairy beef industries experience high levels of morbidity and mortality during the growing period impacting calf welfare and economic sustainability. A large proportion of calves arrive into these industries with identifiable health abnormalities and, in consequence, calves are at highest risk of mortality in their first few weeks after arrival. A conventional method for addressing this high-risk period is the use of group antimicrobial therapy during their first week in the facility. However, in light of growing concerns for the development of bacterial antimicrobial resistance (AMR), targeted strategies for antimicrobial use (AMU) in this high-risk period are being investigated. Selective antimicrobial treatment of only those calves identified as high risk can be used to reduce overall AMU and therefore reduce the selective pressures that confer AMR. The objective of this study was to compare morbidity and mortality for calves in the first 2 weeks at a dairy beef facility between groups receiving conventional group antimicrobial therapy (CT) and those receiving selective antimicrobial therapy (ST) at arrival.

Materials and Methods

All calves received a risk assessment upon arrival to the facility using a standardized screening protocol that evaluated the level of dehydration, navel, presence of a sunken flank, presence of a cough, and other abnormalities. Rooms in the veal facility were randomly assigned to receive either CT or ST. In the ST group, calves were administered antimicrobial therapy, oral electrolytes, or both selectively based on their risk assignment. Mortality records were obtained for all calves at the facility. Calf treatment records were used as a proxy for morbidity, with only the first treatment being included in the data set. To evaluate differences between the CT and ST group, a Pearson's chi square test was used for morbidity, whereas, a Fisher's exact test was used to evaluate mortality due to the small number of mortality events recorded.

Results

Morbidity and mortality records for the first 2 weeks in the dairy beef facility were evaluated for 455 calves that arrived in 9 rooms between January 15th and March 23rd, 2018. Enlarged navels with at least heat or pain or moisture were found in 36% (95% confidence interval (CI): 32-41%) of calves, 7% (95% CI: 5-10%) of calves had a spontaneous or induced cough; other abnormalities were found in 8% (95% CI: 6-11%); sunken flank (defined as depression of the paralumbar fossa) was present in 35% (95% CI: 31-40%); and, signs of clinical dehydration (defined as >5% dehydration based on skin tent, attitude, presence or absence of suckle reflex and eye recession) were found in 27% (95% CI: 23-32%). There were no significant differences between CT and ST groups with respect to risk designation in calves ($P=0.87$). However, the 2 groups differed with respect to the number of dehydrated calves observed ($P < 0.01$) with the CT group having a significantly larger proportion of dehydrated calves. Preliminary analysis comparing morbidity between CT and ST groups suggests that there is no significant difference between the treatment groups ($P=0.64$). In the ST group, 12% were treated with antibiotics during the first 2 weeks on trial; whereas in the CT group, 10% were treated with antibiotics. Only 7 calves died during the first 2 weeks of the growing period with 3/7 deaths reported from the CT group (1%) and 4/7 deaths reported from the ST treatment group (2%) ($P=0.44$).

Significance

Preliminary analysis suggests that there may be no difference in morbidity or mortality in calves between CT and ST groups. If this holds true, it would be a very positive finding. Selective antimicrobial treatment strategies have the potential to reduce the pressures that promote AMR through a reduction of AMU without sacrifice to calf health and welfare.