Role of GnRH on Ovulation during Summer's Months in Cows

Veterinary Medicine

Keywords: analogue, fertility, fertilization, estrus, artificial insemination.

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Abstract

The high temperature over 35 C (heat stress) is one of the factors which influence in general reproduction processes and specially the ovulations process. In our country these temperatures are present from June to August month. Therefore the fertility rate during these months is lower than in other periods of the year. Because of this the authors have thought to experiment the use of hormonal substances (analogue synthetic of GnRH). This study was performed during summer's months. Two cows of Simmental and their crossbreed groups were made up. All the cows have the same breeding conditions. Their age is about 3-6 years old and they are 60 days after their parturition, they are also in normal healthy condition and with estrus normal cycle. Each group was compound of 30 animals (cows) and they have been treated as below. The A experimental group (IA + GnRH), the cows of this group were inseminated and they have been treated with Fertagyl (Intervet, 0.1 ng/ml) 2.5 ml/animal, (IM). The B group of control (IA), the cows of this group has been inseminated without hormonal above. The artificial insemination of the cows was performed about 12 hours after the beginning of the estrus. It resulted that (for two cows groups) the rate of fertilization for the experiment group is 80% against 60% of the control group ($P>0.05$). As conclusion the treatment of the cows by using synthetics analogue of GnRH and at the same time the artificial insemination influences positively on their fertility.

1. Introduction

The estrus cycle of cows lasts about 21 days (18-24 days). The highest moment of the cycle is the exhibition of the estrus and the ovulation (Broers P, 1996, Driancourt MA, 2001, Sali G, 1996, Youngquist RS, 1997). These processes are controlled through the neuronal-endocrinal system. The absence or the delay of the ovulation is one of the factors that decrease the fertility of the cows (Morrow AD, 1986, Emma CL Bleach 2004). As a consequence the cows inseminated in these terms lose the possibility to be fertilizer and they turn again in cycle. Many factors as; the nutrition, breeding conditions, different pathologies, stress caused by high temperature, the milk production, the age, and the breed etc, have a negative influence on the ovulation process. In our days the relations between system hypatalmo – hypofisar- ovaries are completely known (Milvea RA, 1996, Ginther OJ, 2000, Perry TC, 1993). During the estrus, the mature follicle grow up and about 12 hours after it ovulates (Younqguist SR, 1997, Roche FJ, 2001, Sali G, 1996, Broers P, 1996). The HL preovulatory wave stimulate this process (Milvea RA, 1996, Driancourt MA, 2001, Arthur H, 1996) but under the negative influence of one or many other factors mentioned above the ovulation can be delayed. This causes the delay of the arrival ovule in oviduct. The use of the hormonal substances is still one of the best way to avoid the delay of the ovulation (especially during the high temperature). We thought to experiment the use of the hormonal substances together with artificial insemination to prevent the delay of the ovulation.

2. Material and methods

The selected cows were of Simmental and Cross breed. The medium age of selected cows was from 3 to 6 years old and the last parturition was normal in all of them. The breeding conditions were the same (half

intensive system). We made up two groups of cows; one experimental group, and the other the control group. Both groups have the same number of cows (30 cows) and the same physiological status (60 days after the parturition). The cows have been inseminated 12 hours after the exhibition of the estrus symptoms. The cows of the experiment group have been first inseminated and then they have been treated with the hormone Fertagyl (synthetic Gonadorelin) in doses 2.5 ml (0.1ng/ml) intramuscular way and was inseminated too. While the cows of control group haven't been treated after their insemination. The main points of the treatment are as below: The experimental group (IA+GnRH).

The estrus day: the cows have been inseminated 12 hours after estrus beginning. The injection of hormonal substances was performed immediately after the insemination 21 and 42 days later the cows have been controlled for the possibility of estrus return. After 60 days, they have been diagnosed for pregnancy. We followed the same steps for control group too, but without hormonal treatment. The rate of fertilization has been evaluated in both groups after the first insemination to determine the influence of the hormones.

3. Results and disscusion

The aim of this study was to evaluate the efficiency of the hormone on the rate of the fertilization.

Tab. No 1. Some general cows indices and their treatment (The experimental group).

The breed	The age (months)	The weight (kg)	The days after the parturition	The hormonal treatment	IA (hours) after estrus start
Simmental and Cross breeds	52	468 ± 18	76	GnRH, 12 hours after the estrus start.	12

According the records of the tab. No1 results that the body weighs of cows after the parturition is in normal rate. On the other hand the period of 74 days after the parturition is a good indicates the possibility of the fertilization. The insemination and the hormonal treatment are performed 12 hours after the beginning of the estrus. The time of the estrus beginning was rough. The vaginal discharge and their consistence were another important sign that indicated the beginning of the estrus.

