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INFLUENCE OF SYSTEMATIC INDUCTION OF PARTURITION IN THE RABBIT DURING ITS REPRODUCTIVE LIFE, WITH A SYNTHETIC ANALOGUE OF PGF_2 ALFA (ETIPROSTON).

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INTRODUCTION

Various publications point to the possibility of inducing labour in the domestic rabbit by administering cortisol or dexametasona in different doses, between days 25 to 27 post-coitum (p.c.). With this method 23% of the young were live-born /Abel et all, 1973/;Torres and First, 1976/.

/Morgan, 1974/ and /Fuchs, 1978, induced labour with 0,15 - 0,20 U.I. of oxytocin administered on day 31 (p.c.) obtaining a varied individual response rate, frequently stressed labours, and 5,7% neonatal mortality.

/Ruffini-Castrovilli et all, 1978/, / Ruffini-Castrovilli and Nordio-Baldisera, 1980/, /Rodriguez et all, 1984/ and Partridge et all, 1986/ achieve a better result when administering an analogue of Prostaglandin F_2 alfa (PGF_2 alfa) on day 28 (p.c.), and /Rodriguez et all, 1985/ on day 29 (p.c.). All these authors observed a significant reduction in the interval injection - parturition, grouping of parturition, nesting, normal parturition, and lactation, as well as advancing the onset of functional luteolysis, when compared to the Control Group.

However, no information exists on the influence of induction of all parturitions over the rabbits' productivity.

In this experiment the effect on some productive and reproductive parameters of systematic induction of all parturitions taking place during a year long trial in 50 rabbits of the California breed, is studied.

MATERIAL AND METHOD

50 nuliparous rabbits of the California breed, with a mean live-weight of 3,5 ± 0,25 kg, were used. They were randomly allocated in 2 groups of 25 animals, a Control without treatment and a group with all parturitions systematically induced

by administration of an injection of 50 µg(i.m.)of a synthetic analogue of PGF_2 alpha (Etiproston)* at 10 hr. on day 29 (p.c.). This dosage, route of administration, and moment of injection were previously determined /Rodriguez et all, 1985/.

This study was carried out during a period of one year with the object of obtaining the maximum possible amount of information on each parameter studied. Data published by /Maertens, 1979/ refering to the number of parturitions obtained in does during reproductive life, was taken into account. According to this author, 13% of the does reach their 7th parturition and 2% the 10th parturition.

Both groups of rabbits were submitted to a semi-intensive rhythym of reproduction with a 6 day remating interval after parturition. This system is normally used on our experimental farm and by a great part of rabbit breeders in Spain.

The variables studied were: prolificacy of each parturition, number of born dead/litter, conception rate, number of deaths from birth to weaning, number weaned per litter, sexual receptivity postpartum, weight of pups at 21 days for estimation of milk production per 25 days lactation according to /Torres et all, 1979/, and parturition intervals. At the end of the trial the rate of elimination of does en both experimental groups was measured.

This year-long study produced a decrease in the amount of information available, for succesive parturitions, as a result of the elimination of does by natural death or because of low fertility rates, as well as by litter rejection and deaseases. The results of the different parameters studied in this trial were obtained from a total of 246 parturitions controled in both groups (Control: 127; PGF_2 alpha 119).

The data was analyzed as a double factorial experiment. Means were compared using the /Waller and Duncan, 1969/ method, or the Mann-Witney U test, /Siegel S., 1956/. Percentages were compared using the X^2 Test /Yates F., 1937/

RESULTS AND DISCUSSION

No influence on prolificacy was found in either group, nor globally in the total period studied nor in the number of parturitions. The litter size was similar to that published by /Mendez et all, 1986/, obtained in rabbits of the New Zealand breed submitted to different reproductive rhythyms. Other authors such as /R.-Castrovilli and M.-Baldisera, 1980/, /Rodriguez et all, 1984/, or /Partridge et all, 1986/ did not find this parameter affected either, when practising single inductions. With respect to the number of born dead per litter, no significant difference was found between the groups, although the does with induced parturitions had a smaller proportion of born dead/parturition, result which coincides with that of /R.-Castrovilli and M.-Baldisera, 1980/, and with that of /Partridge et all, 1986/, who found a tendency to a lower number of born dead after induction (Table 1).

* Estiproston - Schering España S.A.

The global conception rate (number of parturitions/number of matings) was not affected by the treatment with PGF_2 alpha, although rates for induced does were slightly higher than the Controls (Table 1).

Induction of parturitions does not affect the litter/size at weaning, nor the number of deaths between birth and weaning. These results are similar to those published by /Rodriguez et all, 1984/ and /Partridge et all, 1986/ (Table 1). The results of this trial contradict those of /R.-Castrovilli and N.-Baldisera, 1980/, as these authors find a better growth rate of young at weaning in does induced with a PGF_2 alpha as well as a greater litter size at weaning with relation to the total number of live-born.

