Australian Journal of Basic and Applied Sciences, 3(3): 2834-2837, 2009
ISSN 1991-8178

Oestrus Synchronization and Percentage of Pregnancy in Dairy Calves Using Prostaglandins by Two via of Administration

[1]A. Córdova-Izquierdo, [2]C.A. Córdova-Jiménez, [3]M.S. Córdova-Jiménez, [1]C.G. Ruiz Lang, [1]J.A. Saltijeral Oaxaca, [1]V.M. Xolalpa Campos, [1]S. Cortés Suárez, [4]J. M. Luque Rodríguez, [5]M. Méndez Mendoza, [5]R. Huerta Crispín and [6]J.E. Guerra Liera

[1]Dapartamento de Producción Agrícola y Animal. Cuerpo Académico: Salud y Bienestar Animal. Ecodesarrollo de la Producción animal. Universidad Autónoma Metropolitana Unidad Xochimilco, Mexico.
[2]Beacario CONACyT-Mexico. Facultad de Veterinaria. Universidad de León, Spain.
[3]Laboratorios Brovel, S.A. de C.V. Mexico.
[4]Práctica privada
[5]Facultad de Veterinaria. Benemérita Universidad Autónoma de Puebla, México.
[6]Facultad de Agronomía. Universidad Autónoma de Sinaloa, Mexico.

Abstract: The oestrus synchronization allows in time fixed artificial insemination and increases the number of pregnant dairy calves; the estral cycle can be manipulated by means of the administration of F2∝ prostaglandins by its *luteoiític* power. The objective of this work is to evaluate the percentage of pregnancy of synchronous dairy calves being used two via of administration of prostaglandins (PGF2∝), intramuscular and intravulvar. The study was held in a dairy unit in the municipality State Mexico. There were selected a total of 29 dairy calves Holstein Friesan with corpus luteum (CL) presence to the rectal palpation, the animals were divided in two groups (T1 and T2): 13 dairy calves to which an intramuscular injection of PGF2∝ was administered to them in day 0 (Clorprostenol 530 mcg/2mililiter) and 16 dairy calves to which were administered in day 0 an injection to them to intravulvar of PGF2∝ (Dinoprost 10mg/2ml). The diagnose of pregnancy was done by rectal palpation. It was obtained that intramuscular, T1 (77% of gestation) and T2 to intravulvar, (93% of gestation) having it via of administration IM are practical in its application although its result is not very effective in the answer to oestrus. In conclusion, the T1 where use prostaglandin (Dinoprost) by intravulvar via improved the percentage of pregnancy in comparison to the T2 with cloprostenol by intramuscular via.

Key words: Oestrus synchronization, pregnancy, dairy calves, prostaglandin.

INTRODUCTION

The oestrus synchronization allows artificial insemination planning according to a time scheme, also allows to stagger the plan parturitions beginning in a specific period of time and allows the use of the IA in animal groups in time fixed. Also allows to control and to inseminate individually (Whistles *et al*., 2002).

The control of oestrus in dairy calves means the that they can be inseminated with semen of superior genetic origin to the normal one, with which is increased the genetic improvement. This must remember that the good handling of the animal is essential, means to consider the lodgings, the breeds and to avoid agglomerations (Martineau, 2003). The possibility of modifying the oestrual cycle through hormonal treatments has allowed to design a variety of protocols to reduce the calving interval and the first service of the IA. The control of the oestrual cycle can reduce the associated problems of handling to the detection of heaths, especially in nowadays production systems where the intensification influenced negatively so that the cows show signs of estrus (Sepúlveda *et al*., 2003). Estrus can be induced by means of the PGF∝ administration (Xiang-Dong, 2003). At the nowadays time the PGF2∝ have great importance in this activity given to that their lutheolytic power and because its use has been approved and spread mainly in milk bovine (Gumen and

Corresponding Author: A. Córdova-Izquierdo, Dapartamento de Producción Agrícola y Animal. Cuerpo Académico: Salud y Bienestar Animal. Ecodesarrollo de la Producción animal. Universidad Autónoma Metropolitana Unidad Xochimilco, Mexico.

