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AN ATTEMPT FOR TREATMENT OF INFERTILITY IN MARES OF CROSS-BREED IN LYBIA

(With One Table)

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محاولة انخفاض الخصوبة في الأفراس الخليط في ليبيا

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أجريت الدراسة على عدد (٥٧٤) فرسة خليط من الخيول العربية والأجنبية عمرها ٣ - ٥ سنة تعاني من بعض مشاكل انخفاض الخصوبة، وزعت في ثلاث مجموعات معالجة : مجموعة تحت طبيعة (١٤ حالة)، تم لها تدليك المبايض والرحم فقط مجموعة تحت شبق (٤٠ حالة)، عولجت بحقن البروستاجلندين $F2\alpha$ مجموعة اللاشبق (٢٠ حالة)ن عولجت بحقن هرمون منبه الجريبات، البروستاجلندين $F2\alpha$ هرمون الاباضة. لوحظ في هذه المجموعة أن معدل التنبية الجنسي كان ١٠٠٪، ٧٢,٥٪، ٧٥٪ على التوالي معدل الحمل كان ٧٨,٥٧٪، ٧٥,٨٦٪، ٨٠٪ على التوالي، عدد التلقيحات اللازمة للحمل كانت $1,28 \pm 0,12$ ، $1,83 \pm 0,13$ و $1,56 \pm 0,18$ على التوالي. ولقد دلت الدراسة : أن الاهتمام برعاية الأفراس أثناء موسم التزاوج عاملا أساسيا لتحسن الخصوبة في الأفراس.

SUMMARY

A total number of 74 mares of Thoroughbred-Arabian cross breed, 3-5 years old, with problems of infertility, were clinically identified and classified into three groups. Following the only rectal massage for ovaries and uterus (subnormol group, 14 cases), administration of PGF2-Alpha (Subestrous group, 40 cases) and FSH, PGF2-Alphs and LH (Anestrous group, 20 cases). The rates of sexual response were 100, 72.50 and 75.00%, the rates of pregnancy were 78.57, 75.86 and 80.00% and the numbers of services per ocncption were 1.28 ± 0.12 , 1.83 ± 0.13 and 1.56 ± 0.18 for the three groups, respectively. The present study indicated that fertility of mares is mainly improved by care attention during the breeding season.

Key words: Mares-Cross-breed-Infertitity-Lybia

INTRODUCTION

It is of importance to notice that the reproductive efficiency of horses is mainly coupled with their management, nutrition and care (Van-Nickerk & Van-Heerden, 1972; Kenney, *et al.*, 1975; Baker & Kenney, 1986; Arhtur, *et al.*, 1989). It has been found that the overall reproductive efficiency of mares is low with an average live foal of 58% per annum (Roche, 1986). This lowered rate is closely prone to the seasonal pattern of mares, the 11-month gestation interval, the problems of breeding mares at the foal heat, the difficulties of deciding the optimum time of covering the mare during estrus and to fertility of the stallion (Ginther, 1974; Kenney, *et al.*, 1975; Roche, 1986; Clay, *et al.*, 1989). Thereby, high rate of infertility in horses might be anticipated. With the great attention of owners and sporting clubs in Lybia to horse breeding for the racing object, the present study aimed at elucidating some trials for treatment of infertility problems in mares.

MATERIAL and METHODS

The present study was conducted on a total number of 74 mares aged 3-5 years during the period from March to July, 1995. Mares were belonged to special owners at El-Zawia Centre, 40 km western to Tripoli. They possessed good feeding status, management and care by the owners. From the clinical point of view, as described by Arthur, *et al.* (1989), and from the owner's complaint, mares were identified and classified into three groups. The first subnormal group showed cyclically normal ovarian changes, corpus luteum or graffian follicles in the ovulation fossa, with history of regular estrous cycle and recurrent mating without conception. Mares in this group were allowed only a rectal massage for their ovaries and uterus. The second subestrous group revealed the presence of corpus luteum centrally located in the ovulation fossa with absence of the behavioral signs of estrus and history of foaling over two months. Two successive rectal examinations with 10 days intervals were given to identify nature of the corpus luteum, either periodical or persistent. After the second examination, each mare was injected i.m. by a single dose of 2ml PGF2-Alpha (500ug Cloprostenol, Coopers). The third anestrous group characterized by considerably inactive ovaries which were small in size, firm in texture and structureless in ovulation fossa, with absence of estrus. Mares were treated by i.m. injection of 5000 i.u. FSH (Folligon, Intervet, Holland) followed by 2ml PGF2-Alpha 5 days later and 3000 i.u. LH (Chorulon, Intervet, Holland) on the 2nd day

of estrus. All mares in the three groups were kept under continual observation for the onset of estrus and covered by known fertile stallions on the 3rd day then day-to-day till the end of estrus. Pregnancy was checked 60 days after last mating by the rectal examination. Data obtained were statistically analysed according to Spiegel (1972).

