PRELIMINARY SURVEY OF THE ADMINISTRATION OF PGF2A IN POSTPARTUM DAIRY COWS

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Abstract

This preliminary study was conducted to obtain a first view of the role of PGF2α on placenta expulsion, prevention of postpartum uterine infections, and fertility in dairy cows. Twenty Holstein cows, 3 to 6 years of age, from a commercial dairy farm near Permet's district were selected for this study. Cows were randomly allocated in two experimental groups: Ten cows were administered intramuscularly with 2 ml PGF2α (Estrumate®) 2 hours after parturition, and the treatment was repeated with the same dose at 8 hours after the first treatment. Ten other cows were treated with physiological solution 2ml via intramuscular and kept in the experiment as a control group to contrast the treatment. Results showed that expulsion of placenta occurred earlier in the experimental group cows (13±2.4 hours after parturition), compared with the control ones (19±4.1 hours) postpartum. Three cows in the control group developed signs of endometritis postpartum; one cow of the experimental group was diagnosed with endometritis. Results also indicated a difference between two groups concerning the days open 92± 12.4 days for the experimental group versus 128±9.6 days for control cows) as well as in the index of insemination (1.2 doses of sperm for the experimental group versus 1.6 doses for the control group). In conclusion, the results of this preliminary study indicate that the use of PGF2α early after parturition may prevent placenta retention with positive effects on the prevention of uterine infections and improvement of the fertility in cows.

Keywords: PGF2α, metritis, cows, fertility, placenta.

1. Introduction

Uterine infections are among the most frequent disorders to affect dairy cows during the postpartum period [20, 21]. Some of the most frequent disorders are placenta retention and uterine infections (endometritis and metritis). There are many economic damages caused by these pathologies, such as: it reduces production reduction, permanent or temporary loss of the reproductive ability, increase of the veterinarian treatment cost and in some cases the culled of the animals [3, 18, 21]. In normal conditions, the uterus is protected from bacterial contamination by the vulva, vestibular sphincter, and cervix. During and immediately after parturition these mechanical barriers are breached and the uterus is normally contaminated by a variety of pathogenic and nonpathogenic microorganisms [14, 16]. After birth placenta must excrete normally within 12 hours.

For different reasons placenta excretion is delayed and the probability of uterus infections is increased [2, 1, and 4]. Primary retention of the fetal membranes results from a lack of detachment from the maternal caruncles, whereas secondary retention is related to a mechanical difficulty in expelling already detached fetal membranes (i.e., uterine atony) [18].

Primary and secondary retention mechanisms can coexist. Uterine infections are associated with retained fetal membranes, dystocia, delivery of twins, over conditioning, under conditioning, long-term feeding of urea to dairy cows and a large herd size [21]. Severe uterine infections frequently followed by manual removal of retained fetal membranes. Unsanitary calving conditions and traumatic obstetric procedures predispose cows to uterine infections [16], because of differences in their calving environment, postpartum uterine infections more commonly affect dairy cows than beef cows. Primary metritis occurs within the first 21 days of calving, secondary metritis between 21 and 60 days after calving and tertiary metritis after 60 days postpartum [5].

PGF2α and its synthetic analogs have been widely used to treat a variety of abnormalities of the reproductive tract, including retention of the fetal membranes, postpartum uterine infections and metabolic diseases [17, 21, 22, 15, and 19].

The key to reduce the detrimental effects of uterine infections on milk production and fertility is the prevention of uterine infections by giving attention

to the calving pen environment and dry cow nutrition along with to early identification of uterine infections requiring therapy. Overly aggressive therapy on minimally infected cows with uterine infusions and hormones may be detrimental to subsequent fertility and perhaps cause a residue in your bulk tank milk [21, 13].

2. Material and Methods

The study was carried out from September to December 2011 in a commercial dairy farm in southern Albania (Piskov, Permet), with this longitude and latitude parameters: GPS Coordinates of Permet, Albania - Latitude And Longitude Of Permet, Albania GPS Coordinates Of Permet, Albania - Latitude And Longitude Of Permet, Albania Decimal Minutes (GPS) N40 14.03297 E20 21.1416 Decimal (WGS84): 40.233883, 20.35236 Degrees Minutes Seconds: N 40° 14' 1.9782", E 20° 21' 8.496".

In this study, we used 20 Holstein cows 3 to 6 years of age. All cows showed a normal calving process in their last parturition.

