

Management of Postpartum Reproductive Performance with Administration of GnRH or PGF₂α in Cross Bred Dairy Cows

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Abstract: *The present study was conducted to investigate the influence of administration of GnRH or PGF₂α during early postpartum (PP) on uterine involution (UI), postpartum period (PPP), days open (DP) number of services per conception and calving interval (CI) in cross-bred dairy cows. A total of 45 cross-bred dairy cows (4 – 8 years) were recruited to determine the influence of administration of GnRH or PGF₂α during early PP on the above mentioned traits. The cows were divided randomly into three equal groups A, B and C (15 cows each). Group A and B were injected intra muscularly (i.m) with GnRH or PGF₂α 200 microgram and 500 microgram respectively on day 21 PP, while cows in group C were employed as untreated control. The result of the current study showed that injection of GnRH or PGF₂α three week post calving had no significant difference on the time taken for UI compared to the control. However, the PPP of cows treated either with GnRH or PGF₂α as early as 21 days PP was significantly ($P < 0.005$) shortened when compared to the control. The number of services per conception was significantly ($P < 0.004$) improved for the treated cows as compared to the control. Moreover, the DO and CI were significantly ($P < 0.001$) minimized compared to the control. It is concluded that the PP reproductive performance in dairy cows could be managed with injection of GnRH or PGF₂α as early as three weeks. Reproductive trait, postpartum, GnRH, PGF₂α, Dairy cow*

I. Introduction

The long PP is a major problem that limits the improvement of reproductive performance of dairy cows (Short, et al; 1990 and Ahmed and Elsheikh, 2013a,b). The cross-bred dairy cows in the Sudan are known to have a long PPP (Ahmed and Elsheikh, 2013a,b) which affects their reproductive efficiency. The prolonged PP anoestrus is attributed to uterine bacterial infection and the absence of appropriate LH surge, which lead to atresia of follicles developed during this critical period (Yavas and Walton, 2000). During early PP Pituitary LH stores are depleted (Nett, 1987 and Nett, et al; 1987). On the other hand, GnRH or PGF₂α are considered to be as potential options that applied in the management of PP reproductive performance in dairy cows (Elsheikh and Ahmed 2004). Injection of GnRH or PGF₂α during early PP reduces the PPP, DO, CI and minimizes the number of services per conception in dairy cows (Fernandez et al; 1978 and Schofield et al; 1999, Toribio et al; 1999 and Yavas and Walton 2000). In the view of the above mentioned findings the current study was designed to investigate the influence of injection of GnRH or PGF₂α during early PP on UI, PPP, DO, number of services per Conception and CI in cross-bred dairy cows.

II. Materials And Methods

1. Animals:

The study was conducted on 45 (4 – 8 years) cross-bred (Friesian × Kenana) dairy cows. Their body condition score (BCS) varied from 3.00 - 3.50, according to the five-scale point system outlined by Wildman et al (1982). In this scale emaciated cows were scored 1.00; thin cows 2.00, average cows 3.00, fat cows 4.00 and obese cows were scored 5.00.

2. Heat detection and servicing:

A well-trained herd men visually checked the cows for oestrus signs thrice a day: early in the morning at 7:00 am, in the mid-day at 12:00 and at 7:00 pm for at least 30 minutes [Ahmed and Elsheikh 2004, 2013a and 2013b]. The cow that became restless, licked the perineum of other cows, jumped on other cows, allowed other cows or bull to mount her, bellowed frequently and a transparent clear vaginal mucus discharge hanged from its vulva, is recorded in oestrus. The cow is considered in a full response when it stood to be mounted by the bull and mating was completed (Ahmed and Elsheikh 2004; Arthur et al 2001). Cows in oestrus were serviced with a bull of known fertility.

3- Uterine involution (UI), Postpartum period (PPP), Number of services per conception, Days open (DO), calving interval (CI) and Pregnancy diagnosis:

Uterine involution (UI) was confirmed by rectal palpation every other day after parturition till complete involution. The uterus was described to be involuted when the size of the uterine horn was equal two fingers and the uterine body was palpated in the pelvic cavity (Arthur et al., 2001). The complete uterine involution was assumed when the animal showed the first PP heat. The PPP was calculated from calving till the recrudescence of the first oestrous (Duffy et al., 2000; Elsheikh and Ahmed, 2004, 2013a and 2013b). Number of services per conception was calculated according to Elsheikh and Ahmed (2005). It is the number of services given to the animals that display oestrus signs and resulted in a confirmed pregnancy. Days open were counted by calculating the intervals in days from calving to the subsequent effective service date of those cows that conceived (Ahmed and Elsheikh 2004 and Arthur et al 2001). Calving interval is the duration between two consecutive calving and Pregnancy diagnosis was carried out for none retain cows by rectal palpation at 60 days after the last service (Elsheikh and ahmed 2005).