Tab. No 2. The rate of the fertilization of the cows treated with GnRH, and artificially inseminated.

IA + GnRH	After 21 days (return)	After 42 days (return)	After 60 days (Pregnant)	The fertilization
30 (cows)	6 (cows)	-	24 (cows)	80 %

24/30 or 80 % of the inseminated cows and treated with Fertagyl, resulted pregnant. 6 cows have exhibit estrus 20-21 days after the insemination and they have been inseminated again. All the cows that resulted pregnant (24 cows) have had a normal pregnancy and have 25 parturitions (one cow had twins). The cows of control group have not been hormonal treated. They have been inseminated about 12 hours after the estrus exhibition Tab. No 3.

Tab. No 3. Records of the cows of control group

The breed	The age (month)	The weight (kg)	Days after the parturition	The insemination after the estrus (hours)
Simmental and Cross breed	56	454 ± 15	72.3 ± 1.4	12

The cows of the control group have been inseminated during the summer months and they have rough results with the cows of the experiment group. After the insemination we took these results Tab. No.4.

Tab. No 4. The rate of the fertilization of cows without hormonal treatment (the control group).

IA (cows)	Return after 21 days (cows)	Return after 42 days (cows)	Pregnant cows after 60 days (cows)	Fecundation with 1-st service
30	9	3	18	60 %

Only 9 cows of 30 inseminated cows on the estrus day have had return of the estrus 3 weeks later while 3 cows after 42 later. The pregnancy in inseminated cows is developed normally (have birthed 18 calves). We compared the results between two groups to evaluate the role of the hormonal treatment during the artificial insemination Tab.No.5

Tab. No 5. The comparison of the results between the control and the experiment group to evaluate the efficiency of GnRH

The groups	Cows	The insemination 12 hour after the estrus exhibition	Return after 21 days	Return after 42 days	Pregnant	Fecundation with 1-st service
Experiment	30	30	6	-	24	80 %
Control	30	30	9	3	18	60 %

Comparing the results of both groups it seems clearly the changes between them. So the rate of the fertilization (with GnRH) for experiment group is 80 % against 60 % of the control group ($P>0.05$). We think that the hormonal treatment has the principal role of the highest percentage of the fertilizations rate. This result is also based on fact that all the cows of both groups have the same conditions (breeding conditions, same age, breed, physiological status and the same period of the year). The use of GnRH, as a stimulator of follicle up growth and ovulation has influenced the proper closure of this process about 12 hours after the estrus finality (Ginther OJ, 2000, Momcilovic D, 1998, Peter J, 1991, Roche FJ, 2001). We experimented the efficiency of GnRH on the fertilization exactly in the warmest months of the year to propitiate the effect of the high temperature on this process (Guzeloglu A, 2001, de la Sota, 1998). The influence of the temperature on the ovulation process is related also with the level of the humidity of the stable. The temperature stress influence in the animal's production and in its reproductive abilities (Lopez- Gatius, 2006). The temperature influence seems to be related with genetic factors. So the breed like Holstein and Angus are more sensitive than others. The mechanism of action of high temperature is based on the disorders in the thermoregulations' centre in Hypothalamus. The pre-ovulate centre of hypothalamus is almost paralyzed under the thermal and as a result the pulsate production of the HL from Hypophisa became low until it is completely inhibited (Driancourt MA, 2001, de la Sota, 1998, Backers T, 2001, Guzeloglu A, 2001Ginther OJ, 2000). The low level of HL cannot do grow up and ovulate in the proper time the mature follicle causing delayed ovulation (Broers P, 1996, D O'cchio MJ, 2000). The use of exogenous GnRH has a positive influence on the maturation and ovulation process of the follicle.

4. Conclusions

1. The cows of the experimental and the control group have the same physiological status (76 & 72.3 ± 1.4 after the parturition), belong the same: breed (Simmental and cross-breeds), age (52 & 56 months old), body weight (468 ± 18 & 454 ± 15 kg), breeding conditions (half extensive) and are also inseminated at the same period of the year (June-August).

2. The experimental group that has been artificially inseminated and hormonal treated with GnRH, resulted that 80 % of cows (24/30), have been fertilized since the first insemination and have had a normal pregnancy. 6 cows or 20 % of the cows have returned 3 weeks after the insemination.

3. The cows of control group that have not been specially treated during their estrus (they have been treated just with IA) have been fertilized 18 from 30 cows or 60% of them. Only 12 cows or 40 % of this group have had return in regular periods after 21 and 42 days.

4. The advantage of 20 % of experimental group comparing with control group is because of the influence of GnRH on the ovulation.

5. We recommend the cow's treatment through synthetic analogue both the artificial insemination to prevent the delayed ovulation.

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