The estimated milk production for 25 days lactation according to /Torres et all, 1979/, was similar to that discribed by /Lukefahr et all, 1981/, with a non-significative increase in the second parturition and stabilization until the sixth parturition. In general, lactation was not affected by induction of parturition (Table 1), which coincides with that found by /Partridge et all, 1986/, as well as with the results published by different authors when administering a PGF_2 alpha at the end of pregnancy in different domestic species, as in the bovine /Jiran et all, 1981/ /Rüetsch et all, 1984/, in the sow /Samol S., 1980/ /Jöchle et all, 1982/, in the goat /Bretzlaff and Ott, 1983/ /Walker F.M.M., 1983/, or in the horse /Klem et all, 1982/.

On the other hand, it was possible to observe that systematic induction of all parturitions caused a concentration of sexual receptivity and an increase in post-partum fertility. The does treated with PGF_2 alpha showed a better remating rate between days 6 - 9 (p.p.) with relation to the Control does which presented a greater dispersion in this parameter (Table 1). The animals in the Group PGF_2 alpha also had a higher conception rate than the Control in remating on days 6 - 7 (p.p.), with 82.2% vs 66.6%, respectively (Table 1).

It was also proved that systematic treatment with PGF_2 alpha significantly reduces the parturition interval, constantly during the reproductive period of life studied in this group of animals. The global parturition intervals obtained were 53,5 $\pm$ 1,7 days for the Control Group and 43,9 $\pm$ 1,5 days in the Group PGF_2 alpha respectively, and the global mean reduction of 10,6 days favorable in the Group PGF_2 alpha was very significative (Fig. 1). The mean values of the parturition interval for the Control does was equally similar to the mean parturition interval of all the does on our experimental farm of 56,3 $\pm$ 3,15 days, obtained in a total of 359 parturition intervals controled. The mean values of the Control Group was also similar to that published by /Rodriguez R., 1981/ /Zaragoza et all, 1985/ and /Mendez et all, 1986/, when using remating intervals after parturition of 8 - 9 days.

Together with these results, a significative decrease is detected with a mean of 9,0 days in the remating interval after parturition favorable for the induced rabbits, as well as a significative reduction in this same group in the interval: parturition-

conception, with a global mean value of 10,2 days (Table 2,3).

This means that in the does treated with PGF_2 alpha there is a reduction in the parturition interval for a double reason: first of all, the remating interval post-partum, takes place with a mean of 9,9 ± 0,8 days compared with 18,9 ± 1,5 days of the control, and secondly because of the time lapse between remating (p.p.) and conception is 1,72 days less in the Group PGF_2 alpha (3,82 ± 1,25 days), than in the Control (5,54 ± 1,24 days). This difference, favorable for the PGF_2 alpha group may partially be explained by the better conception rate found in the induced does when compared with the Control (69,2% vs 76,5) (Table 1), although in this trial the result was not significative. Although, it should be noted that the Group PGF_2 alpha showed a conception rate significatively superior to the Control Group in remating on days 6 - 7 post-partum (Table 1). This combination of the two favorable factors (higher conception rate, and greater concentration of remating on days 6 - 9 p.p.) contributed in explaining the shorter parturition intervals found in the Group PGF_2 alpha.

The elimination rate of the does was not significatively affected by the systematic induction of parturitions as compared to the Control Group (56% vs 48% respectively) (Table 1).

CONCLUSIONS

These results would indicate that the reduction of the parturition interval due to the systematic induction of all parturitions during the period of reproductive life of a group of does, makes it possible to obtain a production per doe similar to that of the Control but in a shorter time period, as the reproductive parameters are not significatly altered by the treatment with PGF_2 alpha.

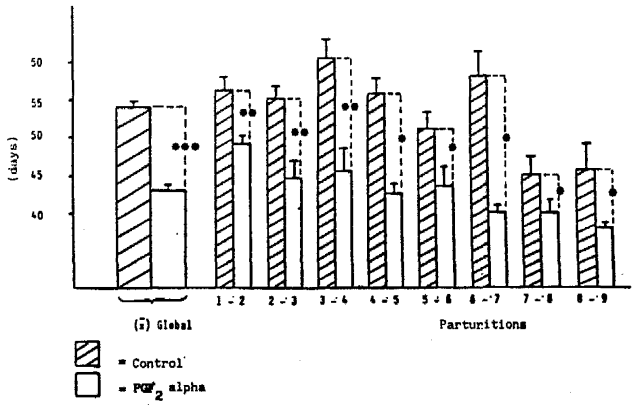
In this trial, an average doe with mean parturition intervals of the Group, will take 429 days to reach its 9th parturition in the Control Group, when compared to 343 days in the PGF_2 alpha Group, with the same number of pups weaned (49,05 in the Control vs 49,59 in the induced does).

