

Evaluation of PGF_{2α} Effects on the Cows with Retained Placenta

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Abstract: The syndrome of retained placenta is an important problem that affects cows in the farms of Iran and other countries. In a study on the cows with retained placenta, the effect of prostaglandin injections on the mean time of placental expulsion was studied. Cows with retained placenta (n = 150) were divided randomly to the three groups of A, B and C (n = 50). In the group of A, 25 mg PGF_{2α} (Lutalyse, Upjohn Ltd) were injected to the cows at the 5, 6 and 7th days of postpartum. In the group of B, the same dosage of PGF_{2α} were injected to the cows at 8, 9 and 10th days of postpartum. In the group of C, PGF_{2α} were not injected to cows and the natural time of placental expulsion in this group recorded as the control time. Mean±SD days of placental expulsion was calculated in each group and statistically compared with control group. Significant statistical differences were not observed between groups of A (13.2±3) and C (13.6±3). But significant statistical differences were observed between groups B (10.3±1) and C (13.6±3) (p<0.05). These results indicated that PGF_{2α} injection to the RFM cows could reduce the expulsion period of the retained placenta at least 3 days, when administered at day 8 onwards, but had no significant effect before day 8.

Key words: Prostaglandin, retained placenta, cow

INTRODUCTION

The syndrome of retained placenta or Retained Fetal Membranes (RFM) is an important economic problem that affects cows in the farms of Iran and many others countries. Theoretically, all cows that calve have retained fetal membranes. Over three fourths of cows expel their placenta by 6 h and very few cows after 12 h postpartum (Van *et al.*, 1992). Detrimental effects on reproductive performance, milk production, postpartum diseases and culling rate were detected when retention exceeded 12 h. Since, the incidences of RFM and postpartum disease vary with parity, the definition of retained placenta may also be age-dependent or parity-dependent. Ranges from 8-48 h have been proposed by various authors, but 12 h is a widely used lapse to define RFM (Arthur, 1979; Noakes *et al.*, 2001). In a study conducted in the Netherlands with 160 000, calving, the relative economic impact expressed in percentage was identified in four main areas: decreased milk production (40%), increased veterinary services (32%), increased culling rate (19%) and increased calving interval (9%) (Youngquist, 1997). Etiologically, detachment of the fetal membranes indicates that uterine involution is progressing normally. Involution of the uterus is accompanied by a massive breakdown of

collagen and other proteins. Lack of cotyledon proteolysis (collagenolysis) appears to be the underlying cause of RFM. If placental-anchoring systems are not enzymatically degraded, fetal membranes are retained (Eiler and Hopkins, 1992, 1993).

MATERIALS AND METHODS

According to Van *et al.* (1992) researches nearly 50% of RFM cows spontaneously expell their placenta by 4th day of postpartum. Therefore, we excluded these cows from our experiment and focused on the cows which have not expelled their placenta by 5th day of postpartum. From January 2002 to January 2004 a total number of 150 RFM cows in the farms of Tabriz (North west of Iran) randomly were divided into 3 groups of A, B and C (n = 50). In the group of A, 5 mL PGF_{2α} (Lutalyse, Upjohn Ltd, containing 25 mg dinoprost as 33.6 mg of dinoprost tromethamine with 0.9% benzylalcohol as preservative) were administered to the cows by IM on days 5, 6 and 7th postpartum (Day of parturition = 1). In the group of B, the same dosages of PGF_{2α} were injected to the cows on days 8, 9 and 10th postpartum. In the group of C (group of control) PGF_{2α} were not injected to the cows. Data were collected from three groups and were analyzed by statistical method of one way ANOVA.

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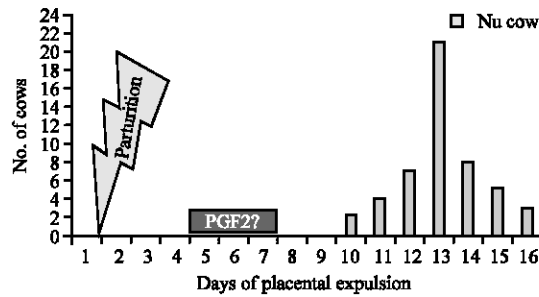


Fig. 1: The time of placental expulsion in the group of A after injection of $\text{PGF}_{2\alpha}$ on days 5, 6 and 7th postpartum. Mean \pm SD days of placental expulsion was calculated 13.2 ± 3