Seguin, 2003). The PGF2∝ acid is hidroxilated, insaturated with lutheolytic action in different species, in such a way that its action is exerted individually, when a corpus luteum or yellow body in the ovaries exists (Hirsbrunner *et al*., 2003). The use of prostaglandin for heaths synchronization is an excellent tool (Cavestany, 2004) also commonly is used during postpartum early to improve the uterine involution and the fertility in the milk cattle (Meléndez *et al*., 2004).

In fact, the prostaglandin is the natural substance produced by the uterus of the cow to cause the normal regression of the CL. Therefore, the prostaglandin injection is a way to selectively induce the regression of the CL of a way similar to the normal process. The percentage of conception with this method is similar to the one of the natural process, at least in comparison within each unit of dairy farms. This hormone was the base of the first method of heath synchronization, although the answer depends on the presence of a functional CL (day 7 to 16 of the cycle).

In fact, the prostaglandin is the natural substance produced by the uterus of the cow to cause the normal regression of the CL. Therefore, the prostaglandin injection is a way to selectively induce the regression of the CL of a way similar to the normal process. The percentage of conception with this method is similar to the one of the natural process, at least in comparisons within each unit of dairy farm. This hormone was the base of the first methods of heath synchronization, although the answer depends on the presence of a functional CL (days 7 to 16 of the cycle) and varies according to the day of the estral cycle in which it is applied (Cavestany, 2004). The premature luteolysis shortens the bovine estral cycle and is a phenomenon commonly followed the first ovulation in the puberty or immediately after milking. Some of the mechanisms of these short estrus completely have not been understood, recent findings as resulting from indicate an early formation of CL, premature liberation of prostaglandins from the uterus (Taponen *et al*., 2003). The efficiency in the detection of estrus is one of the most important factors that they limit the reproductive performance in milk cows.

The great amount of cows has created a new problem for the reproductive handling of the cows. The traditional methods for the detection of estrus are inefficient applying them in cattle ranches of great productions in where the number of cows by worker has been increased being a loss in the efficient detection from estrus. In agreement with recent studies, less than the fifty percent of the milk cows estrus was detected, being a prolonged interval between insemination and insemination and less gain for milk production (Portaluppi *et al*., 2003). In the cow like in other species, a total fertility is essential assuring when estrus is synchronized. The detection of estrus, in synchronous animal groups, can be difficult because many of them can display heats at the same time. It has been suggested difference of the number of cows that are in estrus (based on the aid for the heat detection and the visualization) and the real number of them (based on the determination of the progesterone concentration) can help us to explain the poor index of conception that, occasionally, are from the synchronization of estrus, in some farms; the difficulty does not have to be overestimated individually to identify the cows that are in truth estrus, in synchronous animal groups (Peters and Pursley, 2002). The estrus synchronization is considered like the stage of the estral cycle that has been applied after the detection of non pregnant cows by means of the rectal palpation or of the uterus based on the presence or absence of the corpus luteum. The importance to reduce the interval between the first and second artificial insemination has been simulated in the development of different strategies of synchronization for the return from estrus (Bartholomew *et al*., 2005). If prostaglandins are used in cattle that does not know its cyclical state, it can be in a percentage of pregnancy with a rank from the 30 to 70%. The main factor that contributes to this variation is the percentage of cows cycling at the moment of the treatment (Hirsbrunner, 2002). During the estrus control programs, the cattle will have to be free of stress, to have a good handling and feeding, organized the IA and to maintain severe registries, if we want to achieve success (Bernd-Alois *et al*., 2004).

The objective of this study was to evaluate the percentage of pregnancy of synchronous dairy calves being used two via of administration prostaglandins, intramuscular and intravulvar.

