

Effect of purulent vaginal discharge on ovarian cyclicity, pregnancy, pregnancy loss, and cow survival in a large multi-farm population of Holstein cows

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Introduction

Uterine diseases, such as metritis and endometritis, are highly prevalent in dairy cows. Clinical endometritis, more precisely identified as purulent vaginal discharge (PVD), is characterized by presence of purulent (>50% pus) uterine discharge detectable in the vagina ≥ 21 days after parturition, or mucopurulent (approximately 50% pus, 50% mucus) discharge detectable in the vagina >26 days postpartum. This condition has been associated with variable degrees of reduced fertility; however, the reported effects on subsequent survival in the herd are conflicting. The analysis of a large experimental data set, using a standardized disease definition would help to clarify these long-term responses. Therefore, the objective was to analyze the effect of PVD on multiple reproductive responses and survival in a large population of Holstein cows across US regions.

Materials and Methods

A total of 11,733 cows calving in 16 farms located in 4 regions (Northeast [4 herds], Midwest [6 herds], Southeast [1 herd], and the Southwest [5 herds]) were enrolled at parturition and monitored weekly for multiple reproductive events, disease occurrence, and survival. Occurrence of PVD was assessed at 28 ± 3 days-in-milk (DIM) and defined by presence of mucopurulent to fetid vaginal discharge. Resumption of ovarian cyclicity (ROC) was determined via transrectal ultrasonography at 40 ± 3 and 54 ± 3 d postpartum. Pregnancy diagnosis was performed by ultrasonography on d 32 ± 3 d after artificial insemination (AI) and reconfirmed at d 60 ± 3 of gestation. Subsequently, pregnancy loss between d 32 and d 60 after AI was calculated. Multivariate logistic regression was used for testing potential associations between PVD and

ROC, pregnancy and pregnancy loss at first and second AI, and survival in the herd after 50 DIM. Farm and region were included as random effects in all the models.

Results

Overall, mean (range) farm incidence of PVD was 25.7% (11.8-35.1). Average incidence was greater in cows calving in winter (27.5%) than in summer (23.6; $P < 0.001$) and in pluriparous (27.2%) compared to primiparous (24.8%; $P = 0.006$) cows. Incidence varied by region and was 24.0% (Northeast), 24.4% (Midwest), 32.9% (Southeast), and 26.4 (Southwest; $P < 0.0001$). Purulent VD affected ROC; odds (95% CI) of ROC multiplied by 0.63 (0.57-0.69) in affected cows, indicating that the odds of cyclicity were reduced by 37%. The odds of pregnancy at first and second AI in PVD cows were 0.66 (0.60-0.72) and 0.79 (0.71-0.89) times the odds of pregnancy of healthy cows, respectively. The odds of pregnancy loss at first AI for PVD cows were 1.60 (1.21-2.00) times the odds of pregnancy loss of healthy cows. However, the effect of PVD on pregnancy loss at second AI was not significant (OR = 0.74 [0.27-2.05]). Presence of PVD had a carryover effect on culling and death later in lactation: Cows affected by PVD had lower survival after 50 DIM compared with unaffected cows (OR = 0.85 [0.76-0.95]), indicating that the odds of survival were reduced by 15%.

Significance

Occurrence of purulent vaginal discharge had a significant detrimental effect on multiple fertility responses and survival later in lactation.