

TREATMENT OF CLINICAL ANOESTRUS IN ARABIAN  
MARES BY A PROSTAGLANDIN F<sub>2</sub> α [7]ωΔΔ

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SUMMARY

A synthetic prostaglandin F<sub>2</sub> α (PGF<sub>2</sub> α) analogue, luprostiol\*, was used in treatment of clinically anoestrus Arabian mares that suffered from abnormal persisting luteal function. Thirty two anoestrus mares were selected for this study after careful examination of their breeding history and a thorough genital examination which included rectal palpation of the genital tract and ovaries. The genital examination also included a vaginoscopy of the vagina and cervix. These mares were diagnosed as clinically anoestrus during the spring and summer months breeding season and received a single intramuscular injection of the prostaglandin F<sub>2</sub> α. Twenty six mares (81%) responded to the treatment and came to oestrus within 2-4 days. Ovarian activity of the induced oestrus was monitored by rectal palpation and the mares were bred twice according to their follicular development. A total of 13 mares (54%) became pregnant as

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\* Luprostiol (prosolvlin): a synthetic prostaglandin F<sub>2</sub> α analogue, Intervet International B.V. Boxmeer-Holland. One ml of the solution contains 7.5mg luprostiol in propylene glycol.

a result of the treatment and pregnancies were confirmed later by rectal palpation.

This study reveals that the majority of non-cycling mares during the spring and summer months breeding season are in a prolonged luteal function rather than inactive ovaries or true anoestrus. The study also demonstrates the efficiency of luprostiol in the treatment of clinically anoestrus mares.

### INTRODUCTION

A persistent corpus luteum (CL) is the most common cause, other than pregnancy, of the clinical anoestrus in mares during the physiological breeding season (Allen and Rossdale, 1973; Allen *et al.*, 1974; Stabenfeldt *et al.*, 1974; Neely *et al.*, 1983). The average duration of the persistent luteal phase is approximately 60 days with a range of 35 to 90 days (Hughes *et al.*, 1975). Persistent corpus luteum occurs spontaneously in the nonbred mares during luteal phase or after an early embryonic loss in bred mares (Stabenfeldt *et al.*, 1974; Neely *et al.*, 1983). Prostaglandin F<sub>2</sub>  $\alpha$  (PGF<sub>2</sub>  $\alpha$ ) or its analogues are widely used in equine reproduction for different therapeutic purposes. They are used in cyclic mares during diestrus to shorten the interval between oestrus periods and ovulations (Allen *et al.*, 1974; Thompson & Witherspoon, 1974; Douglas & Ginther, 1975; Kenney *et al.*, 1975 A; Oxender *et al.*, 1975 A and B). They are also used to treat anoestrus mares during breeding season. These mares are usually suffering from a persistent C.L. which is formed either spontaneously or resulted after an early pregnancy loss (Allen & Rowson, 1973; Allen *et al.*, 1974; Stabenfeldt *et al.*, 1974; thompson & Witherspoon 1974; Witherspoon *et al.*, 1975; Cooper, 1976).

Allen and Rossdale (1973), and Kenney *et al.*, (1975A) have demonstrated the clinical value of exogenous  $\text{PGF}_2 \alpha$  in the treatment of clinically anoestrus thoroughbred and standardbred mares in which persistent luteal function prevented onset of oestrous. Allen *et al.*, (1974) have reported a conception rate of 40 to 46% after induction of oestrus by  $\text{PGF}_2 \alpha$  in clinically anoestrus mares. A slightly higher figure (55%) has been reported by Kenney *et al.*, (1975A). Finally, Kenney *et al.*, (1975B); and Burns *et al.*, (1979) have reported a normal to improved fertility rate of mares bred at the induced oestrus following  $\text{PGF}_2 \alpha$  treatment.

This paper presents the clinical value of the synthetic prostaglandin  $\text{F}_2 \alpha$  analogue, luprostiol, in the treatment of anoestrus Arabian mares during the breeding season by inducing oestrus and the resulted conception rate after service.

#### MATERIALS AND METHODS

Thirty two Arabian mares in this study were selected from various cases of infertility which were presented to the department of Theriogenology, College of Veterinary Medicine, University of Baghdad. These mares had reproductive problems during the spring and summer breeding seasons of 1985 and 1986. They were aged from 4 to 14 years and weighed 300 to 500 kgs. They were either kept in individual stalls or breeding farms and received different kinds of ration. Their selection for this study was based upon a good clinical breeding history which included previous fertility, exhibition of oestrus, teasing quality, gestation and parturition. Eight mares out of the 32 selected for this study were mated 30 days prior to the clinical evaluation and had not exhibited oestrus since then.

