Evaluation of reproductive performance of dairy heifers subjected to two estrus detection systems and treated with two prostaglandin formulations

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Introduction

Efficient and accurate identification of estrus is critical for the success of estrous detection based reproductive management. We hypothesized that management of dairy heifers with the aid of an automated estrous detection system (AES) would improve service rate and consequently the reproductive performance of dairy heifers. In addition, we hypothesized that treatment of heifers with cloprostenol (CLO) would improve pregnancy per service compared to treatment with dinoprost (DIN). The objectives were to evaluate the reproductive performance of dairy heifers managed with the aid of an AES vs. a mounting detector device (MD) and synchronized with CLO vs DIN.

Materials and Methods

Holstein heifers (n = 1,019) from a dairy herd in the Southeast of the USA were enrolled in the experiment at approximately 11 months of age when they were fitted with a Heat Ruminating Long Distance collar (SCR Ltd., Netanya, Israel). At approximately 12 months of age heifers were randomly assigned to an estrous detection treatment (EDT: AES vs MD) and prostaglandin (PG) F2a treatment (CLO vs DIN) according to estrous cycle day at PGF2a treatment (d 4 to 6 vs d 7 to 26). Heifers in the AES treatment were serviced according to estrus detected by changes in activity and rumination, whereas heifers in the MD treatment were serviced when detected in estrus by farm personnel according to the activation of the KAMAR device (Steamboat Springs, CO). Heifers were treated with PGF2a (same formulation throughout the experiment) every 14 d or until serviced. The experiment had a 2x2 design according to estrous detection treatment (AES vs MD) and PGF2a treatment formulation (CLO vs DIN) and was analyzed as such, controlling for estrous cycle day at PGF2a treatment. Binary variables were analyzed by logistic regression using the LOGISTIC procedure. Hazard of service and pregnancy were analyzed by the Cox proportional hazard ratio using the PHREG procedure. Statistical significance was considered at P < 0.05 and tendency at 0.05 < P ≤ 0.10.

Results

Estrous detection treatment did not (P = 0.17) affect the hazard of service. There was a tendency (P = 0.06) for CLO heifers to have increased hazard of service (AHR = 1.14, 95% CI = 0.99-1.30) than DIN heifers. The interaction between EDT and PGF2a treatment did not (P = 0.65) affect the hazard of service. Among heifers receiving artificial insemination for first service, EDT (P = 0.78), PGF2a treatment (P = 0.19), and the interaction between EDT and PGF2a treatment (P = 0.81) did not affect pregnancy at 75 d after first service. Among heifers receiving embryo transfer for first service, there was a tendency (P = 0.06) for AES treatment to increase pregnancy at 75 d after estrus compared with MD treatment (AOR = 1.52, 95% CI = 0.98-2.36), but PGF2a treatment (P = 0.71) and the interaction between EDT and PGF2a treatment (P = 0.75) did not affect pregnancy at 75 d after estrus. Hazard of pregnancy was not affected by EDT (P = 0.25), PGF2a treatment (P = 0.51), and by the interaction between EDT and PGF2a treatment (P = 0.54).

Significance

In a commercial dairy farm in the Southeast of the USA, reproductive management with an AES did not improve hazard of pregnancy, despite slightly increased pregnancy to embryo transfer. Despite a tendency for increased hazard of service, treatment with cloprostenol did not improve hazard of pregnancy of dairy heifers.