Table 1). Global reproductive and productive parameteres, ($\bar{x}$ ± S.E.M.)

	Control	PGF_2 alpha	Significance
Litter size at birth	7,9 ± 0,25	8,16 ± 0,23	
Number born dead/litter	0,81 ± 0,16	0,42 ± 0,11	
Litter size at weaning (28 days)	5,45 ± 0,25	5,51 ± 0,30	
Number of deaths between birth and weaning.	2,35 ± 0,30	2,36 ± 0,26	
Milk producián (25 days), g.	3218 ± 184	3028 ± 118	
Elimination rate of does (%)	46	56	
Conception rate (%)	69,2	76,5	
Conception rate in remating on days 6-7 (p.p.) (%)	66,6	82.2	*
Remating rate between days 6-9 (p.p.) (%)	43,0	70,4	***

* = P<0,05

*** = P<0,001



* = P<0,05

** = P<0,01

*** = P<0,001

Figure (1)

Parturition intervals; (days $\bar{x}$ ± S.E.M.)

Table (2)
Remating intervals (days; $\bar{x}$ ± S.E.M.)

	Parturitions									($\bar{x}$)
	1	2	3	4	5	6	7	8	9	global
Control	22,6 ± 3,6	19,8 ± 3,4	20,2 ± 3,3	12,7 ± 2,4	14,4 ± 2,8	18,9 ± 4,3	14,0 ± 5,1	8,7 ± 1,3	11,2 + 2,1	18,9 ± 1,5
PGF_2 alpha	9,3 ± 1,2	12,9 ± 2,7	10,4 ± 3,2	10,8 ± 0,2	8,2 ± 1,2	8,0 ± 1,2	9,1 ± 1,8	6,0 ± 0,2	6,2 + 2,1	9,9 ± 0,8

* * * - P<0,001

Table (3)
Parturition – conception intervals (days; $\bar{x}$ ± S.E.M.)

	Parturitions									($\bar{x}$)
	1	2	3	4	5	6	7	8	9	global
Control	24,4 ± 3,5	23,5 ± 3,5	29,6 ± 4,3	25,3 ± 5,3	20,9 ± 4,2	27,9 ± 6,4	14,0 ± 5,1	15,0 ± 7,1	14,0 + 6,0	23,9 ± 1,7
PGF_2 alpha	17,7 ± 2,9	13,9 ± 3,0	15,1 ± 4,9	11,6 ± 2,5	15,5 ± 6,2	9,1 ± 1,6	3,0 ± 2,9	6,0 ± 0,2	9,25 + 2,9	13,7 ± 1,4

* * * - P<0,001

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SUMMARY

The effect of systematic induction of parturition over some reproductive and productive parameters during a year long trial, in 50 California doe rabbits, is studied.

Intramuscular injections of 50 µg of the synthetic analogue of Prostaglandin F_2 alpha (PGF_2 alfa), Etiproston, were given at 10 hr. on day 29 of pregnancy, Control animals were untreated.

The results indicate that the systematic induction of parturition does not significantly affect prolificacy, fertility, death rate from birth to weaning, litter size at weaning, estimated milk production/25 days, nor elimination rate of the mothers, when compared with the Control. The induced mothers present a greater concentration of sexual receptivity on day 6-9 post-partum (p.p.) and an increase in fertil matings on days 6-7 (p.p.) with relation to the Controls which have a greater dispersion of these parameters. The animals treated with an analogue of PGF_2 alpha showed a constant significant reduction in the parturition interval throughout the period of reproductive life studied. These results would indicate that the reduction of the parturition interval allows a production per rabbit similar to the Control but in a shorter period of time, as the reproductive parameters are not significatively affected.

RESUMEN

Se estudia el efecto de la inducción sistemática de todos los partos que tienen lugar a lo largo de la vida reproductiva de una población de conejas de raza Califoniana, sobre algunos parámetros reproductivos y productivos, vs. Controles no tratados. Se administran (i.m.) 50 µg del análogo sintético de la PGF_2 alpha (Etiprostón), en el día 29 de gestación a las 10.00 h.

Se comprueba que la inducción de todos los partos no afecta significativamente la prolificidad, la fertilidad, la mortalidad durante la lactancia, el número de destetados por parto, la producción lechera estimada para 25 días de lactancia, ni el porcentaje de eliminación de las conejas madres, al compararse con los animales Controles, y también se observa una mayor concentración de la receptividad sexual en los días 6-9 postparto (p.p.) y un aumento de la fertilidad (p.p.) en las cubriciones efectuadas en los días 6-7 (p.p.), en relación a los Controles. Los animales con partos inducidos reducen significativamente el intervalo entre partos de forma constante a lo largo del período de vida reproductiva estudiado. Estos resultados indicarían que es posible obtener en éstos animales, una producción por coneja similar a los Controles en un menor período de tiempo, ya que los parámetros reproductivos no se ven alterados significativamente.