Dept. of Surgery and Theriogenology
Fac. Vet. Med., Alexandria University.
Head of Dept. Prof. Dr. M.Kassem.

FERTILITY OF THE SAANEN GOATS FOLLIWING INDUCTION OF ESTRUS USING PROSTAGLANDIN $F_{2\alpha}$

(With 2 Table)

By

G.A. EL-AMRAWI, F.M. HUSSEIN, and IMAN.E. EL-BAWAB

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الخصوبه فى الماعز السنن (Sannen goat) بعد احداث الشبق باستخدام البروستجلاندين (F2a)

جمال العمراوى ، فكرى حسين ، ايمان البواب

أجريت الدراسة على عدد ٦٠ ماعز سنن وذلك خلال موسم التكاثر وكانت دورة الشبق فيها طبيعيه وذلك لدراسة حدوث الشبق بعد استخدام البروستجلاندين وكذلك تأثير ذلك على القدره التناسليه لهذا النوع. حقنت الحيوانات بجرعه مقدارها ٨ مجم من البروستجلاندين وتم تكرارها بعد ١١ يوم من الحقنه الاولى. تم حساب معدل حدوث الشبق بعد الحقن وكذلك سجلت الفتره من الحقن وحتى ظهور الشبق. أستخدمت الجديان لاكتشاف علامات الشبق والماعز التى لديها استعداد للتكاثر. تم تشخيص الحمل فى الماعز عند ٥٠ يوم من الوثب وذلك باستخدام جهاز الموجات فوق الصوتيه. تم متابعة الماعز العشار لتقدير طول فترة الحمل وتسجيل نوع الولاده ووقت نزول المشيمه فى كل حيوان. أشارت النتائج التى تم الحصول عليها أن كل الماعز التى حقنت أظهرت علامات الشبق خلال ٤٨ ساعه بعد آخر حقنه من البروستجلاندين. كما كانت نسبة الحمل ٨٠ فى المائه. هذا وقد كانت الولاده طبيعيه فى كل الحيوانات. وبالنسبه لعدد الولادات فى كل الحيوانات كانت كالآتى: ٣ حيوانات أعطوا سخلا واحدا لكل، ١٨ حيوان أعطوا توأم لكل، ٩ حيوانات أعطوا ٣ سخل لكل واحد منهم. وقد أشارت النتائج إلى طول فترة الحمل (كانت ١٤٨ر٤ يوم). وأن نزول المشيمه كان خلال ١٨٠ دقيقه بعد الولاده. وبالنسبه للمجموعه الضابطه فإن نسبة حدوث الشبق والحمل ومعدل ولادة السخلان كانت أقل منها فى المجموعه التى عولجت. يمكن أن نستخلص أن استعمال البروستجلاندين أثناء موسم التكاثر كان مؤثرا فى تضبيط دورة الشبق وذلك بدون أى تأثير معاكس على التناسل فى الماعز.

SUMMARY

This study was carried out on 60 normal cycling Saanen goats to investigate the occurrence of estrus following treatment with PGF2 and subsequent fertility. The animls were assigned into two groups (30 each). The animals were injected with 8 mg of PGF2 and saline in treated and control groups respectively. The injection was repeated after 11 days later. The incidence of estrus and the time interval from the last injection to the appearance of estrus signs was reported. The bucks were used to help in the detection of the hidden estrus signs and for breeding the does. Pregnancy diagnosis was done at day 50 post breeding using ultrasonic scanning. The parturient does, type of birth, gestation length and time of placental drop were estimated. The results revealed that, all the treated does came to heat within 48 hours after the last injection with PGF2, 80% of them proved to be pregnant. All the pregnant does kidded normally. Three does gave single kid, 18 gave twin kids and the remainder (9) kidded triplet kids. The average gestation length in treated does was 148.4 days. The placenta was expelled within 180 minutes from expulsion of the last kid. Low percentage of estrus, pregnancy and kiddding does were observed in control animals. Finally, it could be suggested that the use of PFG2 during the breeding season was effective in estrus synchronization without any adverse effect on the fertility.

INTRODUCTION

Prostaglandin (PGF2) has been shown to induce luteolysis effectively in the cycling doe during the breeding season *(OGUNBIYI et al., 1980; OTT et al., 1980; BRETZLAFF et al., 1981; BRETZLAFF, 1983; SMITH, 1986; PARK et al., 1989 and ISHWAR & PANDEY, 1990). ISHWAR and PANDEY (1990)* added that endogenous PGF2 is thought to be the naturally occurring compound that is released by the uterus to induce estrus in the doe. An injection of PGF2 causes the corpus luteum of the cycling goat to regress and stop its production of progesterone. The does then come into estrus at an average of 50 hours after the injection of PGF2 *(OTT et al., 1980 and SMITH, 1986)*. PGF2 injection has been shown to be effective on any doe that is on days 4 to 17 of the estrous cycle *(SMITH, 1986)*.

