Effect of GnRH Timing Following a Long-Term CIDR-Based Estrous Synchronization Protocol on Estrous Response and Conception Rates in Postpartum Beef Cows

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Story in Brief

The objective of this study was to compare the effectiveness of different timing methods of GnRH administration following long-term P4 estrous synchronization. Postpartum Angus-cross beef cows (n = 72) were equally assigned across two treatment groups. Both treatment groups received a P4 vaginal insert (CIDR) for a 14 day period. Treatment group one (TRT 1) was administered GnRH 12 days following the removal of the CIDR insert, and progesterandin (PGF, α) dosing occurred 7 days post-GnRH treatment. Treatment group two (TRT 2) received GnRH dosing 2 days following the removal of the CIDR insert with PGF, α dosing occurring 7 days post-GnRH treatment. Cows were observed for estrus for 96 h following PGF, α dosing, and artificially insemination occurred approximately 12 h after the detection of estrus. A week after the 96 h estrus detection period, all cows were exposed to fertile bulls for 56 days. Three weeks after bull removal, all cows were evaluated for pregnancy status via transrectal ultrasonography. The percentages of cows exhibiting estrus during the 96 h period following PGF, α administration were similar at 83.3 and 77.8% in TRT 1 and 2, respectively. Average time from PGF, α administration until onset of estrus was less (P < 0.01) for TRT 2 at 61.8 h compared to 77.9 h for TRT 1. The artificial insemination pregnancy rates were similar at 60% and 71.4% for TRT 1 and 2, respectively. Overall (seasonal) pregnancy rates were also similar at 97.2% and 89% for TRT 1 and 2, respectively. These results indicate that time of GnRH treatment within a long-term P4 estrous synchronization protocol can be altered, reducing the overall length of the protocol by 10 days without loss of treatment effectiveness.

Introduction

Estrous synchronization and artificial insemination allow beef producers to maximize genetic improvement in their operations. However, many beef producers have been reluctant to incorporate this technology into their program. According to data in the National Animal Health Monitoring System report (2008) only 7.2% of beef cattle operations utilize artificial insemination. This reality may be due to the amount of intense management needed for these procedures. Therefore, any improvements to decrease time and labor inputs may increase the use of such technology. Synchronization programs utilizing CIDR inserts, GnRH, and PGF, α have been shown to be successful for estrous synchronization in postpartum suckled beef cows (Lamb, 2010). However, the total time to complete the synchronization program can be as long as 33 days when utilizing a 14 day CIDR insert. Reducing the time between CIDR removal and GnRH dosing from 12 days to 2 days could shorten the program duration by 10 days and potentially make it more attractive for use by producers. The objective of this experiment was to characterize the response after treatment with a 14-day CIDR insert followed by the GnRH dosing either 2 days or 12 days after CIDR removal followed by a PGF, α injection 1 week after GnRH dosing in postpartum suckled beef cows.

Experimental Procedures

A study was conducted at the Savoy Beef Cattle Research Unit utilizing fall calving, Angus-cross, post-partum beef cows. Throughout the study, all animals were maintained and cared for in compliance with the University of Arkansas Animal Care and Use Committee Protocol #10014. All cows (n = 72) utilized for the study were randomly and equally distributed into two treatments groups (Fig. 1) based on BCS (5.9 ± 0.3) and days postpartum (43 ± 10). Treatment 1 (TRT 1, n = 36) cows received a controlled internal drug release insert (EAZI-Breed CIDR®, InterAg, Hamilton, NZ; 1.38g progesterone) on day 0 (November 10, 2009). On d 14 the CIDR was removed, followed by a 100 µg dose of GnRH (Factrel®, Fort Dodge, Rockway Inc., Spring Valley, Wis.) at time of PGF2, α administration until onset of estrus was less (P < 0.01) for TRT 2 at 61.8 h compared to 77.9 h for TRT 1. The artificial insemination pregnancy rates were similar at 60% and 71.4% for TRT 1 and 2, respectively. Overall (seasonal) pregnancy rates were also similar at 97.2% and 89% for TRT 1 and 2, respectively. These results indicate that time of GnRH treatment within a long-term P4 estrous synchronization protocol can be altered, reducing the overall length of the protocol by 10 days without loss of treatment effectiveness.

Results and Discussion

Progesterone treatment of 14 d, followed by treatment with PGF, α 17 to 19 d after progesterone withdrawal, has been shown to be successful for synchronizing estrus in postpartum beef cows. More recent studies have shown that the estrus response is further improved by adding a GnRH treatment about 12 d after progesterone withdrawal to synchronize follicular development in cows prior to PGF, α treatment. A disadvantage of this synchronization protocol

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is that it requires over 33 d from the time treatment is initiated until estrous detection and insemination. One might expect the synchronization protocol to be equally effective with GnRH administration occurring two days rather than twelve days after progesterone withdrawal because most cows should be exhibiting large preovulatory follicles at that time, and therefore, respond to GnRH treatment. This assumption was the basis for the present study.

Results of estrus response, interval to estrus following PGF$_2$α, and pregnancy rates can be found in Table 1. The percentage of cows exhibiting estrus within the 96 h period following the prostaglandin dosing was similar for both treatments with 83.3% and 77.8% for TRT 1 and TRT 2, respectively. The mean interval from PGF$_2$α dosing until estrus was detected was less ($P < 0.01$) for TRT 2 at 61.8 h compared to 77.9 h for TRT 1. These results are in agreement with Patterson et al. (2000) who reported about 80% of cows exhibited estrus 48 to 96 h after synchronization, using a similar P4-GnRH-PGF$_2$α protocol. The AI pregnancy rates were statistically similar, but TRT 2 had a numerical advantage at 71.4% compared to TRT 1 at 60%. In comparison, the study cited above reported pregnancy rates of about 65%. Seasonal pregnancy rates were 97.2% and 89% for TRT 1 and TRT 2, respectively.

In the present study desirable pregnancy rates were achieved regardless of treatment. Both treatment groups responded to synchronization management likely due to cows being in good body condition and being on average 43 days postpartum. These results indicate that time of GnRH treatment within a long-term P4 estrous synchronization protocol can be altered, reducing the overall length of the protocol by 10 days without loss of treatment effectiveness.

**Implications**

In this study, cows that received GnRH dosing 2 days after the CIDR removal in a 14-d CIDR-Select estrous synchronization protocol had earlier onset of estrus and equivalent estrus detection, AI pregnancy rates and seasonal pregnancy rates compared with cows that received GnRH dosing 10 days after CIDR removal. Reducing the total time of the CIDR-Select program by 10 days increased the convenience and may improve the overall utilization of this protocol.

**Literature Cited**


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**Table 1. Estrus rates, hours to estrus following PGF$_2$α, and pregnancy rates.**

<table>
<thead>
<tr>
<th>Item</th>
<th>TRT 1</th>
<th>TRT 2</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cows in estrus</td>
<td>30/36 (83.3%)</td>
<td>28/36 (77.8%)</td>
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<td>Hours, PGF$_2$α to estrus</td>
<td>77.9 ± 2.8</td>
<td>61.8 ± 2.9</td>
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<td>Cows pregnant to AI</td>
<td>18/30 (60.0%)</td>
<td>20/28 (71.4%)</td>
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<td>Seasonal pregnancy rate</td>
<td>35/36 (97.2%)</td>
<td>32/36 (89.0%)</td>
<td>0.6312</td>
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