The experimental group (10 cows): The cows of this group were treated with PGF2α (Estrumate®; PRODUCT Estrumate Solution for Injection (Cloprostenol sodium equivalent to 250 ug/ml) An Analogue of Prostaglandin F2 for Intramuscular Injection in Beef and Dairy Cattle. NDC: 0061-1266-05. Recall # V-187-2010 CODELot number 7571101, Exp. 5/20/2013; Manufacturer: Essex Animal Health Friesoythe, Friesoythe, Germany. Firm initiated recall is ongoing twice with a dosage of 2 ml via intramuscular, 2 hours after parturition and the second dose 8 hours after the first one.

The control group (10 cows): The control group was treated with physiological solution 2ml via intramuscular and was kept under survey so as to be compared with the indices of the experimental group.

The indices derived from the following steps: the time of placenta removal, the display of uterine infections (metritis) and fertility indices (Calving to conception interval and Service per conception), have been processed and application from our team in our experiment as well in the below pictures:

3. Results and Discussion

The main focus of this study was concentrated on the time needed for placenta excretion considering both groups. The results for this index are presented in table 1.

Table 1: Time of placenta excretion and the indices of fertility in cows of the two groups (experimental and control).

Groups	1st treatment 2 hours after parturition	2nd treatment, 8 hours after parturition	Placenta prolapse (hours)	Calving to conception interval, (d)	Service per conception, (n)
Experimental group	(PGF2α), 2 ml	(PGF2α), 2 ml	13±2.4	92±12.4	1.2
Control group	0	0	19±4.1	128±9.6	1.6

From the data it results that placenta removal has happened previously in the cows treated with $PGF_{2\alpha}$ opposite to the cows of the control group which were not treated with the mentioned hormone ($P>0.05$). We think that the hormonal treatment has played a positive role in this concern. PGF2α has a positive effect on the musculature tonus of the uterus by contracting it and simultaneously by removing the placenta and the content of the uterus. $PGF_{2\alpha}$ has positive effects even with the increase of the immunity of the uterus towards infections [18]. Our results are approximate to the studies of foreign researchers in this field [15].

Another important moment during this study has been the monitoring of uterine infections 2 weeks after parturition and mainly of cows that have had placenta retention or delay in its excretion. From the data it results that from the control group 3 head have been infected with metritis (30%), from which 2 cows have been considered with placenta retention (>24 hours), and from the experimental group only one head has been infected (10%) with metritis, although it does not result with placenta retention [19]. One of the factors influencing highly in the display of uterine infections after parturition is placenta retention. This fact has been evidenced even in the studies of foreign researchers [21, 11, and 19].

The cows were kept under survey even for the fertility indices such as: the period from parturition to

insemination fecundation and the number of inseminations per fecundated cow [8].

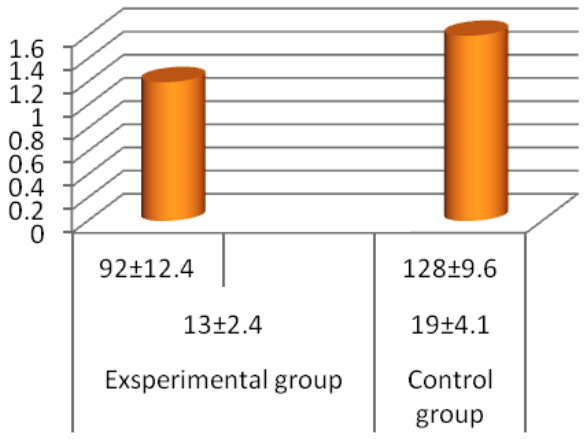

Figure 1: Time of placenta excretion and the indices of fertility in cows of the two groups (experimental and control)

During the study was observed that the cows of the control group needed a longer time to be fecundated and a higher dosage of sperm. The two above indices are significant to evaluate the influence of placenta retention and the uterine infections after parturition on the fertility indices [1, 16, and 24].

4. Conclusions

As a conclusion the main advantages of the application of the PGF2α in the placenta retention were:

- The treatment of the cows with PGF2α accelerated placenta removal, receptively in the treated cow placenta was removed after 13±2.4 hours while in the control group cows removed placenta after19±4. 1 hours
- Application of the PGF2α, decrease the frequency of the uterine infections, specifically in our study the uterine infection resulted 10 % in the experimental group and 30 % in the control group.
- From the application of the PGF2α the Calving to conception interval is decreased from 128±9.6 days in the control group to 92±12.4 days in the experimental group and the Service per conception index is decreased from 1.6 in the control group to 1.2 in the experimental group.

5. Acknowledgements

We wish to thanks the Dairy Research and Technology Center at University of Alberta, for their support during my one year long research project, related to prevention and treatment of uterine infections in dairy cows, and also the Board of Piskov Farm, Permet's district for supporting me on this study.

6. References

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