The mares received a thorough clinical genital examination which includes palpation of genital tract and ovaries, and all the findings were recorded. These include any genital abnormalities, uterine tonicity and follicular activity. The condition of cervix and vagina as to the stage of the cycle or non cyclicity or abnormalities were recorded using vaginoscopy. The mares selected for prostaglandin treatment were those which not suffer from any genital abnormalities according to the clinical examination and only suffered from abnormal persistent of luteal function. These mares were classified as clinically anoestrus since there were no apperant uterine pathological condition and were not pregnant. The mares were divided into two categories, mated or not mated (table 1).

The synthetic PGF<sub>2</sub>  $\alpha$  analogue, luprostiol, was supplied as clear sterile solution in propylene glycol at a concentration of 7.5 mg/ml (Prosolvin, Intervet.)

As soon as a non-cycling condition was diagnosed, the mare was given a single intramuscular injection of 7.5 mg of luprostiol (1ml, according to the supplier dose). The treated mares were teased daily with a stallion to detect signs of oestrus. Mares that showed signs of oestrus were examined daily by rectal palpation to determine the follicular development and ovulation. Unresponded mares had received another injection of the same compound ten days later. Responded mares after first or second injection were mated twice by stallion at the induced heat. These mares were presented for pregnancy diagnosis within 40-45 days after mating. The results of the prostaglandin treatment and subsequent pregnancy or genital condition were recorded.

## RESULTS

The clinical examination of the genital tract for the thirty two mares revealed that these mares were clinically anoestrus during their breeding season or after at least a month from their last breeding. All mares showed a tightly closed and relatively small uterine os. Palpation however, revealed that there were no palpable follicles on both ovaries of each mare. Furthermore, ovaries were slightly hard in consistency, regular in shape and within normal size of a non-cycling mare. The uteri were found easily palpable with strong to a moderated tonicity. Sometimes the cervixes were also palpable, tense and firmly closed. According to these findings, these mares were not pregnant and anoestrus.

The results of the treatment with the luproستيول were summarized in tables 1 and 2.

A positive response to luproستيول treatment was considered when oestrus behavior was exhibited within 2 to 4 days after treatment. This was judged by teasing and by rectal palpation of the ovaries. Oestrus induced by prostaglandin was consistently found to be normal, both

Table 1: The overall response of mares treated with single injection of 7.5mg luproستيول.

No. of mares treated	No. showed oestrus following treatment
32	26 (81.3%)

**Table 2: Categories of mares responded to treatment with 7.5 mg luprostiol.**

Category of mares	No. of mares	No. showed oestrus following treatment
Not mated <sup>a</sup>	24	20 (83.3%)
mated <sup>b</sup>	8	6 (75%)

- a) Barren and Maiden mares which were not cycling normally during the spring and summer months.
- b) Mares which did not return to oestrus after mating but were not pregnant when examined for pregnancy between 30 and 60 days after service.

in duration and in the expression of behavioral signs. The overall response of the 32 mares treated with luprostiol (table 1) was 81.3%. The responded mares came into oestrus and subsequently ovulated during the induced oestrus.

Among the responded mares, 24 were mated during the induced oestrus and subsequently tested for pregnancy. Thirteen mares (54%) were found to be pregnant to this service (Table 3). The other two mares were excluded from mating because they were sold.

The remaining 11 mares which did not conceive (Table3) during the induced oestrus showed different reproductive pattern. Three were conceived during a subsequent naturally occurring oestrus and eight remained barren.

**Table 3: The results of conception of mares mated at the induced oestrus with luprostiol.**

No. of mares mated during induced oestrus	Results of mating
24	13 (54%) conceived 11 (46%) non-conceived

Six mares failed to response to the initial treatment within 10days following the injection, hence received a second injection of the same product. These mares were also failed to respond to the second treatment and neither showed oestrus behavior nor following development.

#### DISCUSSION

The results of this clinical experiment demonstrates the effectiveness of the synthetic  $\text{PGF}_2 \alpha$  analogue, luprostiol, in the treatment of clinically anoestrus mares. It seems that the major cause of clinical anoestrus during the spring and summer months is a persistent luteal function because the majority of mares (81%) in our experiment responded to the prostaglandin treatment. Prostaglandin  $\text{F}_2 \alpha$  is known for its function as a luteolytic factor (Allen and Rowson, 1973). According to these results, the mares that responded to the treatment were suffering from prolonged activity of corpus luteum during spring and summer.

