Introduction

Persistent infection with bovine viral diarrhea (BVD) occurs in a calf that is born to a cow that became infected with BVD within the first 150 days of gestation (Brock, 2003). The calf is immunotolerant of the disease, and will carry the virus throughout its lifetime. A persistently infected calf will constantly shed the virus; serving as a principle source of infection for other cattle. Cattle that are persistently infected with BVD pose a costly economic concern to the industry. Other cattle that become exposed to BVD can exhibit various symptoms including abortion, congenital abnormalities, respiratory disease, acute enteritis, ulceration of mucosal surfaces, lameness, and immunosuppression. These conditions can lead to considerable decreases in performance, and greatly affect production related costs. In the upper Midwest, the estimated incidence of persistently infected (PI) cattle is 1.7% (Bolin et al., 1985). The objective of this project was to determine the incidence of PI calves in Arkansas, targeting weaning age calves that were obtained from sale barns in this state.

Experimental Procedures

Over the course of six months (July to December 2003), six groups of stocker cattle totaling 500 crossbred bull, steer, and heifer (BW 450 ± 50 lb; mostly Continental X English crosses) calves were obtained from Arkansas sale barns and received at the University of Arkansas Experiment Stations at Savoy (four groups; n = 279) and Batesville (three groups; n = 221). Soon after arrival, the cattle were individually weighed, treated for internal and external parasites, vaccinated against Clostridial diseases, infectious bovine rhinotracheitis, bovine viral diarrhea, parainfluenza-3, and bovine respiratory syncytial virus. Bulls were castrated, and horns were tipped. Calves were revaccinated with all vaccines 2 weeks after the initial doses of vaccine.

During initial processing or during the revaccination, skin tissue samples were collected via the ear notch method. Collected tissue samples were placed in individual containers and fixed in a formalin solution. All samples were sent to the Oklahoma Animal Disease and Diagnostic Laboratory to test for testing. An immunohistochemistry test was performed to determine the presence of a persistent infection with BVD (Broderson, 2004). Calves were observed daily for a 28-day receiving period at 8 AM for clinical signs of respiratory disease. Calves pulled for treatment had their temperature taken, and received appropriate antibiotics if their body temperature exceeded 104.0°F. All health and disease data were recorded.

Statistical analysis was performed on the data relative to morbidity rates so as to note correlation with PI BVD prevalence. The morbidity data were analyzed using the GLM procedure of SAS (SAS Inst., Inc., Cary, N.C.).

Results and Discussion

Four tissue samples out of the 500 (0.8%) submitted were positive for the disease (Table 1). One sample originated from a calf at the Batesville unit, and three samples originated from calves at the Savoy unit, in which two of the three calves were in the same group of cattle.

In the three groups that contained PI BVD calves, 42.6% of the calves were treated at least once for respiratory disease, and only 23.9% of those calves in non-PI BVD groups were treated at least once for respiratory disease (P < 0.05; Table 1). There was a significant difference between morbidity rates in groups that contain PI BVD calves versus groups that contained no PI BVD calves.

Implications

There was a 0.8% incidence rate of PI BVD infections in this population of Arkansas stocker cattle. A significant difference was noted between the numbers of calves treated for bovine respiratory disease in the groups of cattle that contained PI BVD calves compared to those groups that did not contain PI BVD calves. More research is needed to identify the economic impact that this disease has on cattle that are exposed to these PI calves.

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Table 1. The number of PI BVD\(^1\) calves and morbidity percentage for calves obtained from Arkansas livestock auctions.

<table>
<thead>
<tr>
<th>Group</th>
<th>Location</th>
<th>Number of calves</th>
<th>Number of PI BVD calves</th>
<th>Morbidity %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Savoy</td>
<td>50</td>
<td>2</td>
<td>62.1(^a)</td>
</tr>
<tr>
<td>2</td>
<td>Savoy</td>
<td>101</td>
<td>1</td>
<td>43.6(^b)</td>
</tr>
<tr>
<td>3</td>
<td>Batesville</td>
<td>90</td>
<td>1</td>
<td>21.1(^c)</td>
</tr>
<tr>
<td>4</td>
<td>Savoy</td>
<td>83</td>
<td>0</td>
<td>43.8(^b)</td>
</tr>
<tr>
<td>5</td>
<td>Batesville</td>
<td>131</td>
<td>0</td>
<td>16.2(^cd)</td>
</tr>
<tr>
<td>6</td>
<td>Savoy</td>
<td>45</td>
<td>0</td>
<td>4.4(^d)</td>
</tr>
</tbody>
</table>

\(^1\)Persistently infected (PI) with bovine viral diarrhea (BVD)

\(abcd\) Least-squares means within a column, with no superscripts in common, differ (P < 0.05)