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Reproduction

Use of Pregnancy Associated Glycoproteins to determine Fetal Age Throughout Gestation

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Objective

The objective of the current study was to determine if a commercially available blood pregnancy test could be modified to detect differences in pregnancy-associated glycoprotein (PAG) concentrations that would be indicative of stage of pregnancy or fetal age.

Study Description

Previously identified pregnant females were grouped by age (heifers n = 173 and cows n = 512). Blood samples were collected between d 27 and 190 of pregnancy and serum was tested in duplicate using a commercially available blood pregnancy test, IDEXX Bovine Pregnancy Test. Procedures were adapted to allow concentrations to be within the detectible range of the assay. Data were analyzed using the MIXED procedure of SAS with age and gestational age in the model. There was an effect of age (heifer vs cow), gestational age, and an age by gestational age interaction ($P < 0.01$) with heifers having greater PAG concentrations compared to cows. Animals were grouped into four gestational groups (<30, 30 to 90, 91 to 178, and >178 d). Among heifers, PAG concentrations did not differ between groups 1, 2, and 3 ($P > 0.37$), but group 4 had greater PAG concentrations than all other groups ($P < 0.01$). Among cows, PAG concentrations decreased from group 1 to 2 ($P < 0.01$), and then increased throughout gestation ($P < 0.01$). Data was then analyzed using the REG procedure in SAS within age group. There was a positive correlation between gestational age and PAG concentrations among both heifers ($P < 0.01$; $r^2 = 0.25$) and cows (gestational age 30 and greater $P < 0.01$; $r^2 = 0.64$).

Take home points

In conclusion, circulating PAG concentrations among pregnant heifers increased with gestational age, but the high variability of concentrations may not make it a reliable marker for gestational age. Among cows, however, gestational age accounted for 64% of the variation in PAG concentrations between d 30 and 190, thus using a modified blood pregnancy test may allow for determining stage of pregnancy.

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