

# Effect of uterine score on concentrations of bovine pregnancy associated glycoprotein (PAGs) and its relationship with pregnancy per artificial insemination and pregnancy losses

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The aim of this study was to evaluate the effect of uterine size and position on concentrations of bovine pregnancy associated glycoproteins (PAGs) and its relationship with pregnancy per AI and pregnancy losses in lactating dairy cows. A total of 662 lactating Holstein cows were enrolled. Size and position score (SPS) of the reproductive tract was assigned at the moment of AI as follows: SPS1–small and compact uterine horns resting within the pelvic cavity; SPS2 – cows had reproductive tracts that were intermediate in cervical and uterine horn diameter with longer uterine horns resting partially outside the pelvic cavity; and SPS3–cows had reproductive tracts that were larger and resting mostly outside the pelvic cavity. Blood samples were taken at 24 and 31 days after AI (d24;d31) for analysis of PAG concentration. Pregnancy diagnosis was performed at days 31 and 120 after AI by ultrasonography. SPS was impacted by parity ( $P<0.01$ ), where primiparous cows had a higher frequency of SPS1 and lower frequency of SPS3 when compared with multiparous cows (SPS1-39.9%vs.19.3%; SPS3-2.9%vs.15.5%). Circulating concentrations of PAG was  $0.93\pm 0.56$  ng/ml and  $3.56\pm 1.76$  ng/ml on d24 and 31, respectively. Concentration of PAGs were not different at d24 between SPS or parity; however, primiparous cows had higher concentration of PAGs at d31 when compared with multiparous cows ( $4.51\pm 0.27$  ng/ml vs. $3.43\pm 0.8$  ng/ml;  $P<0.01$ ). Concentration of PAGs at d31 was higher in animals that had SPS1 when compared with SPS2 and SPS3 ( $5.08\pm 0.36$  ng/ml vs.  $3.66\pm 0.25$  ng/ml vs.  $3.04\pm 0.57$  ng/ml;  $P<0.01$ ). Animals that had SPS1 also had higher fertility when compared to SPS2 and SPS3 (42.4%vs.32.6%vs.23.9%;  $P<0.01$ ) even when parity was held constant. Pregnancy loss between d31 and d120 was increased in cows with SPS3 compared to SPS2 and SPS1 (14.9%vs.9.6%vs.2.9% for SPS3, SPS2 and SPS1, respectively;  $P=0.04$ ). In conclusion, cows that had an SPS 3 had lower fertility, lower concentration of PAGs at d31 post-AI and higher pregnancy losses at d120 post-AI.

Implications: The size and position of the reproductive can be used in a useful scoring system to identify less fertile lactating dairy cows and can easily be diagnosed. It can provide an opportunity to make relevant management decisions and maximize reproductive efficiency in dairy farms.