Induction of fertile estrus by using CIDR and PMSG in anestrous lactating Holstein-Friesian cows suffering from inactive ovaries.

Al-Hamedawi*, T. M.;Ghafel,A.H.and AL-Shammary.S.M***
***College of veterinary medicine/ Baghdad university / Baghdad – Iraq.**
****Technology College/ AL-Forat Al-Awsat University/Babylon-Iraq.**
Dr.talibmusa@mit.edu.

Abstract :
This study was conducted on 45 anestrous lactating Holstein-Friesian cows suffered from inactive ovaries at day 60 postpartum their age were between 3-6 years old in Al-Nasar station / south of Baghdad province during the 2015-2016 period. These cows were divided randomly into three equal groups (15 cow on each one) according to the type of treatment was used, 1st groupwas treated by CIDR inserted intravaginal for 10 days, 2nd group was treated by CIDR for 10 days and immediately withdrawal CIDR injected with 1000 IU/ PMSG/ IM, the third group 3rd group was considered as a control group (without treatment). All animals which observed at estrus inseminated naturally. The results indicated that animals in 2nd group recorded 86.6% (13/15) as response animals compared with 60% (9/15) and 53.3% (8/15) in 1st and 3rd groups respectively with higher significant ($P<0.01$) for the 2nd group, also the duration of response was superior significant differences ($P<0.01$) for the 2nd group (5.37±1.14 days) compared with 1st and 3rd groups (29.56±2.33 and 85.78±7.42 days) respectely, in addition the no. of services / conception was recorded no significant differences between all groups. While the pregnancy rate was 88.8%, 92.3% and 75% in 1st , 2nd and 3rd group respectively with higher significant differences ($P<0.01$) for the 1st and 2nd group compared with 3rd group (control group) but the days open were recorded best significantly ($P<0.01$) for 2nd group compared with 1st and 3rd group. Finally the results showed an increasing in serum level of progesterone and estradiol in treated group compared with control group after 10 days. In conclusion that the use of CIDR or CIDR+PMSG will improved reproductive efficiency through the return of animals suffering from inactive ovaries to estrus behavior in anestrous lactating Holstein-Friesian cows with enhancment in many reproductive parameters represented with animal response, duration of response, pregnancy rate and days open.

Keywords: PMSG – CIDR – Holstein – Fresian – Days open.

ISSN 2072-3875

استحداث الشبق الخصب في ابقار الهولشتاين – فريزيان الحلوب عديمة الصراف والتي تعاني من خمول المبايض باستخدام ال CIDR وهرمون مصل الفرس الحامل.