MATERIAL AND METHODS

A total of 29 dairy calves Holstein Friesan were selected, the selection criteria was dairy calves with presence of CL to the rectal palpation, with a corporal condition of 2,5 and 3. (Scale 1-5), with an age average of 1, 5 years with a conventional feeding, without a change of habitual handling in all. Procedure for the study, the animals were divided in two groups applying to them synthetic prostaglandins by two via which were intramuscular and intravulvar.

In treatment 1, 13 dairy calves to which an intramuscular injection of PGF2∝ was administered in day 0 (Clorprostenol 530 mcg/2 milliliter) which is synthetic and analogous, structurally related with the PGF2∝ were used. Day 0 is told like the day of application of PGF2∝ the dairy calves that displayed CL to the rectal palpation having to wait for 96 hours to carry out the artificial insemination (AI) in time fixed. Diagnose of pregnancywas made by rectal palpation 45 days after AI.

In treatment 2, 16 dairy calves were administered in day 0 and injection to them to intravulvar of PGF2∝ (Dinoprost 10mg/2ml) with the same procedure that in the T1.

RESULTS AND DISCUSSION

In table 1, can be observed that of a total of 13 dairy calves dealt with cloprostenol intramuscular via (T1) 10 was positive to diagnose of pregnancy and that of 16 dairy calves dealt with dinoprost intravulvar via (T2) 15 they were positive to pregnancy diagnosis. In table 2, it is observed the percentage of pregnancy of T1 and T2 in where T1 obtains a 77% in comparison of the T2 that obtained a higher percentage of 93%.

Table 1: Diagnosis of pregnancy with both treatments

Treatment (n)	Via	Product	pregnant females	empty females
1 (13)	Intramuscular	Cloprostenol	10	3
2 (16)	Intravulvar	Dinoprost	15	1
TOTAL			25	4

1= T1
2= T2

Table 2: Percentage of pregnancy in both treatments

Treatment	% of pregnancy
T_1	77%
T^2	93%

The use of schemes of estrus synchronization and in time fixed artificial insemination is a practical form in units of dairy intensive production systems could improve the reproductive efficiency since one of the main problems that affect these farms is associated to the low rate of detection of estrus according to Sepúlveda *et al*. (2003).

The synchronization protocols that are carried out after the IA give to some advantages for the reproductive efficiency in units of milk dairy farm with a suitable detection of estrus. The protocols of synchronization of ovarian follicles and regression of the corpus luteum give to results of low levels of conception but high ranks of services compared with the protocols of estrus synchronization, which usually increase the ranks of pregnancyin herds with low ranks of detection of estrus (Cerri *et al*., 2004).

The protocol used in this investigation for estrus synchronization gives advantages to increase of the pregnancy rank, reduces the possibility of human error in heath detection, this can be corroborated since this protocol obtained like results a 77% in the T1 and a 93% in the T2 demonstrating that both gave high percentage of pregnancy when in time fixed insemination.

Pregnancy rank reduces to the rank on watch and the possibility of human error in heath detection; this can be corroborated since this protocol obtained like results a 77% in the T1 and a 93% in the T2 demonstrating that both gave high percentage of pregnancy when in time fixed insemination. In a study Cerri *et al*. (2004) obtained that the time of the artificial insemination increases the results of rank of pregnancy in the chosen cows that were inseminates under protocol, but the conception ranks were low and similar to those of the cows that insemination on cradles in the detection of estrus.

Unlike Fricke (2001) that Manipulation of the ovarian function mentions in its work that the estrus synchronization with PGF2∝ has been successful if the inseminated cattle in estrus detected because the rate of detection of estrus is increased and the handling of the IA is more efficient is compared with the daily detection of estrus. The results obtained in our study threw that the via of intramuscular administration was of smaller percentage in the diagnosis of pregnancy in comparison intravulvar via as the show table two. On the other hand Martineau (2003) reported that the route of PGF2∝ intramuscular administration is practical in its application although its result is not very effective in the answer to oestrus.