4- Experimental procedure:

This study was conducted to study the effects of administration of GnRH or PGF₂ α on UI, PPP, DO, Number of services per conception and CI in cross-bred dairy cows. A total of 45 cross-bred dairy cows were used to execute the effects of injection of those hormones on the above mentioned traits. The cows were randomly divided into three (A, B and C) groups 15 cows each. Group A was injected I.m with 200 micrograms of synthetic GnRH(Fertagyl 0.10 mg/ml, Intervet, Lot, 200-3A, Boxmeer, Holland).on day 21 PP (Nasir, et al 1990). Group B was injected i.m with 500 micrograms of synthetic PGF₂ α (Estrumate, Coopers, Holland) 21 days PP (Ahmed 2004). While group C was left untreated control. The reproductive traits in questioned were assessed as mentioned above.

5- Statistical analysis:

Data generated were subjected to analysis of variance (ANOVA) followed by Fisher's exact test in a one factorial design using Stat View Analytical Computer Package version 4.01.

III. Results

1. **Uterine involution (UI):** Figure (1) showed that, injection of GnRH or PGF₂ α as early as the 3rd week PP had no significant difference in UI compared to the control. The mean values of UI for the cows treated with GnRH or PGF₂ α and the control were 40.64, 40.13 and 45.12 days respectively.

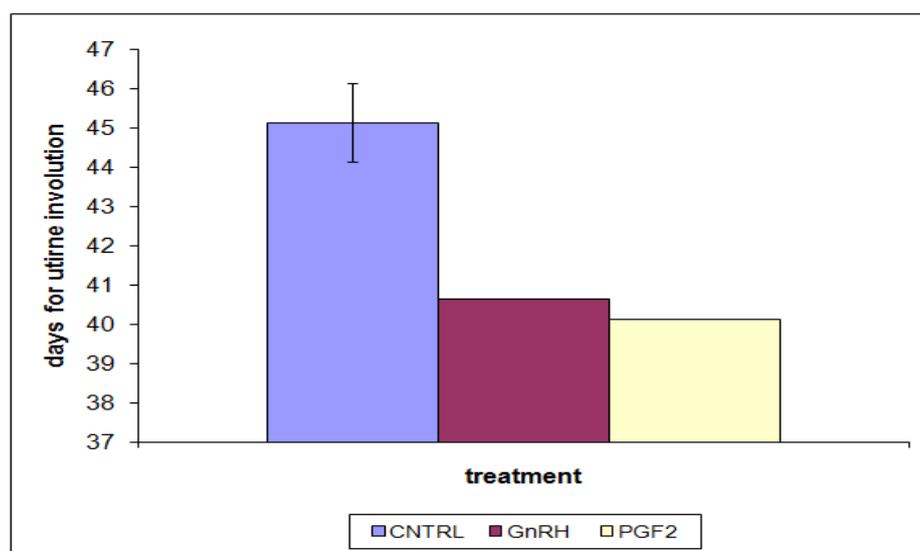


Fig.1

2. **Postpartum Period (PPP):** Figure(2) presented that injection of GnRH or PGF₂ α as early as the 3rd week PP significantly (P 0< 005) minimized the PPP compared to the control. The mean values of PPP for the cows treated with GnRH or PGF₂ α and the control were 45.14, 46.3 and 96.06 days respectively.

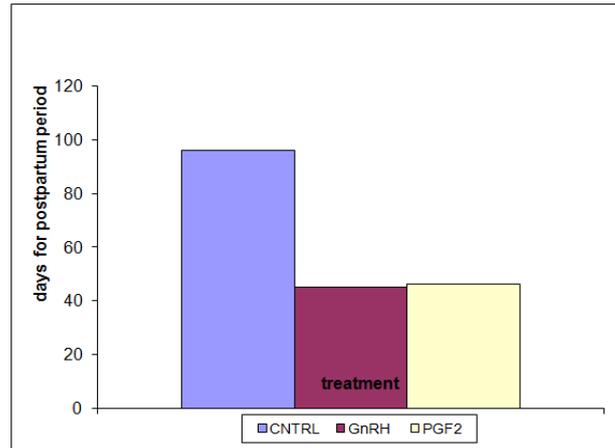


Fig.2

3. **Days Open (DO):** parturient cows injected on day 21 PP withGnRH or PGF₂ α showed significantly ($P < 0.001$) shortened theDO. The mean length of the DO for the cows treated withGnRH (54.14 days) or PGF₂ α (66.60 days) compared to the control (130.03 days) as shown in figure (3).

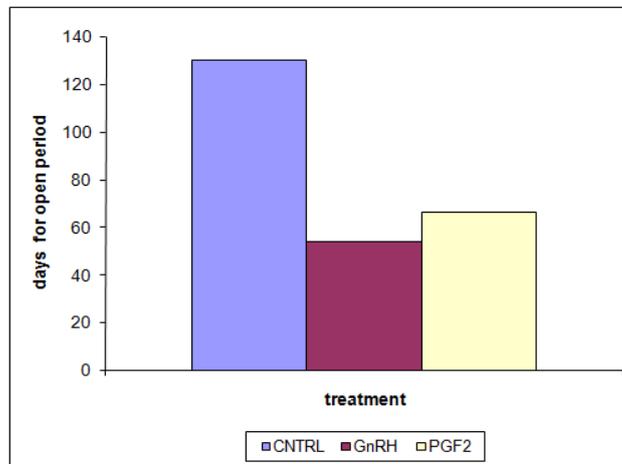


Fig.3

4. **Number of services per conception:** The number of servicesper conception were significantly ($P < 0.004$) reduced by injection of the cows withGnRH or PGF₂ α 21 days after calving. The mean number of services per conception for the treated cows and the control was 1.30, 1.90 and 2.70, respectively as showed in figure (4).