When one injection of 8 mg $PGF2_{\alpha}$ was given to 37 cycling does, 78% (29 out of 37) were in estrus within an average of 50 hours later *(BOSU et al., 1978 and OTT et al., 1980).* They added also that when a second injection was given 11 days after the first one 97% (36 out of 37) were in estrus 50 hours after the second series of injections. In a more recently study by *MOSTAFA (1992),* he reported that out of 30 treated does 6 came in heat after 6 hours from last injection of $PGF2_{\alpha}$ while, 15 and 6 does showed signs of estrus after 36 and 48 hours from second injection respectively. The remainder goats exhibited estrus after 60 hours. The author added that 80% of the treated goats became pregnant after first service.

Short cycling, a normal phenomenon early in the breeding season, has been reported as a side effect after the use of $PGF2_{\alpha}$ for estrus induction and also in does which were aborted during the breeding season with $PGF2_{\alpha}$ (Bretzlaff, 1983). They also added that, the significance of short cycles was that insemination of does at an estrus that followed a short cycle usually unsuccessful. At this point they could not predict which estrus periods would be fertile.

The aim of the present investigation was to study the incidence of occurrence of estrus following treatment with $PGF2_{\alpha}$ and the subsequent fertility in saanen goats.

MATERIAL and METHODS

This study was carried out on 60 clinically normal female dairy goats (Saanen breed) belonging to a private farm close to Alexandria province.

The farm was under restrict vaccination program for infectious diseases. The herd was also free from the external and internal parasites.

The average age of the goats was 3 years and the average weight was 50 Kg.

The goats were kept in corrals during day and night all over the year. The daily ration consisted of: 6 Kg Barseem (Trifolium alexandrinum) during the green season, or 2.5 Kg of hay during the dry season for each goat. In addition, 600-1200 gm concentrates (in the form of pellets containing 14% protein) were also offered daily to each animal all over the year. Besides, water and salt (lick blocks) are freely available.

The goats were milked twice daily at 5 O'clock in the morning and in the afternoon.

Breeding of the animals depended on natural service by fertile bucks.

The experiment was conducted in December during the breeding season (all goats were cycling normal). The animals

were assigned into 2 equal groups. The first group was teated with PGF2α the second group served as a control. The treated does were injected with 8 mg of PGF2α (Lutalyse Upjohn Co.) per each does. The injections were repeated after 11 days. The control goats received 1 ml of saline at the same period. The dose were observed for external signs of estrus (vulval swelling, relaxation of the vulval orifice, raised tail and mucus discharge) and the time interval from injection to appearance of estrus signs were recorded. The goats which exhibited estrus were mated by the fertile bucks.

The ultrasonography was used to diagnose the pregnancy at day 50 post breeding. The conception rates, the kidding rated, type of birth, the gestation length, and the time of placental drop were recorded in both groups.

Statistical analysis was carried out with SPSS.X program in a VAX 750 computer (SPSS, Inc. 1983).

RESULTS

The results in the treated group revealed that 2/30 does (6.7%) came to heat after 20 hours from last injection of PGF2α (table 1). While 6 (20%) and 17 (56.7%) showed signd of estrus after 24 and 36 hours from the second injection respectively. The last five goats (16.6%) exhibited cyclicity after 48 hours. However in the control group the results were 2 (6.7%) out of 30 goats that came to heat after 6 hours from injection with saline. One doe (3.3%) was in estrus after 24 hours from injection with saline while, 3 (10%) showed estrus after 36 hours from the injection.

The external signs of estrus were observed in control goats while, 2 goats in the treated group came to heat but without any external signs of estrus but they were detected by the buck. The treated goats came to heat after 24 and 36 hours did not show mucus discharge but showed the other external signs. The 5 goats which came to heat after 48 hours showed all the external signs of estrus.

All the treated does exhibited cyclicity within 48 hours after the last injection. Twenty four (80%) became pregnant when checked at day 50 post service. All pregnant does kidded normally. Three of them gave single kids and the same number gave triplet-kids. the remainder does (18) delivered twin-kids. In control animals 6 out of 30 (20%) became in estrus after 48 hours from last injection with saline. Four of them proved pregnant at day 50 post breeding. The pregnant does kidded normally. Two gave single kid, and 2 gave twin kids. The difference between the groups was statically significant at $p<0.05$ (table 2).

The average gestation length was 148.4 ± 3.5 and 147.6 ±3.1 days in the terated and control group respectively. The afterbirth dropped after 180 and 200 minutes from the expulsion of the last kid in the treated and control animals respectively (table 2). The differences between the two parameters in treated and control groups were non significant.