Conclusion:

In conclusion, the type of prostaglandin used dinoprost by intravulvar via improved the percentage of pregnancy in comparison of cloprostenol by intramuscular via. This supports the work that of ample way affirm that the use of schemes of estrus synchronization and in time fixed AI is a practical form in units of intensive

dairy farm systems improving the reproductive efficiency since one of the main problems that affect these herds is associated to the low rate of detection of oestrus and per sequence there is a loss in the percentage of pregnancy.

REFERENCES

Bartolomé, J., A. Sozzi, J. McHale, P. Meléndez, A.C.M. Arteche, F.T. Silvestre, D. Kelbert, K. Swift, L.F. Archbald, W.W. Thatcher, 2005. Resynchronization of ovulation and timed insemination in lactating dairy cows I: use of the ovsynch and heatsynch protocols after non-pregnancy diagnosis by ultrasonography. Theriogenology, 63: 1617-1627.

Bernd-Alois, T., R. Surholt, M. Wittke, C. Voggel, M. Drillich and W. Heuwieser, 2004. Use of ovsynch in dairy herds- differences between primíparous and multíparous cows. Animal reproduction Science, 81: 1-11.

Cavestany, D., 2004. Resultados experimentales en lechería. Instituto Nacional de Investigación Agropecuaria. La Estanzuela, pp: 1-20.

Cerri, R.L.A., J.E.P. Santos, S.O. Juchem, K.N. Galvão, R.C. Chebel, 2004. Timed Artificial Insemination with estradiol Cypionate or insemination at estrus in high-producing dairy cows. Journal of Dairy Science, 87: 3704-3715.

Fricke, M.P., 2001. Manipulación de la función ovárica. Instituto Babcock, Universidad de Wisconsin. Novedades lácteas, Reproducción y selección geneática N.605, pp: 1-14.

Gumen, A., B. Seguin, 2003. Ovulation rate alter GnRH or $PGF_{2\propto}$ administration in early postpartum dairy cows. Theriogenology, 60: 341-348.

Martineau, R., 2003. Dinopros versus clorprotenol: Does route of injection modulate their efficacy in dairy cattle. The Bovine Practitioner, 37(1): 10-19.

Meléndez, P., J. McHale, J. Bartolomé, L.F. Archbald, G.A. Donovan, 2004. Uterine involution and fertility of holstein cows subsequent to early pstpartum $PGF_{2\propto}$ treatment for acute. Journal of Dairy Science, 87: 3238-3246.

Peters, M., J. Pursley, 2002. Fertility of lactating dairy cows treated whit ovsynh after presyncronization injections of PGF2∝ and GnRH. Journal of Dairy Science, 85(9): 2403-2405.

Portaluppi, M.A. and J.S. Stevenson, 2005. Pregnacy Rates in lactating dairy cows after presynchronization of estrous cycles and variations of the ovsynch protocol. Journal of Dairy Science, 88 : 914-921.

Hirsbrunner, G., 2002. Effect of prostglandin E2, DL-cloprostenol, and prostaglandin E2 in combination with D-cloprostenol on uterine motility during diestrus in experimental cows. Animal Reproduction Science, 79: 17-32.

Sepúlveda, N., J. Risopatrón, F. Rodríguez, E. Rodero, 2003. Fertilidad en vacas lecheras asociada A la sincronización de celos e inseminación a tiempo Fijo utilizando GnRh y PGF2 ∝. Revista Científica, FCV-LUZ., 13(3): 182-186.

Silva, C., R. Guzmán, R. Delgado, R. Aké, 2002. Respuesta de novillas Brahman a la sincronización del estro con progestágenos; conducta sexual y tasa de gestación. Revista Biomédica, 13: 265-271.

Taponen, J., P. Hjerppe, E. Kopra, M.H. Rodríguez, T. Katila, H. Kindahl, 2003. Premature prostaglandin $F_{2\alpha}$ secretion causes luteal regresión in GnRH- induced short estrous cycles in cyclic dairy heifers. Theriogenology, 60: 379-393.

Xiang-Dong, Z., 2003. Reproduction in female yaks (*Bos grunniens)* and opportunities for improvement. Theriogenology, 59: 1303-1321.