طالب موسى عبدالله الحميداوي عباس حسين غافل صلاح مهدي الشمري

الخلاصة:
اجريت هذه الدراسه على 45 بقرة هولشتاين – فريزيان حلوب عديمة الصراف (تعاني من خمول المبايض) في اليوم 60 بعد الولادة ، وكانت اعمارها تتراوح ما بين 3-6 سنوات وذلك في محطة النصر الكبرى / جنوب محافظة بغداد خلال الفترة من 2015-2016 م. تم تقسيم هذه الابقار عشوائيا الى ثلاث مجاميع متساوية العدد (15 بقرة / مجموعه) طبقا لنوع العلاج المستخدم. المجموعه الاولى تمت معالجتها بادخال (CIDR) (اله تستخدم لاطلاق البروجسترون داخل المهبل) لفترة 10 ايام فقط ، أما المجموعه الثانيه فقد عولجت بادخال CIDR داخل المهبل لفترة 10 ايام وبعد ازالتها مباشرة حقنت 1000 وحدة دوليه من هرمون مصل الفرس الحامل / في العضله ، فيما تركت المجموعة الثالثه بدون معامله علاجيه واعتبرت كمجموعة سيطرة ، جميع الحيوانات التي اظهرت علامات الشبق بعد انتهاء فترة العلاج تم تلقيحها طبيعيا. اظهرت النتائج ان حيوانات المجموعه الثانيه قد سجلت نسبة استجابه وصلت الى 86.6% (15/13) مقارنة مع 60% (15/9) و 53.3% (15/8) في كل من المجموعتين الأولى والثالثه مع افضلية احصائيه بمستوى $P<0.01$ لصالح المجموعة الثانيه، كذلك فترة الاستجابه لهذه العلاجات سجلت فارق احصائي معنوي بمستوى $P<0.01$ تصب لصالح المجموعة الثانيه (5.37+ 1.14 يوم) مقارنة مع (29.56+2.33 و 85.78+ 7.42) في المجموعتين الاولى والثالثه على التوالي، أما مايخص عدد التلقيحات اللازمه للاخصاب فلم يسجل فارق معنوي لكل المجاميع. بينما سجلت نسبة الحمل فارقا معنويا ($P<0.01$) لصالح المجموعتين الاولى والثانيه مقارنة مع المجموعة الثالثه (مجموعه السيطرة)، أما فترة الايام المفتوحه فقد كانت تميل لصالح المجموعه الثانيه مقارنة مع المجموعتين الاولى والثالثه. واخيرا فان مستوى هرموني البروجستيرون والاستروجين قد ازدادا في مصل الدم في فترة ما بعد العلاجات عما عليه قبل التداخل العلاجي في كل من المجموعة الاولى والثانية وبفارق معنوي $P<0.01$ فيما لم تظهر المجموعه الثالثه اي فارق معنوي خلال قياس الهرمونين ضمن نفس الفترة التي تمت بها المعالجة (قبل وبعد) والبالغة 10 ايام. عليه نستنتج بان استخدام CIDR لوحده او مع هرمون مصل الفرس الحامل يحسن من الكفاءة التناسليه من خلال عودة الحيوانات التي تعاني من خمول المبايض الى إظهار الشبق بفترات قصيرة مقارنة مع مجموعة السيطرة مع تحسين في بعض مقاييس التكاثر المتمثله بفترة الاستجابة ومعدل الحمل إضافة الى فترة الايام المفتوحة.

الكلمات المفتاحية: هرمون مصل الفرس الحامل، الة السيطرة لاطلاق البروجسترون، هولشتاين- فريزيان، الايام المفتوحه.

Introduction :

Reproductive efficiency of dairy cows are influenced by different factors include genetic, season, age, production system, nutrition, management, environment and diseases (1,2 and 3), but the progesterone hormone have been investigated and used for estrus induction and synchronization for several decades (4 and 5). Many authors reported that the administration of hormones included progesterone and gonadotropin (eCG, hCG or GnRH) during the early postpartum period was increased early ovulation (6 and 7). Anestrous cows usually represent a major proportion and may varies among herd and within a herd from year to year (5 and 8). The number of cows that ovulate after the short period of progesterone exposure can be increased substantially by providing a stimulus to

ISSN 2072-3875

induce ovulation during the period 1-3 days after progesterone withdrawal (9 and 10). Many technique available in the worldwide for administering progestin to bovine are through the head, subcutaneous implants into the ear, or through intravaginal device (11). Recently using CIDR (control intravaginal drug release) which contain 1.38gm progesterone , was designed to maintain elevated blood concentration of progesterone to be at least 2ng/ml for up to 10 days (12). The CIDR has been incorporated into a wide variety of estrus control programs in many countries and many research trials, with this insert have been performed (4). The aim of this study was to evaluate the effect of using CIDR alone or with eCG during postpartum anestrum. Upon the reproductive efficiency which include: the induction of estrus (Animal response and duration of response), pregnancy rate and days open.

Materials and Methods :

This study was performed on 45 lactating Holstein-Fresian cows their age were between 3-6 years old in Al-Nasar station /Baghdad province, these animals were suffering from inactive ovaries after 60 days from postpartum period, during 2015-2016. These cows were divided randomly into three equal groups (15 cows on each), the 1st group treated by insert CIDR (Eazi-Breed CIDR. Hamilton-Newzeland which contain 1.38gm progesterone) intravaginal for 10 days, the 2nd group treated by inserting CIDR (contain 1.38gm) intravaginal for 10 days and immediately after withdrawal in day 10 injected with 1000IU/PMSG /IM (Intervet. B.V.-Holland).While the 3rd group was considered as control group (without treatment). Animals response, duration of response, number of services per conception and days open were recorded. As well as recording assay was used for serum level of progesterone and estrogen before and after treatment using specific Kits (13) in specialist laboratory for hormone analysis, statistical analysis include mean, standard error, chi square, F-test and analysis of variance were used according to (14).

