

Application of the Bovine Milk Pregnancy ELISA in beef cows

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Introduction

Pregnancy-associated glycoproteins (PAGs) are produced by binucleate giant cells of the ruminant placenta and secreted into maternal circulation during pregnancy. These proteins can be detected in maternal serum and milk as early as 28 days post-insemination, which makes them a potential target for pregnancy detection, which in turn could provide an alternative management tool for dairy and beef producers. The presence of PAGs in serum has been used extensively to diagnose bovine pregnancy. More recently, the Bovine Pregnancy ELISA (IDEXX, Westbrook ME) has been used to detect the presence of PAGs in milk. Although the milk ELISA was designed primarily to be a management tool for dairy operations, it has potential for use in beef operations in remote areas where veterinarians are not readily available to perform pregnancy diagnosis and the producer lacks the skill set to collect a blood sample. The objective of this study was to compare the results of the PAG ELISA used on milk and serum to pregnancy diagnosis by transrectal palpation or ultrasound in lactating beef cows with previous artificial inseminations or bull exposure.

Materials and Methods

One hundred forty-three Red Angus cows from the Michigan State University AgBio Research Lake City Experiment Station were used in this study. All cows were artificially inseminated once, followed by bull exposure. The bull was separated from the cows 40 days prior to examination for pregnancy. Cows were between 40 and 120 days post-breeding at the time of examination. Serum and milk samples were collected from each cow and submitted to AntelBio (Lansing, MI)

for PAG analysis using the IDEXX Bovine Pregnancy ELISA. In parallel, each cow was examined by transrectal palpation or ultrasound. The results of the PAG assays were compared to the transrectal palpation or ultrasound findings.

Results

The sensitivity and specificity of both the serum and milk PAG assays were 100% and 75%, respectively. The agreement of the two tests was 99.99%. Two cows that were declared open on transrectal palpation were declared pregnant on the milk PAG assay. These conflicting results could have been caused by recent embryonic or fetal loss or misdiagnosis on palpation. In this study, test sensitivity was comparable and specificity was slightly lower in lactating beef cows, compared with those found in studies that evaluated the milk PAG ELISA in lactating dairy cows.

Significance

Based on this preliminary study, the milk PAG ELISA was reliable in detecting pregnancy in beef cows. The reliability of this test could make it potentially useful as a management tool when collection of a blood sample is not possible or a veterinarian is unavailable for pregnancy diagnosis by means of palpation or ultrasound. However, not all beef cows may be amenable to collection of a milk sample, and the safety of the individuals working with the cattle should always be a consideration. More data is being collected to evaluate the test's performance at different stages of gestation in beef cows. Future studies may also involve the evaluation of this assay for use in other lactating ruminant species, such as goats and water buffalo.