Control of Puerperium in a Dairy Farm using an Intrauterine Suspension

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RESEARCH ARTICLE

Abstract
The purpose of this research was to evaluate a product developed at the Faculty of Veterinary Medicine of Cluj Napoca and its efficiency in the control of the puerperium at cows. The study was carried out between January 2017 to December 2018 in a dairy farm from Mures county, Romania. In this study were enclosed 60 cows, randomly divided in 3 groups: Puerperal group (group 1), Puerperal and Estrumate group (group 2), and control group (group 3). For each group the treatment applied for the control of puerperium was different. For each group were followed: the evolution of puerperium, the appearance of the first postpartum estrous cycle, the interval of service period and the number of artificial inseminations necessary for one gestation. For the puerperium control and to avoid the postpartum complications Puerperal intrauterine suspension it’s a good option.

Keywords: endometritis; estrous; puerperium.

INTRODUCTION
The puerperium is a critical period for the reproductive tract and for the performance of this in the next period. Reproductive efficiency in the dairy cow has been decreasing in the past two decades, in parallel with high increases in milk production per cow (Roche et al., 2000). Reproductive performance of dairy cows after the voluntary wait period is highly related to the health status of the uterus after calving (Kasimanickama et al., 2004). Postpartum endometritis has a negative effect on reproductive performance as it increases services per conception, the calving to first service interval and the calving to conception interval, reduces the risk of pregnancy, and decreases the conception rate (Fourichon, 2000). Following parturition in the cow, there is a significant period of sexual quiescence of variable length. This period of reproductive quiescence was found to be longer in suckling or intensively milked animals. Puerperium in cattle is classified into three stages, early puerperium, clinical puerperium, and whole puerperium. The early puerperium lasts nine days during which the placenta must be dropped either naturally or manually. Clinical puerperium stays 21 days during which the uterus returns to its normal size, but not normal histological structure. The whole puerperium lasts about 42 days during which the uterus regains its normal histological structure as before pregnancy (Mohammed A. E., 2018). The restoration of the uterus to its normal non-pregnant size and function after parturition is termed uterine involution which depends on the rate of myometrial contractions, elimination of bacterial infection and the histological regeneration of the endometrium. Involution of the uterus is necessary before the cow can conceive again. As a result of the removal of the fetus, oxytocin and prostaglandin F2α (PGF2α) production reduced the uterine size.
Uterine involution is considered to be complete when both uterine horns had returned to equal or almost equal non-gravid size in their normal location in the pelvic floor, and their normal tone and consistency (Gohar et al., 2018). The uterine involution is noticed to begin rapid then the subsequent changes are slower. The reduction in the rate of involution between four to nine days postpartum, with a period of accelerated changes from day ten to fourteen, and gradual decrease thereafter (Morrow 1986). Prostaglandins have a role in controlling uterine involution. A positive correlation between PGF2α metabolites concentration in puerperal circulation and the diameter of a uterine horn was recognized. Using exogenous PGF2α twice daily for 10 days starting from day 3 postpartum, uterine involution has been accelerated by 6-13 days (Kindahl et al., 1982). In cattle, the first postpartum dominant follicle has a predilection for the ovary contralateral to the previously gravid uterine horn. However, the presence of an estradiol-secreting dominant follicle in the ipsilateral ovary is a marker of subsequent fertility, possibly due to a localized effect of ovarian estradiol on uterine involution (Sheldon et al., 2003). Prostaglandin F2α appears to be the normal physiological signal whereby the uterus causes regression of the corpus luteum at the end of the estrous cycle. The PGF2α is important for uterine involution and ovarian function. The duration of increased PGF2α production in the postpartum period negatively correlated with the number of days to complete uterine involution and the interval between parturition and resumption of normal ovarian activity (Madej et al. 1984).

Benmard and Stevenson (1986) reported that treatment with GnRH (200 µg) between 10 and 14 days postpartum reduced the interval to first ovulation and first detected estrus and increased the proportion of cows with three or more ovulations before the first service from 57% of saline-treated controls to 83% (Benmard and Stevenson, 1986). Decreased number of services per conception with GnRH and PGF2α treatment was investigated in some studies. Exogenous PGF2α facilitates the ability of exogenous GnRH to release Pituitary LH in multiparous and primiparous dairy cows with subsequent decreased number of services per conception and conception rate (Richardson et al., 1983).

The purpose of this research was to evaluate a product made at the Faculty of Veterinary Medicine of Cluj Napoca and his efficiency in the control of the puerperium at cows.