Results and Discussion :

The result showed in table -1- the type of treatment and animals response to their treatment-consequences of the 1st group which treated with CIDR (1.38gm insert intravaginal for 10 days was recorded 60% (9/15), while alternative groups recorded 86.6% (13/15) and 53.3% (8/15) in the 2nd and 3rd group respectively, however the best results were recorded higher significantly ($P<0.01$) in 2nd group compared with 1st and 3rd groups, additionally the 1st group which treated with CIDR was recorded predominant critical contrasts ($P<0.01$) better than 3rd group these finding that related to hormonal treatment (CIDR or/ CIDR+PMSG) in agreement with many creator in different nations (4, 11 and 12) which recorded the reaction between 50-90% aimed in your studies. The result in table-1- also demonstrate the duration of response and recorded 29.56±2.33 days, 5.37±1.14 days and 85.78±7.42 days in the 1st, 2nd and 3rd groups respectively and

ISSN 2072-3875

were recorded superior significantly ($P<0.01$) related with 2nd group compared with 1st and 3rd groups, additionally the 1st group recorded highly significant ($P<0.01$) compared with 3rd group, these results supported by many researchers (8, 13 and 14) who recorded 6-25 days due to expanded amassing of FSH and LH in blood gradually. A a results, it combined with increase in progesterone concentration in blood serum during period of treatment and ceased suddenly. this indicate the increase in gonadotropin hormone from adenohypophysis. The outcomes that recorded in table -2- included the number of services per conception, pregnancy rate and days open. These results obtained no significant differences between all groups related with No. of services / conception (1.61±0.15, 1.32±0.11 and 1.65±0.23). while the pregnancy rate was recorded best significant ($P<0.01$) for the 1st and 2nd groups (92.3% and 88.8%) compared with control group (75%), this outcomes in concurrence with many authors which reported a better general origination rate was happened by utilizing PMSG and recorded 80-100% in diverse studies (5, 8 and 15). Finally the days open recorded best period in 2nd group compare with 1st and 3rd groups and these results in agreement with (5, 13 and 16). The results in table -3- and table -4- were showed the increasing in progesterone and estradiol (Fig -1-) in serum level in treated groups after treatment compared with control group with higher significant differences ($P<0.01$) due to using CIDR which contain progesterone and PMSG which stimulate follicles forming to produce estradiol. We concluded that the use of CIDR or CIDR + PMSG improved the reproductive efficiency through the return of animals to estrus behavior I anestrum lactating Holstein–Fresian cows with improvement in duration of response, pregnancy rate as well as days open.

Table -1- The type of treatment, Response animals and duration of response in lactating Holstein-Friesian cows.

Groups	No. of cows	Type of treatment	Response animals No. %	Duration of response(days) M±SE
G1	15	CIDR (1.38gm) intravaginal/10 days	9 60% b	29.56±2.33 b
G2	15	CIDR(1.38gm) intravaginal/10days+PMSG 1000 I.U /IM	13 86% a	5.37±1.14 a
G3	15	Control/without treatment	8 53.3% c	85.78±7.42 c
Total	45	----------	Treat.22/30 73.3% Untreat. 8/15 53.3%	----------

Different letters mean significant differences($P<0.01$).

ISSN 2072-3875

Table -2- Number of services/ conception, pregnancy rate and days open in Holstein-Friesian cows.

Groups	Response animals No. %	No. of service / conception M±SE	Pregnancy rate No. %	Days open M±SE
G1	9 60	1.61±0.15 a	8 88.8 a	116.34±13.45 b
G2	13 86.6	1.32±0.11 a	12 92.3 a	98.23±9.18 a
G3	8 53.3	1.65±0.23 a	6 75 b	152.24±16.37 c
Total	----------	----------	Treat.20/22 90.9% Untreat. 6/8 75%	----------

Different litters mean significant differences (P<0.01).

Table -3- Effect of CIDR or/ CIDR+PMSG on progesterone concentration (ng/ml) on lactating Holstein-Friesian cows.

Groups	Progesterone level before treatment M±SE	Progesterone level after treatment M±SE
G1	3.75±3.0.6 aA	8.71±2.26 bA
G2	4.72±2.16 aA	7.89±2.60 bA
G3	5.22±2.23 aA	5.62±1.18 aB

Different small litters mean significant differences (P<0.01) between groups.
Different capital litters mean significant differences (P<0.01) within groups.

