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Asian Journal of Animal and Veterinary Advances



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Comparative Effect on Clinical use of PGF₂ α and REPROCINE in the Treatment of Retained Placenta in Dairy Cows at TIARET Region (Algeria)

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ABSTRACT

The aim of this study was to determine which protocol allows cows, subject to a retained placenta, to recover their reproductive performances as soon as possible, using an injecting of REPROCIN (Carbetocin) a delayed oxytocin, intramuscularly at a dose of 10 mg, 24 h after parturition and that of CLOPROSTENOL (a synthetic analogue of Prostaglandin F_{2a}), also used intramuscularly at a dose of 50 μ g, 24 h after parturition, compared to a control group. The results show that injection of a standard dose of PGF_{2a} in case of retained placenta, has a significant effect on uterine involution, 60% of animals which had a normal involution against 40%, as well as a significant impact on reduction of postpartum metritis in dairy cows, especially during the first month after calving, 10% of animals affected against 30%. The same positive effect was observed with the interval calving-fertilization, the study shows 70 days against 112, 4 days.

Key words: Cows, retained placenta, post partum, PGF_{2a}, carbetocin

INTRODUCTION

The retained placenta is a more frequent disease in Algerian dairy herds; the etiology is highly variable making it difficult means of prevention. The economic losses it causes can be important for the farmer, including a decline in milk production and a complication by metritis which may lead to the reform of the animal (Niar *et al.* 2006). Delayed uterine involution and endometritis are generally the most common consequences of retained placenta; they are detrimental to the future breeding of the cow with altered parameters of fertility, thus causing a prolongation of the Calving-fertilizing insemination interval (Graves and McLean, 2002).

This study aimed to compare the effect of the use of REPROCINE (whose active ingredient is Carbetocin, a synthetic analogue of oxytocin with a delayed effect) and Prostaglandin F_{2a} (Cloprostenol), during disruption time of post partum. Carbetocin (long-acting oxytocin), with a prolonged therapeutic effect on the uterus: From 1.6 to 3.7 times longer than the oxytocin (Barth *et al.*, 1980), is used after the calving to reduce the incidence of retained placenta and postpartum problems that may arise, regarding its utero-tonic effect to induce strong and prolonged contractions (Bernhard *et al.*, 1993) and prevention of endometritis that may result, with improved interval of calving-fertilizing insemination Mollo *et al.* (1997). Clinically and in the context of calving synchronization, various studies showed that with the REPROCINE, the duration of

farrowing was shortened, thereby facilitating the organization of working time during parturition (Leike and Huhn, 1992). Prostaglandins (natural or synthetic) have long been used in cattle breeding; have proved their effective efficacy in treating cases of metritis, through their luteolytic and utero tonic actions. Hanzen *et al.* (2003) speaks about a utero tonic action; repeated administration of prostaglandin F2a, 3-13 days after calving, accelerates uterine involution by promoting the elimination of the uterine contents.

MATERIALS AND METHODS

This study was conducted from 2008 to 2010.

Experimental protocol: For purposes of this study, we used 39 dairy cows which belong to the Pie noire race. The age of these cows ranged from 2 to 6 years, with an average of 4.75 years.

These cows were divided into three groups of 13 cows each, distributed as follows:

- Group I:** It is the control negative group, receiving no further treatment
- Group II:** It is the group who received a single intramuscular injection of 2 mL of Estrumate (cloprostenol), a synthetic analogue of PGF2a, the day of issue
- Group III:** It is the group who received who received an intramuscular injection of 5 mL of Reprocine, the day of issue

The protocol includes three visits:

- **VISIT 1:** During the first visit, we've always done a general examination, followed by a manual delivery of the afterbirth, then a general and local treatment with antibiotics of the concerned cow and finally the application of our protocol. Some useful information regarding the animals was collected on site during the first visit (age, race, level of production, assessment of body condition)
- **VISIT 2:** 30 days after calving, each cow is subject to an examination of her genital tract through the rectum so to assess the degree of uterine involution (position of the reproductive status and size of horns). The uterine horns must be grouped in the palm of the hand. A vaginal exploration was subsequently performed on each cow in order to determine the presence or absence of pus in the floor of the vagina and the vaginal mucus
- **VISIT 3:** 45 days after the first visit, we must assess the level of milk production (high***, medium**, small*) of cows forming part of the study as well as their body condition. From that moment we began collecting data on various parameters of fertility, which we will then assess the reproductive potential of each group depending on which treatment was administered. Among the parameters measured, we recorded the dates and modalities of breeding, interval calving-natural mating, calving-fertilization, the index of insemination or the number of mating and possible causes of reform

