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Effect of GnRH Injection at - 72 h in MGA- PGEstrus Synchronization Protocol

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Summary with Implications

Yearling beef heifers from 2 locations were synchronized with melengestrol acetate (MGA)-prostaglandin $F_{2\alpha}$ (PGF) fixed time AI (TAI) protocol. At PGF administration 72 h before AI, heifers were randomly assigned to receive either 0 or 5 μg gonadotropin-releasing hormone (GnRH). The administration of 5 μg GnRH at PGF did not increase estrus activity or improve TAI pregnancy rates at either location (Location 1, 56% (GnRH) vs. 57%; Location 2, 59% (GnRH) vs. 53%). Administering GnRH at PGF increased (74% vs. 63%) pregnancy rates for heifers inseminated during a follow-up heat detection period at one location. A low dose of GnRH administered 72 h prior to AI in a 14 d MGA-PGF synchronization protocol does not increase pregnancy rates or estrus expression in yearling, beef females bred with TAI when compared to the normal MGA-PGF synchronization protocol.

Introduction

Artificial insemination allows producers to utilize proven superior genetics with a larger group of females. When combined with estrus synchronization, a more uniform calf crop is born earlier in the calving season with greater weaning weights. Single service AI alone does not produce the same pregnancy success as a 45 to 60 d breeding season with bulls. The challenge is getting all females to synchronize and come into estrus before AI and ovulate shortly thereafter. Estrus synchronization protocols are constantly being analyzed and improved in hopes of increasing pregnancy success to AI.

The objective of this study was to determine if administrating 5 μg GnRH to young beef females 72 h prior to insemination in an MGA- PGF fixed-time AI (TAI) estrus synchronization protocol improved pregnancy success. The addition of this small dose of GnRH is to mimic a natural physiological pulse of luteinizing hormone and increase estradiol circulation, which is to increase estrus expression and potentially improve pregnancy success.

Procedure

Angus-based, commercial, yearling heifers (n = 1,518) from 2 locations in central Nebraska were randomly assigned to 1 of 2 treatments, 0 or 5 μg GnRH at PGF administration 72 h before insemination. Both operations utilized MGA-PGF TAI (0.5 mg MGA/hd per day for 14 d) estrus synchronization protocol with location 1 following up with heat detection and breeding (Figure 1).

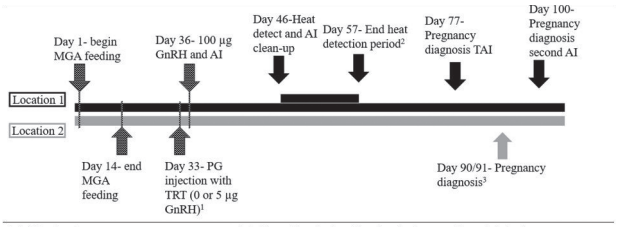
Heifers at the first location (n = 1,071; 843 ± 7 lb; Ainsworth, NE) received 25 mg of PGF i.m. (Lutalyse-Zoetis Animal Health, Parsippany, NJ) 72 h prior to AI. At the time of PGF administration, every third heifer was injected with 5 μg GnRH (Factrel, Zoetis Animal Health, Parsippany, NJ). The injection was administered i.m. with a Tuberculin syringe. At AI, all heifers received 100 μg of GnRH i.m. After initial TAI, all heifers were observed 10 to 21 d post-breeding for estrus behavior and any heifers showing estrus were inseminated 12 h later. Forty-five days after TAI, pregnancy diagnosis was performed on heifers not expressing estrus after TAI. Heifers inseminated a second time were diagnosed for pregnancy approximately 45 d after the follow-up estrus detection period. Bulls were used as clean-up, but not until after AI pregnancy diagnoses; therefore, only AI breeding results are reported.

At the second location (n = 447; 799 ± 15 lb; Sutherland, NE) 72 h prior to AI, every heifer received PGF and estrus detection patches (Estrotect; Rockway Inc., Spring Valley, WI) were applied. The GnRH treatment was administered to every other heifer through the chute. At AI, all heifers received 100 μg of GnRH i.m. Patch scores (1: 0% rub-off coating removed, 2: < 50% activated, 3: ≥ 50% activated, 4: patch missing) were recorded and removed at breeding. At location 2 no clean-up bulls were used, heifers only breeding exposure was TAI. Pregnancy diagnosis was performed via rectal palpation approximately 55 days post AI.

Results

Treatment with 5 μg GnRH 72 h prior to AI did not ($P < 0.20$) improve pregnancy rates at either location (Location 1, TAI, 56% (GnRH) vs. 57%; Location 2, TAI, 59% (GnRH) vs. 53%). There was no effect of location on treatment nor an interaction between treatment and location ($P = 0.23$). At the first location, 5 μg GnRH did improve ($P = 0.03$) pregnancy rates for those inseminated during the follow-up heat check period (74% vs. 63%, 5 μg GnRH vs. 0 μg GnRH, respectively). There was no ($P = 0.20$) increase in heifers not conceiving after the initial TAI that expressed estrus and were rebred for the treatment (68%) than control (62%) at location 1. The GnRH treatment tended ($P = 0.11$) to improve final pregnancy rates at location 1 over control heifers (78% vs. 74%, respectively).

At location 2, 5 μg GnRH did not ($P = 0.64$) affect patch score as pregnancy rates were similar between 5 μg and 0 μg GnRH groups within each patch score category (1- 29% vs. 26%; 2- 40% vs. 33%; 3- 71% vs. 66%; 4- 57% vs. 56% 5 μg GnRH vs. control, respectively). There was an ($P < 0.01$) association between observed patches activated (high activation patch score) on pregnancy rate in heifers, which was to be expected as estrus expression (patch activated) is associated with pregnancy success. There was a ($P = 0.01$) pen effect on patch score, which indicates a synchrony affect within each pen; however, pregnancy rates were similar ($P = 0.96$) among pens.



[1]Administration of 5 µg GnRH as treatment or 0 µg as control administered i.m. via tuberculin syringe simultaneous with PG administration
[2]Location 1 utilized a follow-up estrus detection and AI period from 10 to 21 d following initial TAI
[3]Pregnancy diagnosis was conducted via rectal palpation at both locations

Figure 1. Timeline of a melengestrol acetate-prostaglandin (MGA-PG) synchronization protocol at 2 separate locations with treatment of 5 µg gonadotropin-releasing hormone (GnRH) 72 h prior to fixed-time AI (TAI).

Conclusion

In summary, a low dose (5 µg) of GnRH administered in conjunction with PG 72 h prior to AI in a 14 d MGA-PG synchronization protocol does not increase pregnancy rates or estrus expression in yearling beef females bred with TAI, however may influence return to estrus in those that don't conceive to the initial AI.

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