Can GnRH Be Used to Induce Ovulation Early in Lactation and Improve Fertility in Dairy Cows?1
Klibs N. Galvão2

Introduction
It is well established that early cyclicity results in increased pregnancy per artificial insemination (PAI) and decreased time to pregnancy (Thatcher and Wilcox 1973; Darwash et al. 1997; Galvão et al. 2010). Treatment with gonadotropin-releasing hormone (GnRH) has long been used to induce ovulation in early postpartum dairy cows (Britt et al. 1974). Earlier studies showed an improvement in ovulation risk from 20%–28% to 75%–90% when GnRH was administered between 10 and 14 days in milk (DIM) (Britt et al. 1974; Benmrad and Stevenson 1986). Effects of GnRH administration early postpartum on fertility, however, have not been consistent. Some studies showed a detrimental effect of GnRH administration early in lactation on uterine health and reproductive performance (Etherington et al. 1984; Stevenson and Call 1988; Padula and Macmillan 2002). Others failed to show an improvement in reproductive performance when GnRH was administered early in lactation (Cavestany and Foote 1985; Foote and Riek 1999). Nonetheless, others have reported increased PAI and reduced time to pregnancy (Nash et al. 1980; Benmrad and Stevenson 1986; Jeong et al. 2013) or reduced culling because of reproductive failure (Britt et al. 1977) when GnRH was administration between 8 and 29 DIM.

Nevertheless, none of the previous studies used synchronization programs such as the Presynch-Ovsynch as part of their reproductive management. Therefore, the objective of this article is to present the results of a recent paper (Bittar et al. 2014) that evaluated the effects of administration of GnRH at 17 ± 3 and 20 ± 3 DIM in Holstein dairy cows without a corpus luteum (CL) on induction of ovulation, uterine health, and reproductive outcomes.

Evaluation of the effect of GnRH administration in early lactation on induction of ovulation, uterine health, and reproductive outcomes
Holstein cows without a CL at 17 ± 3 DIM were assigned randomly to receive intramuscular (i.m.) GnRH (n = 245) at 17 ± 3 and 20 ± 3 DIM or to remain as controls (n = 245). Ovaries were scanned by ultrasonography (US) twice weekly totaling four examinations. Ovulation was characterized by the appearance of a CL ≥ 20 mm at any US or by CL < 20 mm in two consecutive examinations. Clinical and cytological endometritis were diagnosed at 35 DIM. Compared with control, GnRH increased ovulation up to 3.5 d after the last treatment (78.7% vs. 45.0%), and did not affect the prevalence of clinical endometritis (23.9% vs. 18.6%) or cytological endometritis (30.9% vs. 32.8%). Treatment with GnRH did not affect pregnancy per AI at 32 d after AI (37.6% vs. 38.6%) or 74 d after AI (35.0% vs. 31.5%), but treatment with GnRH reduced pregnancy

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2. Klibs N. Galvão, DVM, MPVM, PhD, Dipl. ACT, Department of Large Animal Clinical Sciences, College of Veterinary Medicine; UF/IFAS Extension, Gainesville, FL 32611.

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loss (6.8% vs. 18.1%). There was no overall effect of GnRH treatment on hazard of pregnancy (Figure 1).

Figure 1. Kaplan-Meier survival curves for time to pregnancy up to 300 DIM for GnRH-treated group (GNRH; dashed line; n = 240) and control group (CON; solid line; n = 240). GnRH-treated group (cows received 100 µg i.m. injection of gonadorelin hydrochloride at 17 ± 3 and 20 ± 3 DIM) and control group (no hormonal injection) had median days to pregnancy and proportion of cows pregnant by 300 DIM of 122 days/78.8% and 136 days/76.3%, respectively (univariable survival analysis, P = 0.93).
Credits: Adapted from Bittar et al. (2014)

Conclusion
In summary, early postpartum administration of GnRH induced ovulation without affecting uterine health, but failed to improve PAI or time to pregnancy, although it reduced pregnancy loss.

References