Allen and Rossdale, 1973; and Allen *et al.*, 1974, demonstrated in similar experiments that a persistent C.L. was the most common cause of clinical anoestrus in thoroughbred mares. The results of this study are similar

to earlier findings of Allen and Rowson, that synthetic PGF<sub>2</sub> α was highly luteolytic in mares that suffered from prolonged luteal function. The percentage of response (81%) of the treated mares in this study is similar to the results reported by Cooper (1976), in which 80% of PGF<sub>2</sub> α treated mares showed oestrus.

It seems that two mares in the category b, which failed to respond to treatment had an early resorption of their conceptuses (after day 45 of pregnancy). Therefore, it appears, that these two mares were probably affected by the presence of PMSG secreted by the endometrial cups (Allen and Rossdale, 1973). This observation is similar to the earlier experiments of Allen (1970), in which surgical removal of the entire concepts after 38 days of gestation from the mare's uterus resulted in protracted anoestrus. The mares remained anoestrus until endometrial cups had ceased to function and PMSG had disappeared from the serum. Four mares in category a, that failed to respond to the PGF<sub>2</sub> α treatment had not mated and therefore could not have pregnancy or contained any functional endometrial cups. These were probably in true anoestrus in which their ovaries were completely inactive and did not contain follicles or luteal tissue.

Stabenfeldt *et al.*, 1974, found that non-pregnant mares frequently and spontaneously went into periods for prolonged dioestrus. Our results indicated a similar observation and illustrated that during the breeding season, a very high proportion of mares in clinical anoestrus due to the prolongation of the luteal function rather than true anoestrus.

The conception rate of (54%) to breeding at the induced oestrus obtained in this study was comparable to the conception rate of 50 to 60 per cent attained in



naturally occurring oestrus (Kenney *et al.*, 1975 A). The remaining mares which did not conceive during the induced oestrus by luprostiol, subsequently returned to oestrus. Since conception rate in thoroughbred mares to service during a single oestrus is normally between 40 percent and 55 percent (Allen *et al.*, 1974; Kenney *et al.*, 1975 A), the result obtained in this study provided good evidence that the oestrus which follows treatment with luprostiol is of normal fertility.

Thus a single i/m injection of luprostiol appears to be effective luteolytic agent for the treatment of most clinical non-cycling mares, and would be recommended as clinical therapy for such condition.

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علاج انعدام العطف السريري في  
الافراس العربية بالبروستاكلاندين

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الخلاصة

تم استخدام الهرمون المصنع للبروستاكلاندين في علاج انعدام  
العطف السريري في الافراس العربية التي اظهرت عدم سوية وظيفة  
الجسم الاصفر الثابت (المتبقي) وقد اختيرت ٣٢ فرس لغرض العلاج.  
وقد تم التشخيص بعد دراسة تاريخ الحالة التناسلية  
والفحص السريري للجهاز التناسلي والمتضمن فحص السبيل التناسلي  
والمبايغ من خلال الجس عن طريق المستقيم وكذلك المهبل وعنق  
الرحم عن طريق المنظار المهبل.

بعد تشخيص حالات انعدام العطف في هذه الافراس خلال موسم  
الانسالي (الربيع والصيف)، تم العلاج بحقن جرعة واحدة من  
البروستاكلاندين، ان غالبية الافراس المعالجة (٨١%) قد استجابت  
للعلاج واثرت العطف خلال ٢-٤ ايام، الفاعلية الجريبية للمبايغ  
للافراس التي اظهرت العطف بعد العلاج وتم التعرف عليها عن طريق  
الجس المستقيمي. وبعد تسفيد الافراس المستجابة للعلاج مرتين تبين

ان نسبة الافراس الحوامل بعد التسفيد كانت (٥٤%). ان هذه  
الدراسة كشفت النقب من ان غالبية الافراس عديمة العطف خلال  
موسمي الربيع والصيف هي في حالة اطالة الوظيفة اللوتينية اكثر  
مما هي عديمة العطف نتيجة خمول المبايض الحقيقي. والدراسة هذه  
اوضحت كفاءة البروستاكلاندين F2 a في علاج الافراس العديمة العطف  
السريري.