Is GnRH Necessary at CIDR Insertion Using a 7-Day CIDR Synchronization Protocol for Beef Heifers?

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Introduction

The EAZI-BREED CIDR is commonly used in estrous synchronization protocols for both beef heifers and cows. The label calls for insertion of a progesterone-impregnated controlled internal drug release (CIDR) for 7 consecutive days with an injection of prostaglandin $F_{2\alpha}$ given a day before CIDR removal. Animals should display estrus 1 to 3 days after CIDR removal. Modifications to this protocol include administration of gonadotropin-releasing hormone (GnRH) at the time of CIDR insertion and administration of the prostaglandin injection at the time of CIDR removal on day 7. Use of GnRH in conjunction with a CIDR may improve estrous synchronization in beef cows and fertility at fixed-time insemination but may not be necessary when synchronizing beef heifers. Our objective was to compare heat response and fertility in heifers with or without GnRH administration at the time of CIDR insertion. Our hypothesis was that heifer fertility would be similar between treatments.

Experimental Procedures

Yearling heifers from the Kansas State University Commercial Cow-Calf Unit in 2009 (n = 93) and Purebred Beef Teaching Unit in 2009 (n = 62) and 2010 (n = 85) were assigned to one of two treatments (Figure 1). Heifers in the Select Synch+CIDR treatment were administered a 2 cc injection of GnRH (Cystorelin; Merial Limited, Duluth, GA) at the time of CIDR insertion (EAZI-BREED CIDR, Pfizer Animal Health, New York, NY). Seven days later, a 5 cc injection of prostaglandin $F_{2\alpha}$ (Lutalyse; Pfizer Animal Health, New York, NY) was given and the CIDR was removed. The 7-day CIDR treatment was similar except no GnRH was administered at CIDR insertion. Heifers at the Purebred Beef Teaching Unit were observed twice daily for 5 days beginning at the time of CIDR removal and artificially inseminated approximately 12 hours after onset of estrus following the AM/PM rule. Heifers at the Cow-Calf Unit were given an injection of GnRH at a fixed-time insemination 54 hours after CIDR removal. Conception and pregnancy rates were determined by transrectal ultrasonography 30 to 35 days after insemination. Progesterone assays were performed from blood samples taken at CIDR insertion and a minimum of 1 hour after CIDR removal. Heifers with at least one sample containing progesterone concentration >1 ng/ml were considered to be cycling.

Results and Discussion

Most heifers (>91%) had reached puberty in each herd by time of either CIDR insertion or CIDR removal. Interval from CIDR removal to onset of estrus was similar between treatments with more than 85% displaying estrus from 48 to 72 hours after the prostaglandin $F_{2\alpha}$ injection. Synchronization rate (percent of heifers that displayed

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estrus) at the Purebred Beef Teaching Unit did not differ between treatments (89% vs. 87% for females in the 7-day CIDR and Select Synch+CIDR treatments, respectively) but tended to differ (P<0.06) between 2009 and 2010 (92% vs. 81%, respectively; Table 1). Because all heifers received Estrotect Heat Detector (Rockway, Inc., Spring Valley, WI) patches at time of CIDR removal and were placed in pens with penile-deviated bulls, the difference between years is unlikely due to errors in heat detection. The Select Synch+CIDR conception rate was 58% and did not differ from the 7-day CIDR conception rate of 59%. Pregnancy rates were similar between the Select Synch+CIDR and 7-day CIDR treatments (56% vs. 58%, respectively). Conception and pregnancy rates for the 11 heifers that had <1 ng/ml of progesterone at both CIDR insertion and removal (considered prepubertal) were 6/9 (66%) and 6/11 (54%), respectively. Pregnancy rates to a 54 hour fixed-time insemination for heifers at the Cow-Calf Unit were similar between the Select Synch+CIDR and 7-day CIDR treatments (56% vs. 53%, respectively).

