

Effect of Anovulation and Subclinical Endometritis on Fertility of Lactating Dairy Cows

Why Are Dairy Cows Not Getting Pregnant—Lack of Cyclicity, Uterine Disease, or Both?¹

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Introduction

Virtually all Holstein dairy cows have the first wave of follicle growth starting two weeks postpartum, with about 30% of these cows ovulating within 21 days in milk (DIM). An additional 30%–40% of the cows ovulate follicles from subsequent follicular waves within 30–50 DIM, and about 20%–40% of the cows remain anovulatory by 60 DIM (Beam and Butler 1999; Butler 2003; Santos et al. 2009; Galvão et al. 2010).

Resumption of ovarian cyclicity before the first artificial insemination (AI) has been shown in several studies to be a positive determinant of first service pregnancy per AI (Santos et al. 2009; Galvão et al. 2009a). However, most of the benefit is actually from cows that start cycling very early in lactation (Galvão et al. 2009a). We observed that cows cycling by 21 DIM had decreased ($P < 0.05$) median days open (103 days) compared with cows cycling by 49 DIM (147 days) and cows not cycling by 49 DIM (173 days); while cows cycling by 49 DIM only tended ($P = 0.09$) to have decreased days open compared to cows that were not cycling by 49 DIM (Galvão et al. 2009a). Higher fertility in cows that cycle earlier can be partially explained by more estrous cycles, which provide progesterone priming and uterine cleansing during estrus (Thatcher and Wilcox 1973). In fact, cows that were cycling at 21 DIM had

decreased prevalence of endometritis at 49 DIM compared with cows that were not cycling by 49 DIM (30% vs. 44%; $P < 0.05$). Cows that started cycling between 21 and 49 DIM had similar prevalence of endometritis as cows that were not cycling by 49 DIM (39% vs. 44%; $P > 0.15$).

Subclinical endometritis is one of the uterine diseases most prevalent in dairy cows (Galvão et al. 2011; Galvão 2012). It is defined by the accumulation of neutrophils (5% to 10% of cells in the uterine cytology) between 35 and 60 DIM (Gilbert et al. 2005; Galvão et al. 2011; Galvão 2012). Subclinical endometritis has been shown to decrease pregnancy per AI and to increase time of conception and pregnancy loss (Gilbert et al. 2005; Galvão et al. 2009b; Galvão et al. 2009c; Lima et al. 2012).

Therefore, the objective of this article is to present the results of a recent paper (Vieira-Neto et al. 2014) that evaluated the individual and combined effects of anovulation and subclinical endometritis (SCE) on reproductive performance of dairy cows.

Materials and Methods

A total of 1,569 cows from three states (CA, FL, and NY) were used. Cyclicity and SCE was determined at 35 ± 3 or 49 ± 3 days in milk (DIM). Cows were grouped according

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to cyclicity status (Cyclic = Cyc, and anovular = Anov) and presence of SCE (with = SCE, and without subclinical endometritis = Healthy).

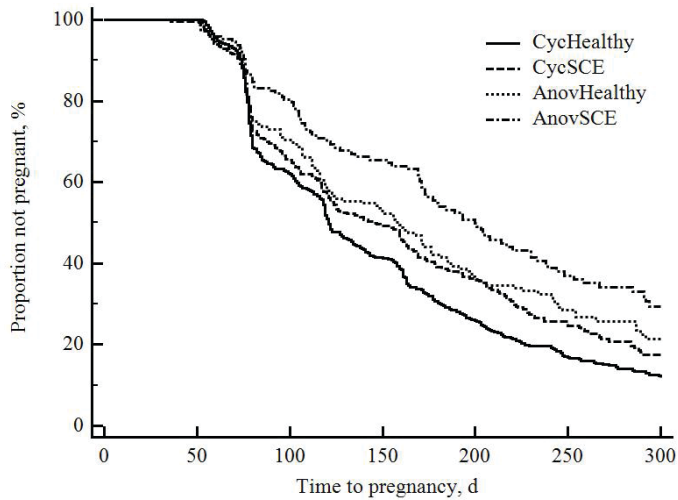


Figure 1. Kaplan-Meier survival curves for time to pregnancy up to 300 DIM according to cyclic status (Cyclic = Cyc; anovular = Anov) and the presence of cytological endometritis (present = CTE; absent = Healthy). Median days open were 121 for CycHealthy ($n = 560$), 145 for CycCTE ($n = 292$), 159 for AnovHealthy ($n = 159$), and 200 for AnovCTE ($n = 142$).

Credits: Adapted from Vieira-Neto et al. (2014)

Results

Pregnancy per AI (PAI) diagnosed at 30 to 38 d after first AI was affected by grouping based on cyclicity and SCE, with AnovSCE cows having decreased ($P < 0.05$) PAI compared to CycHealthy cows (21.3% vs. 46.7%), whereas AnovHealthy (37.9%) and CycSCE cows (36.0%) had intermediate PAI. Pregnancy loss was not affected by grouping based on cyclicity and SCE. Hazard of pregnancy up to 300 DIM was affected by grouping based on cyclicity and SCE, with AnovSCE (Hazard ratio [HR] = 0.55), AnovHealthy cows (HR = 0.71), and CycSCE (HR = 0.8) having decreased ($P < 0.05$) hazard of pregnancy compared to CycHealthy cows. Median days open were 200, 159, 145, and 121 for AnovSCE, AnovHealthy, CycSCE, and CycHealthy, respectively (Figure 1).

Conclusion

In summary, cyclicity and uterine health status are equally important for fertility in dairy cows. Both lack of cyclicity and presence of SCE negatively affected fertility, and when combined they had an additive negative effect. Cows should receive special attention during the transition period (three weeks before to three weeks after calving) to improve health and to prevent anovulation and uterine disease.

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