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EFFECT OF PROSTAGLAND IN F₂α ON THE SEMEN PICTURE OF NAGTIVE BULLS

(With 2 Tables)

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تأثير هرمون البروستاجلاندين ف₂α على خواص
السائل المنوى لطلائق الأبقار البلدية
نشأت صالح

استخدم في اجراء هذا البحث عدد ٢ طلوقة بقرى بلدية يتراوح عمرها بين ٤ - ٦ سنوات. تم تجميع عدد ١٥ قذفة بفاصل ١٠ دقائق بين القذفة والأخرى على مرات من الطلوقة (أ) كضابطة قبل حقن هرمون البرستاجلاندين ف₂α . تم تجميع عدد ١٧ قذفة بفاصل ١٠ دقائق بين القذفة والأخرى على ٣ مرات من الطلوقة (ب) كضابطة قبل حقن هرمون البرستاجلاندين ف₂α . تم حقن الطلوقة (أ) بجرعة ٦٠ مجم بروستاجلاندين ف₂α (مرتين)، في المرة الأولى تم تجميع عدد ٨ قذفات بفاصل ١٠ دقائق بين القذفة والأخرى وذلك بعد مرور ساعة من الحقن، وفي المرة الثانية تم تجميع ٧ قذفات. تم حقن الطلوقة (ب) بجرعة ٣٠ مج بروستاجلاندين ف₂α (مرتين)، في المرة الأولى تم تجميع عدد ٥ قذفات بفاصل ١٠ دقائق بين القذفة والأخرى وذلك بعد مرور ساعة من الحقن، وفي المرة الثانية تم تجميع ٩ قذفات. أو النتائج للسائل المنوى الذى جمع بعد حقن ٦٠ مجم من البروستاجلاندين ف₂α عن زيادة معنوية جدا (١ %) في كلا من الحركة الفردية للحيوانات المنوية والنسبة المنوية غير الطبيعية وكذلك أظهر الطلوقة (أ) تحسن في الرغبة الجنسية مع زيادة في متوسط عدد الحيوانات المنوية بينما متوسط حجم القذفة، تركيز أيونات الهيدروجين والحركة الجماعية للحيوانات المنوية لم تتأثر بالحقن بينت الدراسة أن حقن الطلائق البلدية بجرعة ٣٠ مجم من البروستاجلاندين ف₂α نتج عنه زيادة معنوية (٥ %) في متوسط حجم القذفة وزيادة معنوية جدا (١ %) في النسبة المنوية للحيوانات المنوية غير الطبيعية، مع تحسن طفيف في الرغبة الجنسية وزيادة في الحركة الفردية للحيوانات المنوية بينما تركيز أيونات الهيدروجين، الحركة الجماعية للحيوانات المنوية لم تتأثر بالحقن.

SUMMARY

Two Native bulls 4- 6 years old were included in the present study. 15 ejacuates with a 10 minutes interval in between were collected in a period of three times from bull A as a control before injection of prostaglandin F₂α . 17 ejaculates with a 10 minutes interval in between were collected in a period of three times from bull B as a control. Bull A injected with 60mg PGF₂α for two times. 17

ejaculates with a 10 minutes interval in between were collected in a period of three times from bull B as a control. Bull A injected with 60 mg PGF₂α for two times, one hour after injection 8 ejaculated with a 10 minutes interval in between were collected in the first time and 7 ejaculates in the second time. Bull B injected with 30 mg PGF₂α for two times, one hour after injection 5 ejaculates with a 10 minutes interval in between were collected in the first time and 9 ejaculates in the second time. Semen collected after PGF₂α injection (60 mg) had a highly significant (P< 0.01) increase in both the percentage of spermatozoa with forward motility and total abnormalities. Bull A showed an improvement in libido, the mean sperm cell concentration tended to increase while the mean volume of ejaculate, PH and mass activity revealed no response. Injection of 30 mg PGF₂α in Native bulls resulted in a significant increase (P<0.05) in the mean volume of ejaculate and a highly significant (P<0.01) increase in the percentage of total abnormalities, the libido showed slight improvement and the percentage of spermatozoa with forward motility tended to increase while the PH, mass activity and sperm cell concentration exhibited no response to prostaglandin F₂α injection.

