

DOUBLE OVSYNCH PROTOCOL AS AN EFFICIENT TOOL FOR IMPROVING THE POSTPARTUM FERTILITY IN CATTLE

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ABSTRACT

This study aimed to study the effect of double Ovsynch protocol as a tool to improve the postpartum fertility. Four hundreds cows were selected randomly from the herd and were classified after parturition into two groups. Two hundreds cows were kept untreated as a control group. Two hundreds cows were undergone for double Ovsynch protocol. In double Ovsynch protocol, the cows received GnRH at 40-47 days after calving, followed by an injection of PGF₂α, 7 days later and GnRH 72 h after PGF₂α, then began the Ovsynch protocol 7 days later. The Ovsynch protocol: GnRH, PGF₂α, 7 days later, GnRH 56 h after PGF₂α, and artificial insemination 16 to 20 h later. Double Ovsynch protocol was evaluated for its efficiency using days to first bred, days open and number of services per conception parameters. The results of this study showed that double Ovsynch treatment significantly improved the reproductive performance by increasing and decreasing both days open and number of services per conception. Thus, we can conclude that double Ovsynch protocol can be used as an efficient tool for improving the fertility in postpartum animals and its beneficial role is probably attributed to its hormonal effect.

Key Words: *Double Ovsynch protocol, Reproductive parameters, Postpartum fertility.*

INTRODUCTION

Postpartum period is one of the most important and critical periods of female reproductive life that determines the future fertility of the female. This period is greatly affected by the nature of parturition as well as the postpartum management. The postpartum period is that period which extends from parturition until the genital organs return to its normal physiological and histological condition, as nearly as before pregnancy (Hafcz, 2000). Any extension of the postpartum period in cows might have a detrimental effect on

the reproductive performance of the individual animal (Noakes et al., 2001). Thus, the main determinant of this period is essentially dependent on the resumption of normal ovarian cycles, manifestation of estrous behavior and conception following insemination (Narasimha, 1990).

Natural resumption of reproductive function in postpartum cows often occurs without signs of behavioral estrus preceding the initial rise in progesterone following parturition (Werth et al., 1991). Ovarian follicles destined to form corpus luteum (CL) with short-

ened life spans, which are common during natural resumption of estrous cycles, secreted or contained less estradiol than follicles that formed CL with typical life spans (**Garcia-Winder et al., 1987**). The absence of adequate LH release during the period of anestrus might be the main reason for the postpartum acyclic problem.

Early resumption of ovarian cyclicity postpartum is important to breed the cow and attain early pregnancy in the postpartum period (**Shrestha et al., 2004**). Treatments that induce resumption of estrous cycles in cows that are anestrus can potentially provide considerable economic benefits for cow-calf enterprises.

Once anterior pituitary LH stores have been replenished, several methods to initiate cyclicity and ovulation have been attempted. These methods include: complete, partial or temporary weaning, biostimulation to bulls or androgenized females, GnRH administration, administration of gonadotropins (Gn) as eCG, FSH or hCG and steroids (estrogens, anti-estrogens or progesterone).

Therefore, the aim of the present study was to apply double-Ovsynch protocol for early resumption of ovarian activity; ending with regaining cyclicity as early as possible.

In Holstein dairy cows.

MATERIAL AND METHODS

This study was carried out on summer season using 400 lactating Holstein-Friesian cows aged 3-7 years old, in a large dairy herd, NADEC Company for milk production, Hoffof, Saudi Arabia. The chosen animals were close-

ly observed before, during and after calving and they showed apparently good general health condition with same body condition score (BCS). They were free from any infectious and contagious diseases as proved by veterinary services authorities. These animals were received circular prophylactic treatment against internal and external parasites and also they were vaccinated against the endemic diseases by local veterinary authorities.

Four hundreds cows were selected randomly from the herd and were classified after parturition into two groups. Two hundreds cows were kept untreated as a control group. Two hundreds cows were undergone for double Ovsynch protocol using 100 µg/ ml Gonabred injection (Gonadorelin acetate, Parnell laboratories, Australia) and 250 µg/ ml Estroplan injection (Cloprostenol Sodium, Parnell laboratories, Australia) starting at 40-47 days after calving according to Souza et al. (2008). In brief, cows received GnRH at 40-47 days after calving, followed by an injection of PGF₂α 7 days later and GnRH 72 h after PGF₂α, then began the Ovsynch protocol 7 days later. The Ovsynch protocol: GnRH, PGF₂α 7 days later, GnRH 56 h after PGF₂α, and artificial insemination 16 to 20 h later. Double Ovsynch protocol was evaluated for its efficiency using days to first bred, days open and number of services per conception parameters.

The estrus was detected though ALBRO system via fixation of the transponder on the neck of the cow with special activity tag number. The signals were transmitted to computer system where the activity of the cow was measured. Increasing the activity more than

70% was confirmed by rectal examination. The insemination was applied artificially using imported frozen semen from International sire company (Alta Genetics Company, USA) using the recto-vaginal insemination technique.

Pregnancy was determined by ultrasonography (Agroscan, ECM Co., France) at 30-35 days post insemination and confirmed rectally on day 60 post insemination.

Statistical Analysis:

The data were expressed as means \pm SEM. The statistical significance of differences was analyzed using StatView version 5.0; Abacus Conceptus, Berkeley, CA, USA).