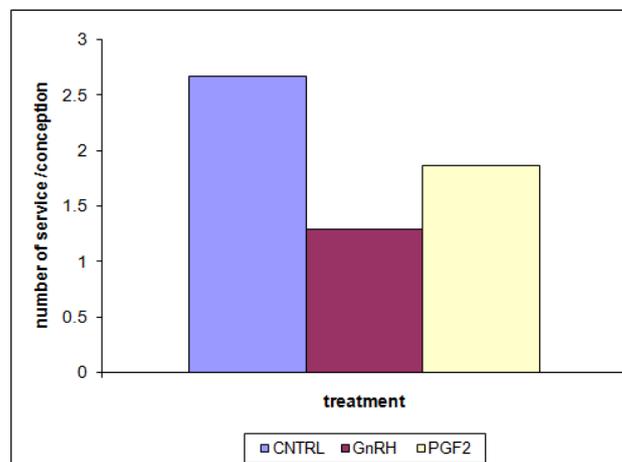


Fig.4

5. **Calving Interval:** The result showed that treatment with GnRH or PGF₂α 21 days PP significantly ($P < 0.001$) reduced the CI as compared to the control. The mean length of CI for the cows treated with GnRH (332.8 days) or PGF₂α (344.53 days) and the control (408.40 days) as shown in figure (5).

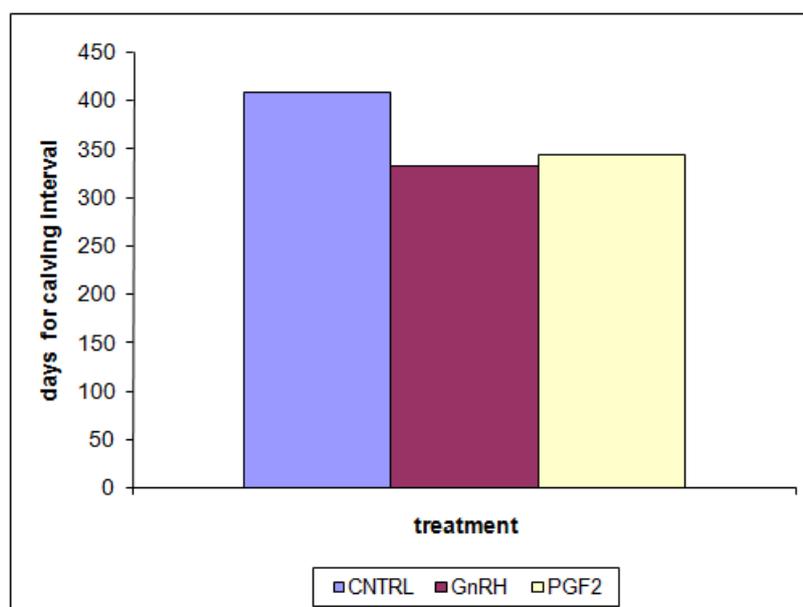


Fig.5

IV. Discussion

The uterine bacterial infection during early PP and the associated endometritis reduces FSH concentration and suppresses LH release in dairy cows (Opsomer, et al; 2000). Consequently, this perturbs their reproductive efficiency. The study of Carvestany and Foote ((1985) reported that injection of GnRH or PGF₂α during early PP accelerated UI. However, the results of the present study showed that treatment of dairy cows with GnRH or PGF₂α 21 days post calving had no effect on UI. The differences between the above mentioned findings are due to breed, parity or nutritional variations (Gieser, 1968). Injection of GnRH or PGF₂α during early PP also improve the reproductive performance of the dairy cows (Thatcher et al; 1999). This agrees with the results of the current study where injection of the same hormones during this critical period shortened the PPP. As early as the third week PP injection of GnRH or PGF₂α was shown to improve the number of services per conception in the dairy cows (Britt, et al; 1977, Resco, et al; 1995 and Nasir, 1999). This finding is in consistent with the finding obtained in this study, where treatment of the dairy cows with GnRH or PGF₂α during the same period showed clear improvement in number of services per conception, This improvement might be due to the release of high quality oocytes. The treatment of dairy cows with GnRH or PGF₂α during early PP had no effect DO (Foote and Riek, 1999), Contrary, the present study showed that injection of GnRH or PGF₂α as early as the third week PP reduced the DO. This finding disagrees with the previous study. This difference is probably due to the time of injection of those hormones, time of cow breeding and the breed. Administration of GnRH or PGF₂α on day 21 PP shorten the CI in dairy cows (lamming, et al; 1982 and Risco, et al; 1995). This finding is in consistent with the result of the present study.

In conclusion, the relatively reduced PP reproductive efficiency in cross-bred dairy cows could be improved with administration of GnRH or PGF₂α as early as the third week postcalving.

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