Keywords: Effect, Prostaglandin F₂α, semen, picture, native bulls.

INTRODUCTION

The known effects of PGF₂α on the female reproductive tract led a number of workers to investigate its influence on the male reproductive tract. HAFS *et al.* (1974) found that injection of PGF₂α around the testis and epididymis of the rabbit doubles the number of spermatozoa in the vas deferens when compared to controls. Administration of PGF₂α to rabbits tripled sperm output (REICHARD *et al.*, 1978). FARR and ELLIS (1980) suggested that PGF₂α in vitro increased the frequency and tone of contractility of rat seminiferous tubules which in vivo would

participate in sperm transport from the testes. The present study was done to study the effect of PGF₂α injection on the semen properties in Native bulls. HASHIZUME and NIWA (1984a) studied the effect of injection of PGF₂α upon semen properties of Holstein bulls and found no appreciable change in libido, volume, PH, viability of spermatozoa at collection and rate of acrosomal abnormality. The mean sperm concentration following injection of 30 mg PGF₂α tended to increase and the 60 mg increased it significantly (P<0.05).

HASHIZUME and NIWA (1984b) reported that PGF₂α injection in boars increased contractility of the

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body and tail portion of epididymal ducts which have relatively developed smooth muscle and it may be effective in a boar in which sperm number in the ejaculate is low. *HASHIZUME and NIWA (1984c)* concluded that in bulls the parenchyma and mediastinum of the testis showed no response to PGF₂α but the head, body and tail of the epididymis and the vas deferens contracted in response to PGF₂α. The height of contraction of the tail of the epididymis and the vas deferens had a tendency to be greater than that of the head and body of the epididymis. The present study was done to study the effect of PGF₂α injection on the semen properties in Native bulls.

MATERIAL AND METHODS

Two native cattle bulls aging from 4 to 6 years were included in the present study. During the period of experiment, bulls were kept under the same nutritional and managemental conditions. 15 ejaculates were collected in a period of three times (4, 6, and 5 in the first, second and third time respectively, with a 10 minutes interval in between at each time) from the first bull (bull A) as a control before injection of prostaglandin. Bull A was injected with 60 mg PGF₂α i.m (8 ml pro-

solvin*) for two times, one hour after injection 8 ejaculates were one collected with a 10 minutes interval in between in the first time and 7 ejaculates in the second time (total of 15 ejaculates were collected after injection of prostaglandin). 17 ejaculates were collected in a period of three times (5, 7, and 5 in the first, second and third time respectively, with a 10 minutes interval in between at each time) from the second bull (Bull B) as a control before injection of prostaglandin. Bull B was injected with 30mg PGF₂α i.m (4 ml pro-solvin) for two times, one hour after injection 5 ejaculates were collected with a 10 minutes interval in between in the first time and 9 ejaculates in the second time (total of 14 ejaculates were collected after injection of prostaglandin).

Semen samples were collected by means of an artificial vagina. A male teaser of suitable size was used. The routine gross and microscopical evaluation of each semen sample was done directly after collection according to *LAING (1979)*. Smears stained with alkaline methylene violet stain were used to study the sperm cell morphology, a total of 200 sperm were counted. By means of Neubauer haemocytometer sperm cell concentration was determined. Statistical analysis of the obtained data was carried out according to

*: Intervet International B.V. Holland.

SNEDECOR and COCHRAN (1967).