RESULTS

Regarding the history of breeding and results of the clinical examination, from the total number of 74 mares, there were 14 cases (18.92%) in subnormal, 40 cases (54.05%) in subestrous and 20 cases (27.03%) in anestrous conditions.

Following the treatment, the rate of sexual response-exhibited by the onset of heat- for the first subnormal group was 100%, whereas for the second subestrous group was 72.50% and for the third anestrous group was 75.00%.

The rate of pregnancy for the sexually responded mares was 78.57% in the subnormal, 75.86% in the subestrous and 80.00% in the anestrous groups.

The number of services required per conception appeared lowered in the subnormal group (1.28 ± 0.12) significantly ($P < 0.01$) than that in the subestrous group (1.83 ± 0.013) and nonsignificantly than that in the anestrous group (1.56 ± 0.18).

Table (1): Rate of sexual response and pregnancy and number of service per conception following treatment of subnormal, subestrous and anestrous mares.

Group	Total No.	Responded No.	Rate of Response (%)	Pregnant No.	Rate of Pregnancy	No. of S/C
Subnormal	14(18.92)	14(24.14)	100.00	11(24.44)	78.57	1.28bc± 0.12
Subestrous	40(54.05)	29(50.00)	72.50	22(48.89)	75.86	1.83a± 0.13
Anestrous	20(27.03)	15(25.86)	75.00	12(26.67)	80.00	1.56ac±0.18
Overall	74	58	78.38	48 (100)	82.76	1.63±0.09

Values between brackets are percentage from total

S/C : Service per conception.

Different letters within the same column are significant at $P < 0.05$.

DISCUSSION

The ovarian and uterine massage per rectum, allowed for mares of subnormal condition, was preceded by 100% onset of estrus, as indicated from the regularity of the estrous cycle. So, the rectal massage seems to have no contribution for heat stimulation in this condition. However, the ovarian and uterine palpation per rectum was helpful to decide the reproductive status of the animal involving the stage of the estrous cycle and expected dates of estrus, ovulation and service by which the owner should be advised to take his care. Thereby, when mares were covered by known fertile stallions at the expected times, 78.56% pregnancy rate was attained. This finding might confirm the importance of care and management to achieve maximum reproductive efficiency in mares (Kenney, *et al.*, 1975; Baker & Kenney, 1986 and Roche, 1986).

From the present results, 54.05% of the total number showed subestrus possibly due to the presence of either persistent or periodical corpus luteum. When PGF2-Alpha was injected, 72.50% of the subestrus mares displayed an external signs of estrus, a finding which appeared lower than 74% (Rieb, *et al.*, 1985) and 78.95% (Veselinovic, *et al.*, 1985). Herein the responded mares in the present study were anticipated to have a persistent corpus luteum in their ovaries synchronized mainly with suckling and lactation after foaling. However, there was 27.50% of PGF2-Alpha treated mares failed to exhibit signs of estrus. It has been suggested that the possibility of detecting a periodical corpus luteum and administration of PGF2-Alpha too early or too late of the luteal phase in insufficient dose by unsuitable route result in failure of response to PGF2-Alpha treatment (Hafez, 1980). In the mean time, 75.86% of the responded mares to PGF2-Alpha treatment became pregnant after increased number of service per conception, a finding which appeared between 70% (Rieb, *et al.*, 1985) and 86.67% (Veselinovic, *et al.*, 1985) in mares and much higher than 36.36% (Line, 1983) and 52.60% (Arriola & Duran, 1979) in cows. This difference was attributed to the good tolerance of mares to PGF2-Alpha treatment (Rieb, *et al.*, 1985).

The present study revealed 27.03% of the total mares to have deep anestrus. This finding may be due to effects of the individual tendency, the age, the physiological status during the preceding season and the body condition of the mare (Van-Nickerk & Van-Heerden, 1972; Palmer, *et al.*, 1982; Bour, *et al.*, 1985 and Thompson, *et al.*, 1987). On the treatment by FSH and PGF2-Alpha 5 days afterwards, the onset of heat displayed in