RESULTS & DISCUSSION

As shown in Table 1, the number of cows which did not exhibit estrus signs after the first injection of GnRH (day 0 of the program) was 178 (89.00%). After PGF₂ α injection on day 7, the number of cows which did not exhibit heat was further decreased from 178 to 130 (65.00%). The second dose of GnRH on day 10 could decrease the number of anestrus cows to 88 (44.00%). This number was decreased after injection of GnRH on day 17 from 88 to 70 (35.00%). Injection of PGF₂ α on day 24 further decreased the number of anestrus cows to 46 (23.00%). After the final injection of GnRH on day 26, the remaining number of cows for fixed time insemination was 44 (22.00%).

Days to first bred was evaluated in control and treated double Ovsynch groups. As shown in table 2, using double Ovsynch program significantly ($P < 0.0001$) decreased the

days to first bred from 68.34 ± 0.8 to 50.22 ± 0.4 days.

Double Ovsynch protocol was evaluated for its effect on average days open. As shown in table 2, using double Ovsynch program significantly ($P < 0.0001$) decreased the days open from 162.6 ± 1.3 to 124.26 ± 0.3 days.

Double Ovsynch protocol was evaluated for its effect on the number of services per conception. As shown in table 2, double Ovsynch program could decrease the number of services per conception significantly ($P < 0.0001$) from 5.39 ± 0.01 to 3.03 ± 0.01 .

Anestrus is one of the major causes of economic losses in both the beef and dairy industries. Its effects are greater than most dairy farmers realize. Not only does it lengthen the postpartum interval, but also it substantially reduces the farmer's financial returns due to overall reduced number of pregnancies (Mwaanga and Janowski, 2000). As a result, this study aimed to reduce the postpartum interval as well as improving the conception rate by using more complex double- Ovsynch protocol.

There are many trials aimed to improve the postpartum fertility using different synchronization strategies such as Ovsynch and Pre-synch-Ovsynch protocols (Moreira et al., 2001). In general, Ovsynch protocol has been a tremendous tool for improving conception rate in lactating dairy cows. However, Ovsynch has some limitations when used in cows that are either not cycling or in cows that are not at the ideal phase of the estrous cycle at the onset of the program. As a result,

It is necessary to find an alternative strategy to overcome these limitations.

In this study, double- Ovsynch treatment significantly improved the reproductive performance by increasing the conception rate and decreasing both days open and number of services per conception. These results come in agreement with those obtained by **Souze et al. (2008)** and **Ozturk et al. (2010)** who found a significant increase of the reproductive performance in double-Ovsynch group than control group. This improving effect of double- Ovsynch protocol might be attributed to its effect on anovular non cyclic cows. In contrast, Presynch-Ovsynch was not effective in anovular cows because only PGF₂α was used during the pre-synchronization protocol (**Moreira et al., 2001**).

In addition to its effect on anovular cows, it seems likely that double- Ovsynch more tightly synchronized the stage of the estrous cycle at initiation of Ovsynch compared to Presynch-Ovsynch (**Vasconcelos et al., 1999**). Cows on day 7 of the estrous cycle, the stage selected for initiation of the breeding Ovsynch, was found to be very likely to ovulate in response to the first GnRH of Ovsynch (**Vasconcelos et al., 1999**). Moreover, presence of CL on the day of PGF₂α during Ovsynch increased in probability of pregnancy (**Bello et al., 2006**).

In conclusion, double- Ovsynch protocol can be used as an efficient tool for improving the fertility in postpartum dairy cows and its beneficial role is probably attributed to its hormonal effect.

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الملخص العربى

الافيسينك المزدوج كاداه فعاله لتحسين الخصويه فى الابقار بعد الولاده

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أستهدفت هذه الدراسة دراسة تأثير الافيسينك المزدوج كأداة لتحسين خصوية ما بعد الولاده. تم إختيار 400 حيوان عشوائيا وتم تقسيمهم الى مجموعتين. المجموعة الأولى لم تستقبل أى علاج وتم استخدامها كمجموعة ضابطة. المجموعة الثانية وهى التى أستقبلت الافيسينك المزدوج عند اليوم 40-47 ما بعد الولاده. تم حقن هرمون الغدة المنسلية متبوعا بالبروستاجلاندين بعد 7 أيام ثم هرمون الغدة المنسلية بعد ثلاثة أيام. ثم البدء فى الافيسينك الثانى، حيث تم حقن هرمون الغدة المنسلية متبوعا بالبروستاجلاندين بعد 7 أيام ثم الحقنة الأخيرة من هرمون الغدة المنسلية بعد 56 ساعة وتلقيح الميرانات اصطناعيا بعد 20-16 ساعة. تم تقييم كفاءة برنامج الافيسينك المزدوج عن طريق تقييم الفترة حتى التلقيح وفترة الاحمل وعدد التلقيحات حتى الاخصاب. أظهرت هذه الدراسة أن الافيسينك المزدوج قام بتحسين الكفاءة التناسلية عن طريق تقليل الفترة حتى التلقيح وفترة الاحمل وعدد التلقيحات حتى الاخصاب. وهكذا، نستخلص من هذه الدراسة أن الافيسينك المزدوج يمكن أستخدامه كاداه فعالة لتحسين خصوية ما بعد الولاده ومن المحتمل أن دورها النافع يرجع الى تأثيرها الهرمونى.