MATERIALS AND METHODS

The research has been carried out between January 2017 to December 2018 in a dairy farm from Mures county, Romania. In this study were enclosed 60 cows from Romanian Spotted bread, animals with normal parturition. The cows were randomly divided in 3 groups, which are: Puerperal group (Group 1), Puerperal and Estrumate group (Group 2), and control group (Group 3). For each group the treatment performed for the control of the puerperium was different. The treatment for the control of puerperium was performed with 2 products: Cloprostenol (Estrumate, Intervet) and Puerperal (FVM Cluj Napoca). The product Puerperal is an intrauterine suspension with: betadine, lincopectin, vitamins, boric acid and kaolin.

At the group 1 (Puerperal group) the treatment was performed with Puerperal at 12h after the parturition, 200 ml of intrauterine suspension was administrated. For the group 2 the treatment was made with Puerperal and Estrumate: at 12h after the parturition were administrated 200 ml of Puerperal and 2 ml of Estrumate intramuscularly. The group 3 was the control group, at this group noting was administrated, the puerperium was left to run normally. For each group were followed: the evolution of puerperium, the appearance of the first postpartum estrous cycle, the interval of service period and the number of artificial inseminations necessary for one gestation.

RESULTS AND DISCUSSIONS

In case of group 1 (Table 1) in 90% of animals was observed a physiologic evolution of puerperium, the first postpartum estrous cycle appeared at 48.16 days after the parturition, the average of service period was 62.5 days with limits between 43 days and 72 days. For one gestation in case of group 1 were necessary 1.45 doses of semen. In case of group 2 (Table 1) 95% of the animals developed a physiologic evolution of puerperium, the first signs of estrous were detected in average at 41.13 days after the parturition, the average of service period was 66 days with limits between 50 days and 86 days. For one gestation in case of group 2 were necessary 1.35 doses of semen. Regarding the third group (Table 1) the results were as follows: 65% of animals presented a physiologic evolution of puerperium, the first postpartum estrous cycle was detected at 52 days after the parturition, the average of service period was 132 days with limits between 55 days and 292 days. In this situation were necessary 2.25 doses of semen for one gestation.

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
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</thead>
<tbody>
<tr>
<td>Physiologic puerperium</td>
<td>18 cases (90 %)</td>
<td>19 cases (95 %)</td>
<td>13 cases (65 %)</td>
</tr>
<tr>
<td>Pathologic puerperium</td>
<td>2 cases (10%)</td>
<td>1 cases (5%)</td>
<td>7 cases (35%)</td>
</tr>
<tr>
<td>First detected estrous postpartum</td>
<td>48.16 days</td>
<td>41.13 days</td>
<td>52 days</td>
</tr>
<tr>
<td>Interval of service period</td>
<td>62.5 days</td>
<td>66 days</td>
<td>132 days</td>
</tr>
<tr>
<td>Doses of seminal material for one gestation</td>
<td>1.45 doses</td>
<td>1.35 doses</td>
<td>2.25 doses</td>
</tr>
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</table>
The best results of puerperium control can be observed in case of group 2 but also the results are good for group 1. The treatments with Puerperal or with Puerperal and Estumate are good methods for control the puerperium and its effects on the reproductive status of the cows. The first estrous detected appeared more quickly for the groups 1 and 2 (48.16 and 41.13 days) than in a study from 2004 where the first detected estrous was at 55.2 days (Sakaguchi et al., 2004). The first estrous detected for group 3 was similar with the results reported by Sakaguchi et al., 2004.

The optimal length of service period should be as short as possible. For cows, it is normally 60 to 90 days, but should not exceed 100 days. If this time period is extended, the next calving will be temporally shifted. As is well known, the length of the service period is multifactorial. It depends on hormonal status (Répási et al., 2014), the level of milk production, the involution disorders, the body condition, the metabolic status and other reproductive features (Dörstelmann et al., 2018). In our study the service period was in limits just for the group 1 (62.5 days) and 2 (66 days), for group 3 the service period was longer than normally, exceed 100 days. The incidence of endometritis has been estimated in previous studies at 7.5–8.9%, based on visible mucopurulent vaginal discharge (Francos, 1979). In our study the incidence of endometritis (pathologic puerperium) was 10% in group 1, 5% in group 2 and 35% in group 3. Irina Garcia-Ispierito and Fernando Lopez-Gatius reported 2.7 ± 1.7 artificial insemination for 1 gestation (1–9 inseminations), but in our study for group 1 were necessary 1.45 doses, for second group 1.35 doses and for the control group 2.25 doses. These results may also be due to the fact that we worked on farms with a small number of cows where animal monitoring is easier.

**CONCLUSIONS**

Puerperal Intrauterine suspension it is a good option for control the puerperium and for avoid the postpartum complications. The first detected estrous, the service period and the number of artificial inseminations for a gestation have lower values if the control of puerperium is performed. The complications of puerperium can be avoided by the treatment with Puerperal and Estrumate at 12h after the parturition.

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**Conflicts of Interest**

The authors declare that they do not have any conflict of interest.

**REFERENCES**