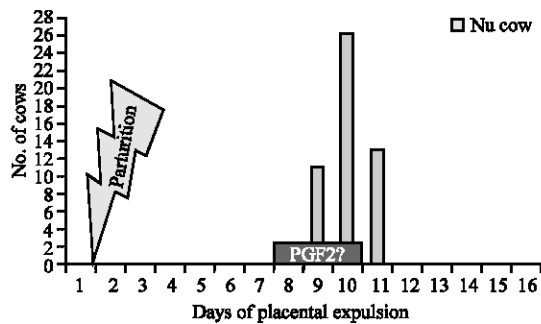


Fig. 2: The time of placental expulsion in the group of B after injection of $\text{PGF}_{2\alpha}$ on days 8, 9 and 10th postpartum. Mean \pm SD days of placental expulsion was calculated 10.3 ± 1

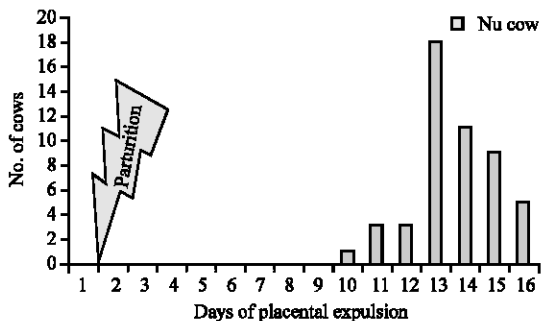


Fig. 3: The times of placental expulsion in the group of C (group of control). Mean \pm SD days of placental expulsion was calculated 13.2 ± 3

RESULTS AND DISCUSSION

Summarize of results were given in Fig. 1-4. Figure 1 is the time of placental expulsion in the group of A. In this group $\text{PGF}_{2\alpha}$ were injected on 5, 6 and 7th days postpartum, Mean \pm SD for days of placental expulsion

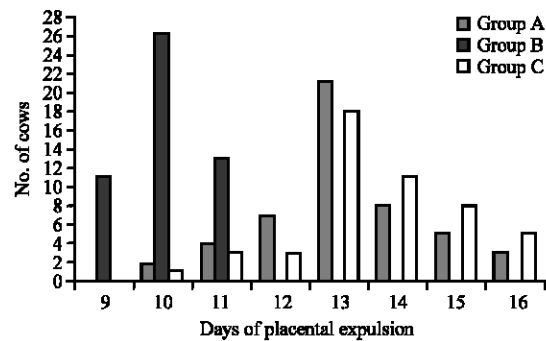


Fig. 4: Comparing the times of placental expulsion in the 3 groups

was calculated as 13.2 ± 3 . In the group of B (were injected $\text{PGF}_{2\alpha}$ on 8, 9 and 10th days post partum) Mean \pm SD was calculated 10.3 ± 1 . Figure 3 is the time of placental expulsion in the group of C, Mean \pm SD for days of placental expulsion was 13.2 ± 3 . Figure 4 is the time of placental expulsion in three groups (A, B and C) in one graph. The differences between two groups of A and C was not statistically significant, but between groups of B and C was observed significant differences ($p<0.05$).

Detachment of placenta in the cow involves separation of the finger-like cotyledon villi from the caruncle crypts without significant tearing of either fetal or maternal epithelia (Paisley *et al.*, 1986).

After placental detachment is accomplished, uterine involution is completed in an average of 39 days in normal cows and 50 days in cows with RFM (Marion *et al.*, 1968). By day 6 postpartum, caruncle septa are disorganized, by day 15, caruncles are completely sloughed due to necrosis (Van, 1992). Consequently, RFM are detached by caruncle necrosis within 6-10 day and not later than 17 day postpartum. Many approaches have been used to detach RFM (Roberts, 2002). These include manual removal, administration of uterokinetic drugs, sulfonamides, antibiotics, antiseptics, hormones and collagenase. None of these methods are effective in detaching RFM and collagenase is not currently approved for use in food-producing animals in the United States (Youngquist, 1997).

CONCLUSION

We used $\text{PGF}_{2\alpha}$ in the cows with RFM, because of its safety and easily administration of it to the cows. But comparison between three groups of A, B and C (Fig. 4), indicated that injection of $\text{PGF}_{2\alpha}$ to the cows before the 8th day of postpartum have not any effect on retained placental expulsion. In other word, $\text{PGF}_{2\alpha}$ is not effective

on the placental expulsion before beginning of the caruncle necrosis in the cow's uterus. These results indicated that PGF_{2α} injection could reduce the placental expulsion period at least 3 days, when administered to RFM cows at day 8 onwards but had no significant effect before day 8.

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