The interaction of estrous expression and GnRH administration at the time of AI on pregnancy and ovulation rates

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The aim of this study was to determine if the administration of GnRH at the moment of AI could increase ovulation rates and fertility of animals expressing low estrous behavior. Cows were enrolled at the time of estrus from three commercial farms (n=1763 AI events; Farm A: 528, Farm B: 481, Farm C: 754) and randomly assigned to receive GnRH at AI or not. On all herds, cows had their estrous expression monitored through leg-mounted activity monitors. Estrous expression was quantified as the maximum activity that occurred during the event; using the farm median, estrous expression was categorized as high or low. On Farm A, cows were assessed at alert and for ovulation at 24h (n=270), 48h (n=788) and 7d (total ovulation rate; n=825) post-alert using transrectal ultrasonography; ovulation was determined by the disappearance of the dominant follicle. Pregnancy was confirmed at 31±3d post-AI. Differences between treatments were tested using the GLIMMIX procedure of SAS where cow within farm was used as a random effect. An interaction between GnRH and estrous expression was found for both the occurrence of ovulation at 24 and 48 hr as well as total ovulation. At 24 hr, animals with higher estrous expression had lower ovulation rates, but with the administration of GnRH the magnitude of these differences was dampened (GnRH: High – 21.1 ± 5.0 Low – 28.8 ± 5.6; No GnRH: High – 17.7 ± 5.3 Low – 35.8 ± 5.3%; P = 0.07). At 48 hr, ovulation rates were highest for cows with high expression receiving GnRH (GnRH: High – 94.8 ± 2.3 Low – 86.1 ± 2.4; No GnRH: High – 89.2 ± 2.3 Low – 89.3 ± 2.3%; P = 0.04). Similarly, the total ovulation rate was highest for cows with high estrous expression receiving GnRH (GnRH: High – 97.7 ± 1.8 Low – 92.9 ± 1.9; No GnRH: High – 91.6 ± 1.8 Low – 91.8 ± 1.8%; P = 0.04). Finally, there was an interaction of treatment and estrous expression on fertility, although it does not seem due to ovulation. Animals with low estrous expression receiving GnRH at AI had higher P/AI than those not receiving GnRH; GnRH did not impact P/AI of high expression cows. In fact, cows with low estrous expression receiving GnRH had the same P/AI as those with high estrous expression without GnRH (GnRH: High – 46.9 ± 2.5 Low – 39.8 ± 2.7; No GnRH: High – 42.0 ± 2.5 Low – 31.0 ± 2.9%; P < 0.01).

Implications: Administration of GnRH at the time of AI may be useful for increasing conception rates of animals with low estrous expression; however, this increase in fertility does not seem to be closely related to ovulation rates.