RESULTS

I/Uterine involution 30 days after: It appears from these results that 60% of cows in group II, who received an injection of PGF2a on the day of delivery, showed a normal uterine involution 30 days after (n = 8), against only 40% of cows of group III, received an injection of Reprocine (n = 5) and 30% of cows in group I, of the control group (n = 4).

Table 1: Uterine involution 30 days after, in the three groups of cows studied

Control of uterine involution 30 days after	Group I n = 13	Group II n = 13	Group III n = 13
Normal uterine Involution	30% n = 4	60% n = 8	40% n = 5
Sub involution	30% n = 4	30% n = 4	30% n = 4
Delayed uterine involution (metritis)	40% n = 5	10% n = 1.3	30% n = 4

Group I: Witness group, who received no injection; Group II: Animals that received an injection of PGF2a (Cloprostenol); Group III: Animals that received an injection of Reproceine

However, the situation is quite the contrary as regards the number of cows with delayed involution and therefore metritis. In this context, the group I was the group presenting the more cases of metritis (40% of cows, n = 5), followed by group III (30% of cows, n = 4) and only 10% of cows in group II (n = 1.3) (Table 1).

In reviewing the information gathered during the first visit made in an average of 1, 77±1, 35; 1, 32±0, 79; 1, 66±1, 11 days post partum, respectively, for groups I, II and III ; it appears a certain homogeneity between these groups. However, the time interval between the first visits from different dates of calving is more than 24 hours. Nevertheless, 60% of cows were issued 12-24 h of parturition. This significant time lag is due to slowness on the part of the breeder in the solicitation of Veterinary, awaiting a spontaneous delivery of the animal. These waiting times are not safe for the parturient because they favor the contamination of the uterus through the placental cord. This is a gateway to germs on a litter as often dirty and poorly maintained as is often the case in our farms. The majority of cows' parts of this work were from either the Pie noire race or cross breed races. The mean ages were similar in different three groups. They are 4, 2±1, 24; 4, 7±1, 82 and 5±1, 63 years respectively in groups I, II and III. With regard to body condition, noted during the first visit, it is located between 2 and 2, 3 for the 3 groups.

Regarding the culled cows, the largest number was located in group I (05 culled cows: 02 for infertility). These cows had a poor body condition (score between 1 and 1, 5) and a delay in uterine involution. In the group III, 3 cows were culled: 2 for repeat breeding and the third had a poor body condition.

In terms of the group II, 02 cows were culled for infertility; one of them presented a metritis.

This leads us to say that there is a close relationship between the poor state of cow's overweight in the postpartum period and the delay of its uterine involution. This will inevitably lead to the onset of fertility problems and the cull of the animal.

Review of the genital tract

Position of the cervix 30 days post partum: Without treatment, only 5 of 13 cows of group I and III had a uterine cervix in a normal position, in the pelvis. With an injection of Cloprostenol (group II), the number of animals regaining the normal position of the cervix is increased to 7 out of 13.

Nature and volume of the uterine flow: The observation of abnormal vulva discharges during the postpartum period constitutes an important element in the diagnosis of delayed uterine involution. It is sometimes necessary to review the uterus by a rectal palpation to observe the pathological discharges. In fact, the stimulation of the uterus by a massage with the hand that causes contraction of the organ.

Table 2: Parameters of fertility recorded in the three groups of cows studied

Groups	No. of cows	Interval calving-Mating	Interval calving-Fertilisation	Mating No.	% of No. return to estrous
I	13	86.7	116.9	2.25	50
II	13	59.0	70.0	1.44	90
III	13	66.33	112.4	2	60

Group I : Witness group, who received no injection; Group II : Animals that received an injection of PGF2a (Cloprostenol); Group III: Animals that received an injection of Reprocine

Regarding the nature of the flow, we noticed that it was purulent in 4 of 13 cows of the group I, in 4 of 13 cows of the group III and 2 of 13 cows of the group II. Similarly, production of pus was smaller in cows treated with Cloprostenol (group II) than in controls (group I) and subjects treated with Reprocine (group III).