Table -4- Effect of CIDR or/ CIDR+PMSG on Estrogen level (ng/ml) on lactating Holstein-Friesian cows.

Groups	Estrogen level before treatment M±SE	Estrogen level after treatment M±SE
G1	2.96±0.23 aA	7.01±2.44 bA
G2	3.40±0.42 aA	6.82±1.06 bA
G3	3.25±0.18 aA	4.06±0.12 aB

Different small litters mean significant differences (P<0.01) between groups.
Different capital litters mean significant differences (P<0.01) within groups.

ISSN 2072-3875

References

1- Lucy, M.C.(2001). Reproductive loss in high production dairy cattle: where will it end? J. dairy Sci. 86: 3215-3217.

2- Royal, M.D.; Pryce, J.A. and Flint, A.P.(2002). The genetic relationship between commencement of luteal activity and calving interval. Body condition score, production and liner type traits in Holstein-Friesian dairy cattle. J. Dairy Sci. 85: 3071-3080.

3- Roberts, S.Y. and Walter, R.T.(2007). Current therapy in large animal. Theriogenology. 2nd Ed. Saunders-Elsevier. 865-879.

4- Smith, R.D.; Pomerantz, A.J.; Beal, W.E.; McCann, J.P.; Pilbeam, T.E. and Hansel, W.(1984). Insemination of Holstein heifers at a present time after estrus cycle synchronization using progesterone and prostaglandin. J. Anim. Sci. 58: 792-800.

5- Peters, M.W. and Purstey, J.R. (2003). Timing of final GnRH of the ovsynch protocol affects ovulatory follicle size, subsequent luteal function in dairy cows. Theriogenology. 60: 1179-1204.

6- Kamomae, H.; Kaneda, Y.; Domeki, I.; Iwamura, S.; Arari, I.; Ogasa, A. and Nakahara, T.(1988). The effects of PMSG on ovarian function quisoent heifers. Japanese. J. Vet. Sci. 50: 1222-1231.

7- Foot, R.H. and Riek, P.M.(1999). Gonadotropin-releasing hormone improves reproductive performance of dairy cows with slow involution of the reproductive tract. J. Anim. Sci. 77: 12-16.

8- Arthur, G.H.; Noakes, D.E.; Pearson, H. and Parkinson, T.J.(2000). Veterinary reproduction and obstetrics. 7th ed. W.B. Saunders company limited, London. Pps: 187, 440, 502.

9- Mike, D.(2001). Application of the CIDR-B to estrus synchronization in beef cattle. J. Anim. Sci. 78: 1-7.

10- Stevenson, J.S.(2007). Application of the progesterone (CIDR) insert in artificial insemination programs of dairy cattle. Dairy Research. (7) 5-11.

11- Macmillan, K.L.(1993). Anew intravaginal progesterone releasing device for cattle (CIDR-B) for estrus synchronization, anestrus. J. Anim. Reprod. Sci. 33: 1-25.

12- Lucy, M.C.; Billing.; Butler, W.R.; Ehnis, L.R.; Fields.; Kesler, D.J.; Kinder, J.E. and Hafs, H.D.(2001). Efficacy of an intravaginal progesterone insert and an injection of PGF2α for synchronizing estrus and shorting the interval to pregnancy in postpartum beef cows, peribubertal heifers and dairy heifers. J. Anim. Sci. 79: 982-995.

13- Berga, S.L. and Dainiels, T.L.(1991). Use of the laboratory in disorder of reproductive neuroendocrinology. J. Clinical Immunoassay. (14) 23-28.

ISSN 2072-3875

14- Steal, R.G.D. and Torries, H.J.(1986). Principles and procedures of statistic. 2nd Ed. McGraw Hill, London.

15- Chebel, R.C.; Santos, J.E.; Cerri, R.A. and Bruno, R.G.(2006). Reproduction in dairy cows fallowing progesterone insert. Presynchronizatio and resynchronization protocols. J. Dairy Sci. 39: 4205-4219.

16- Arthur, , G.H.; Noakes, D.E.; Pearson, H. and Parkinson, T.J.(2008). Veterinary reproduction and obstetrics. 8th ed. W.B. Saunders an imprint ed. Elsevier, London.

ISSN 2072-3875