RUSLTS

The obtained uslts (Table 1) showed that semen collected after PGF₂α injection (60 mg) had highly significat ($P < 0.01$) increases in both the percentage of spermatozoa with motility and the total abnormalities, the bull showed an improvement in lipido (shorter reaction time), the mean sperm cell concentration tended to increase while, the mean volume of ejaculate, PH and mass activity revealed no response. the present study (Table 2) demonstrated that injection of 30 mg PGF₂α in Native bulls resulted in a significant increase in the mean volume of ejaculate ($P < 0.05$) and a highly significant increase ($P < 0.01$) in the percentage of total abnormalities, the libido showed slight improvement tended to increase while, the PH, mass activity and sperm cell concentration exhibited no response to prostaglandin injection.

DISCUSSION

In Native bull A (Table 1) injection of 60 mg PGF₂α increased the mean sperm cell concentrtrion. The increased number of spermatozoa tended to improve significantly ($P < 0.01$) the percentage of spermatozoa with forward motility. These obtained results are in agreement with those obtained by HAFS *et al.* (1974); REICHARD *et al.* (1978) and

HASHIZUME and NIWA (1984a) who reoprtd a significant ($P < 0.05$) increases in the mean sperm cell concentration of Holstein bulls following injection of 60 mg PGF₂α. The mean perecentage of totaal anomalies (Tables 1 and 2) tended to encrease significantly ($P < 0.01$) fter injection of 60 mg 30 mg PGF₂α in Native bulls which may be due to rapid movement of spermatozoa into the ductus deference of bulls (GOMES, 1977; FARR and ELLIS, 1980; HASHIZUM and NIWA, 1984c). Nativebulls injected with 60 mg and 30 mg PGF₂α (Table 1 and 2) exhibited an improvement in libido (shorter reaction time). These results coincide with those reported by BEARDEN and FUQUAY (1980) who demonstrated that injection of PGF₂α in bulls will cause a surge in LH and testosterone. The significant increase ($P < 0.05$) in the mean volume of ejaculate (Table 2) after injection of 30 mg PGF₂α in Native bull B may be due to testosterone effect on the accessory glands which increased as a results of prostaglandin injection (BEARDEN and FUQUAY, 1980).

In conclusion, injection of 60 mg PGF₂α in Native bulls tended to improve their libido, concentration of spermatozoa and the percentage of spermatozoa with forward motility but the only adwers effect is the abnormalities while injection of 30 mg resultsd in slight improvement in

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libido, improvement in the percentage of spermatozoa with forward motility and significant increase in ejaculate volume. The only side effect of injected 30 mg PGF₂α in Native bulls is highly increased percentage of total abnormalities.

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Table. 1: Bull " A " Mean (\pm S. E) semen properties before and after PGF₂ α injection (60 mg)

Criteria	Befor	After
Reaction time (seconds)	105 \pm 39.14	95.66 \pm 44.63
Volume (ml)	4.07 \pm 0.24	3.99 \pm 0.15
PH	6.51 \pm 0.007	6.59 \pm 0.048
Mass activity	3.4 \pm 0.16	3.26 \pm 0.18
Motility (%)	82.66 \pm 1.45	**92.66 \pm 0.66
Sperm cell Conc. (million / mm ³)	0.99 \pm 0.11	1.24 \pm 0.15
Total abnormalities (%)	24.33 \pm 1.53	**30.86 \pm 1.47

Before n= (15).

After n= (15)

** : Highly signifcant difference (P < 0.01).

Table. 1: Bull " B " Mean (\pm S. E) semen properties before and after PGF₂ α injection (60 mg)

Criteria	Befor	After
Reaction time (seconds)	65.29 \pm 24.69	59.64 \pm 20.05
Volume (ml)	3.01 \pm 0.22	*3.70 \pm 0.24
PH	6.58 \pm 0.032	6.60 \pm 0.046
Mass activity	3.17 \pm 0.21	2.29 \pm 0.22
Motility (%)	77.64 \pm 1.66	87.85 \pm 1.54
Sperm cell Conc. (million / mm ³)	1.29 \pm 0.13	1.29 \pm 0.24
Total abnormalities (%)	9.64 \pm 0.74	**30.35 \pm 2.16

Before n= (17).

After n= (17)

*:Significant difference (P < 0.05).

** : Highly signifcant difference (P < 0.01).