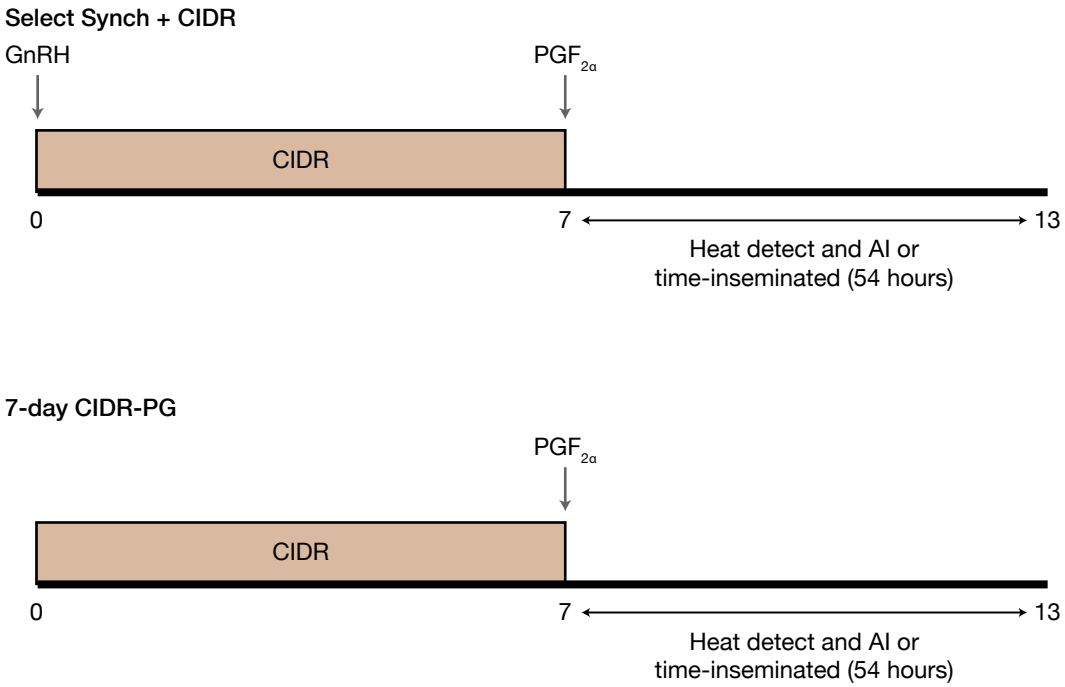
Implications

In cycling beef heifers, administering GnRH at the beginning of a 7-day CIDR protocol gained no advantage in fertility. Interestingly, 60% of prepubertal heifers (12/20) conceived to insemination on their first estrus induced by this protocol.

Table 1. Estrous detection, conception, and pregnancy rates for Select Synch+CIDR and 7-Day CIDR treatments by herds

	Select Synch+CIDR	7-day CIDR
Item	% (total n)	% (total n)
Synchronization rate		
PBU09	90.9 (33)	93.9 (33)
PBU10	82.9 (41)	80.0 (40)
Overall	87.5 (74)	88.7 (73)
Conception rate*		
PBU09	63.3 (30)	54.8 (31)
PBU10	52.9 (34)	62.5 (32)
Overall	58.2 (64)	58.7 (63)
Pregnancy rate**		
PBU09	60.6 (33)	53.1 (33)
PBU10	51.4 (41)	61.3 (40)
PBU overall	56.4 (74)	56.9 (73)
CCU09	56.0 (47)	52.7 (46)

* Number of heifers conceiving to artificial insemination/number of heifers inseminated.
** Number of heifers conceiving to artificial insemination/total number of heifers synchronized.



GnRH = gonadotropin-releasing hormone (Cystorelin); $PGF_{2\alpha}$ = prostaglandin $F_{2\alpha}$ (Lutalyse); CIDR = intravaginal progesterone-releasing controlled drug release (EAZI-BREED CIDR)

Figure 1. Experimental protocol: Heifers at the Kansas State University Purebred Beef Teaching Unit were inseminated after estrous detection. Heifers at the Kansas State University Cow-Calf Unit were time-inseminated at 54 hours after prostaglandin $F_{2\alpha}$ injection.