Reproductive performance with an automated activity monitoring system versus a synchronized breeding program

Rafael C. Neves, *DVM, MSc*; **Stephen J. LeBlanc**, *DVM, DVSc*
Population Medicine, University of Guelph, ON, Canada, N1G 2W1

Introduction

Automated activity monitoring is being increasingly used in the dairy industry for reproductive management, but there are few studies assessing its performance relative to synchronized breeding programs. The objective of this study was to compare reproductive performance of dairy cows managed with an automated activity monitoring (AAM) system with that of cows managed with a synchronized breeding program under field conditions.

Materials and Methods

A total of 1,429 Holstein cows from three commercial dairy herds in Ontario, Canada, were enrolled over one year in a randomized controlled trial. At each farm, primiparous and multiparous cows were housed in separate pens. One of two reproductive management programs (heat detection via an AAM system (Heatime, SCR Engineers Ltd) or a timed artificial insemination program (TAI)) was randomly assigned to each pen. After six months, each pen was assigned the opposite reproductive management program to avoid confounding treatment (reproductive management program) with parity. Additionally, insemination on the basis of visual observation of estrus was practiced in all pens. Time to insemination and time to pregnancy were assessed with Cox proportional hazards models.

Results

Data for a total of 1,985 cow six-month periods was obtained. For cows overall, time to pregnancy, time to first service, and time to second service did not differ between the AAM and TAI treatment groups. However, there was an interaction between herd and treatment, such that some outcomes between treatments did differ for some herds. Time to pregnancy between treatments for herds A (median, 151 and 136 days for AAM and TAI, respectively; hazard ration [HR], 0.93; $P = 0.52$) and C (median, 99 and 124 days for AAM and TAI, respectively; HR, 1.24; $P = 0.08$); whereas for herd B, time to pregnancy was significantly shorter for the AAM treatment (median, 119 days) than that for the TAI treatment (median, 146 days; HR, 1.3; $P = 0.02$). When all inseminations, including those performed on the basis of visual observation of estrus (AAM, 19%; TAI, 32%), were considered, overall herd pregnancy rate and cow-time to pregnancy did differ between treatments, but the effect of the reproductive management program varied by herd. When only the inseminations that were performed in accordance with the assigned treatment program were considered (n = 924 cow six-month periods), there was also an interaction between herd and treatment. Results of stratified analysis indicated that for herd A, there was no difference in time to pregnancy (HR, 1.3; $P = 0.12$) between AAM and TAI; whereas, for herds B (HR, 1.7; $P = 0.002$) and C (HR = 2.8, $P < 0.0001$) cows in the AAM treatment group became pregnant sooner than those in the TAI group.

Significance

Factors that influence the variability in relative performance of AAM and TAI systems between herds require further investigation. Our study used one commercial AAM system, and the results cannot necessarily be generalized to other systems. The results of this study suggest that AAM systems may yield reproductive performance at least comparable to a TAI-based program under field conditions, but that relative reproductive performance may vary between herds.