Comparison of reproductive performance of dairy cattle following a multivalent modified live post-partum vaccine protocol or a multivalent killed pre-partum vaccine protocol

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Introduction

Reproductive performance has a major impact on productive efficiency, culling decisions, and profitability of dairy herds. Vaccination of beef cows with a modified live vaccine (MLV) before artificial insemination (AI) has been shown to reduce pregnancy per AI (P/AI) compared with cows that received a killed vaccine (KV). Although a previous experiment with dairy cows showed no difference in P/AI following postpartum vaccination with KV and MLV, the impact of replacing postpartum vaccination with the use of KV prepartum has not been evaluated. The hypothesis of this experiment was that prepartum vaccination with KV improves reproductive efficiency compared with postpartum vaccination with MLV. Therefore, objectives were to evaluate P/AI and pregnancy loss following first AI postpartum, and the hazards of pregnancy and culling by 150 days in milk (DIM) in lactating dairy cows receiving 1 of 2 vaccination protocols.

Materials and methods

Pregnant Holstein heifers and cows from 2 herds located in Florida and Wisconsin were enrolled in this experiment. Weekly cohort of heifers and cows were randomly assigned to 1 of 2 treatments: prepartum vaccination with 2 injections of KV (Vira Shield 6 L5, Elanco, Greenfield, IN) given 28 to 35 days apart with the first injection 50 to 70 days before expected calving (KV; n = 2,361), or postpartum vaccination with 1 injection of MLV (Bovi-Shield Gold FP5 L5, Zoetis, Parsippany, NJ) given 30 to 45 days before first AI (MLV; n = 2,745). Cows in the Florida herd were subjected to the Double-Ovsynch protocol for first service, whereas cows in Wisconsin were subjected to the Presynch-Ovsynch protocol. Following first AI, cows detected in estrus were inseminated on the same day. Pregnancy was diagnosed using transrectal ultrasonography 30 days after previous AI and pregnant cows were reconfirmed 60 days after AI. Non-pregnant cows were resynchronized using the Ovsynch protocol. Binary responses were analyzed by multivariable logistic regression using the FREQ and GLIMMIX procedures of SAS. Time-dependent variables were analyzed by Cox's proportional hazard models and Kaplan-Meier survival curves using the PHREG and LIFETEST procedures of SAS. Cows were right censored from analyses at 150 DIM.

Results

Pregnancy per AI did not differ between treatments on day 30 (KV = 50.2 vs. MLV = 50.9%; $P = 0.62$) or day 60 after AI (KV = 47.1 vs. MLV = 47.1%; $P = 0.98$). Pregnancy loss between 30 and 60 days of gestation was not affected ($P = 0.25$) by treatment (KV = 5.1 vs. MLV = 6.2%). The hazard of pregnancy within the first 150 DIM was not affected ($P = 0.29$) by vaccination protocol (adjusted hazard ratio = 1.04, 95% confidence interval = 0.97 to 1.11), leading to a similar ($P = 0.12$) proportion of cows pregnant by the end of the follow up period (KV = 72.3 vs. MLV = 70.4%). Treatment did not affect ($P = 0.40$) the hazard of culling within the first 150 DIM (adjusted hazard ratio = 0.87, 95% confidence interval = 0.64 to 1.20), which was linked to a similar ($P = 0.40$) proportion of cows culled by the end of the follow up period (KV = 2.3 vs. MLV = 2.6%).

Significance

Results from the present experiment did not support the initial hypothesis as the use of a KV prepartum compared to MLV postpartum did not impact outcome of first breeding, time to pregnancy, proportion of cows pregnant by 150 DIM, and culling patterns.