72.50% of total anestrous mares. This evidence might be attributed mainly to action of FSH as growth promoting factor to the ovarian follicles. It has been noticed that deep anestrus and early transition stimulations in mares need for exogenous FSH (Bour, *et al.*, 1985), and the level of FSH remains high for several days in blood following ovulation (Baker & Kenney, 1986). However, the role of PGF2-Alpha for the onset of heat in this condition is questionable due to absence of its luteolytic function. Otherwise, the hypothesis that sensitization of the ovarian receptors by PGF2-Alpha to action of FSH for the follicular growth and the consequent sexual response might be suggested. On the other hand, when LH was administered on the 3rd day of estrus, after FSH and PGF2-Alpha administration, a rate of 80% pregnancy was attained. This finding appeared nonsignificantly higher than a rate of 75-86% in the subestrous group and 70% (Rieb, *et al.*, 1985) but lower than that of 86.67% (Veselinovic, *et al.*, 1985) when PGF2-Alpha was only injected. In this respect, as the mare has naturally a high level of LH during the breeding season (Freedman, *et al.*, 1979; Silvia, *et al.*, 1986) and LH is the limiting factor for seasonal initiation of cyclicity in mares (Bour, *et al.*, 1985), the need for exogenous LH is not recommended, particularly if the pregnancy rate is not significantly improved as shown from the present results.

REFERENCES

- Arriola, J. & Duran, E.M. (1979) : Treatment of anestrus in dairy cattle with PGF2-Alpha and their subsequent fertility. *Veterinaria, Mexico*, 10(1); 1-12.
- Arthur, G.H.; Noakes, D.E. and Pearson, H. (1989) : *Veterinary reproduction and obstetrics*. 7th Ed., Bailliere Tindall, London.
- Baker, C.B. and Kenney, R.M. (1986) : Systematic approach to the diagnosis of the infertile or subfertile mares. In "Current therapy of theriogenology", Ed. by D.A. Morrow, W.A. Saunders Co., Philadelphia.
- Bour, B.; Palmer, E. and Driancourt, M.A. (1985) : Stimulation of ovarian activity in the pony mare during winter anestrus. In "Endocrine causes of seasonal and lactational anestrus in farm animals", Ed. by Elleucrj and Elsuem, Kluvin Acad., The Nederland, pp : 85-97.
- Clay, C.M.; Squires, E.I.; Amann, R.P. and Nett, T.M. (1989): Influence of season and artificial photoperiod on stallion : Pituitary and testicular response to exogenous GnRH. *J. Animal Sci.*, 67 : 763-770.

- Freedman, I.J.; Garcia, M.C. and Ginther, O.J. (1979):* Influence of photoperiod and ovaries as seasonal reproductive activity in the mare. *Biol. Reprod.*, 20 567-574.
- Ginther, O.J. (1974):* Occurrence of anestrus, estrus, diestrus and ovulation over a 12-month period in mares. *Am. J. Vet. Res.*, 35(9) : 1173-1179.
- Hafez, E.S.E. (1980):* Reproduction in farm animals. 4th Ed., Lea and Febiger, Philadelphia.
- Kenney, R.M., Ganjam, V.K. and Bergman, R.V. (1975):* Noninfectious breeding problems in mares. *Vet. Scope*, 14(1): 1-11.
- Line, C.S. (1983):* The study of PGF2-Alpha used in cows. I-Test of PGF2-Alpha used in long term infertile cows. *Taiwan J. Vet. Med. and Anim. Hubs.*, 41 : 37-43.
- Palmer, E.; Draincourt, M.A. and Ortavant, R. (1982):* Photoperiodic stimulation of the mare during winter anestrus. *J.Reprod. Fertil., Suppl.*, 32 : 275-282.
- Rieb, W.; Kullec, H.J.; Usky, K. and Beduhn, M. (1985):* Experience with the PGF2-Alpha analogue, Oestrophan, for treatment of anestrus in mares. *Monatshefte fur Vet.*, 40(22) : 763-765 (*Vet. Bull.*, 56,2,No. 2389).
- Roche, J.F. (1986):* Some factors affecting fertility of the mare. *Vert. Update*, Dublin, 1986, 1-6.
- Silvia, P.J.; Squires, E.I. and Nett, T.M. (1986):* Changes in the hypothalamic-hypophyseal axis of mares associated with seasonal reproductive recrudescence. *Biol. Reprod.*, 35 : 897.
- Spiegel. M.R. (1972):* Statistics, McGraw-Hill Publ., London.
- Thompson, D.L.; McNeill, D.R.; Wiest, J.J.; George, R.L.; Jones, L.S. and Garza, F. (1987):* Secretion of LH and FSH in intact and ovariectomized mares in Summer and Winter. *J. Animal Sci.*, 64 : 247-253.
- Van-Nickerk, C.H. and Van-Heerden, J.S. (1972):* Nutrition and ovarian activity of mares early in the breeding season. *J. Am. Vet. Med. Ass.*, 43(4); 351-361.
- Veselinovic, S.; Perkucin, R.; Miljkovic, V.; Mirvos, G.; Kovacevic, J.; Zivkovic, V. and Milohvic, Z. (1985):* Treatment of anestrus in mares using PGF2-Alpha (Equimate-ICI). *Veterinarski Glasnik*, 39 (4/5) : 455-459 (*Vet. Bull.*, 56,2,No. 10970).

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