Fertility parameters recorded in the three groups of cows studied: The reproductive capacity of animals of each group was estimated from the number of cows used for breeding (natural mating) and the interval calving / fertilization.

Comparison of index of mating: In the absence of treatment, cows have an average of 2, 25 and 2, 0 services by mating, respectively for group I and III, against only 1, 5 services by mating for the group II (treated with PGF2a).

Analysis of variance showed that the treatment effect between groups was significant between group II and groups I and III (Table 2).

Comparison between calving- first natural mating intervals: This study showed that there are differences between interval - natural mating intervals, especially between group I and groups II and III. The calving – mating interval between groups II and III are not very distant. These are respectively: 86.7, 66.33 and 59 days for group I, III and II.

Comparison of calving intervals-natural mating fertilizing: The results of the calving-fertilization at natural mating intervals are very different between groups I and III and group II treated with PGF2 a: 116, 9 and 112.4 days respectively for groups I and III against only 70 days for group II.

Rates of no return to estrous: The rates of no return to estrous have also seen a marked improvement in cows of the group II, compared to groups I and III. We observed a rate of 80% of no return to estrous for group II, against 50 and 60%, respectively for witness group (controls) and the group III (treated with Reprocine). This shows the effect of treatment with Cloprostenol on improving pregnancy rates; however we found no improvement with the Reprocine.

DISCUSSION

The test used has been conducted in order to test the effectiveness of REPROCINE (Carbetocin) compared to PGF2a, injected 24-48 hours after calving, when retained placenta.

We noted a slight difference in uterine involution in animals injected with Reprocine (group III) and the control group (group I). However, in the use of PGF2a (group II), the rate of cows that had a normal uterine involution was of 60%. We can therefore conclude that carbetocin (Reprocine)

showed a slight non significant efficiency during routine immediately after calving in improving the rate of non-delivery (Kudlac and Zamecnik, 1984). Our study aimed to determine the effectiveness of the curative REPROCINE during the observation of a case of retained placenta. It appeared that the administration after 24 h post partum did not improve significantly the uterine involution and does not significantly decreased the interval from calving to fertilization, compared to the control group. The reason for this non efficiency is probably related to the decrease after calving, of the number of oxytocin receptors in the uterine wall (Gimpl and Fahrenholz, 2001).

In animals that received an injection of REPROCINE (group III), we found that 40% of subjects returned in heat, against 50% of cows in the control group (group I). This slight difference does not reflect the influence of Reprocine. By cons, in animals that received an injection of Cloprostenol (Lot II), the rate of cows in return to estrus was only of 10%, result much more significant compared to that of Reprocine.

This difference is due to reproductive disorders and delayed involution associated with chronic metritis and/or a cyclical disorder that contributed to promote these cows back in heat.

CONCLUSION

These results show that injecting a standard dose of PGF2a in a case of retained placenta, has a significant effect on the uterine involution and a significant effect on reduction of post partum metritis in dairy cows and this, during the first month after calving. The same positive effect was observed with the different parameters of fertility seen in these animals during the post partum period.

Unfortunately we haven't observed this beneficial effect when using the Reprocine (Carbetocin or Oxytocin long action). This does not mean that this drug has no effects on the genital area during post partum, but it may be that the time of its use has not been adequate in our experiment, since farmers do not present cows with placental retention at the right time to the veterinarian. This effect can cause a decline in its effectiveness, given that oxytocin receptors tend to disappear gradually as one move away from calving. However, further experiments are required to conclude about this molecule.

ACKNOWLEDGMENTS

Great thanks for the staff of the department of Biotechnology and Pathology of Reproduction, Ecole Nationale Vétérinaire de Nantes (France) as well as Vétoquinol Laboratories of France for providing us advises and the Reprocine in order to make this work. We also thank all the dairy farmers in the region of Tiaret (Algeria), for having opened the gates of their farms to carry out this research work perfectly.

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