DISCUSSION

In the cycling does, the ovaries usually carry mature corpora lutea (CL) about 5 days from the onset of heat. Injection of $PGF2_{\alpha}$lead to lysis of the CL and induces a new estrus. Because of the seasonal nature of goat reproduction, the use of prostaglandin for induction of estrus is restricted to the breeding season *(BRETZLAFF, 1983)*. In the present work 2(7%) out of 30 does came to heat after 20 hours from the last injection of $PGF2_{\alpha}$, 6(20%) showed signs of estrus aftr 24 hrs. from the second injection. The majority of goats 17 (56.7%) were observed in heat after 36 hours from the last injection. The other goats 5 (16.6%) exhibited cyclity after 48 hours. Thus 100% of the treated does came in heat within 48 hours from the last injecyion. These results agreed greatly with the results obtained by *BRETZLAFF and OTT (1982)*, who reported that 100% of goats to be in estrus within 36-72 hours from the last injection. Lower percentage (72%) was obtained through the same period by *OTT* et al. *(1980)*. They attributed the low percentage of estrus after treatment not to the drug but may be to the managemental consideration (parasitic, nutrition and subfertile animals). On the other hand, 6 out of 30 (20%) showed signs of estrus after injection with saline. The external signa of estrus were observed in all cycling control goats while, only 2 goats in the treated group came to heat but without any external signs of estrus and detected by the buck. The treated goats came to heat after 24 and 36 hours did not show mucus discharge but showed the other external signs. The 5 goats came to heat after 48 hours showed all the external signs of estrus. *PERERA* et al. *(1978)* reported that 5 goats out of 6 treated with $PGF2_{\alpha}$came in heat between 18 and 23 hours without external signs of estrus, the buck showed interest in the 5 does with frequent sniffing of vulval region, exhibiting Flehman and ended by service. The reaction does responding to the $PGF2_{\alpha}$came to heat within 36 hours accompanied with silent ovulation so that the presence of the buck and proper estrus detection must be done *(BRETZLAFF, 1983)*. In the present work the doe shows first signs of heat within 2 days after the last injection of $PGF2_{\alpha}$and therfor, responds differently to cattle and buffalo. This was unexpected since all 3 species have estrus cycle of

approximately the same duration. The conception rate in the treated does was 80% while in control animals the percent was 13%. *SMITH (1986)* observed that in the treated goats the pregnancy rate was 76.5% while in the control group was 82%. *MOORE and EPPLESTON (1979)* reported that injection OF $PGF_{2\alpha}$ induced estrus in the treated goats but not all succeed to be pregnant. The conception rates at $PGF_{2\alpha}$ induced estrus has varied from 49 to 90% *(BREZTALFF, 1983). PARK* et al. *(1989)* and *MOUSTAFA (1992)* reported more than 80% conception rate between the treated animals with $PGF_{2\alpha}$.

In the present study the incidence of twin kids was high. *NAIR and RAJA (1973)* cited that the goat usually is biparous animal and it is only natural that the ova/embryo losses was higher when more than two are shed at a time.

In the present work the treatment with PGF_2 had no significant effect on the gestation length, the parturition and the placental drop. *MOORE and EPPLESTON (1979) and MOUSTAFA (1992)* reported that the use of $PFG_{2\alpha}$ has no effect on the gestation length, the parturition and the placental drop.

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Table 1. The time of onset and external signs of estrus in does treated with double doses $PGF_{2\alpha}$.

Time interval (hours)	Animals: Treated (n=30) estrus does		signs of heat				Control (n=30) estrus does		signs of heat			
	No	%	VS	RVO	RT	MD	No	%	VS	RVO	RT	MD
6	-	-	-	-	-	-	2	6.7	+	+	+	+
20	2	6.7	-	-	-	-	-	-	-	-	-	-
24	6	20	+	+	+	-	1	3.3	+	+	+	+
36	17	56.6	+	+	+	-	3	10	+	+	+	+
48	5	16.7	+	+	+	+	-	-	-	-	-	-

VS= Vulval swelling
RVO= Relaxation of vulval orifice
RT= Raised tail
MD= Mucus discharge

Table 2. The effect of $PGF_{2\alpha}$ on the incidence of estrus, conception rate, kidding rate, type of birth, gestation length and time of placental drop during the breeding season in Saanen goats.

Treatment	doe in estrus		preg. doe		kid. doe		type of birth S		T		Tr.		G.L. days	Par.	P.d. (min)
	No.	%	No	%	No	%	No	%	No	%	No	%			
$PGF_{2\alpha}$ double doses (n=30)	30	100	24*	80	24	100	3	10	18	60	3	10	148.4	Nor	180
Saline (n=30)	06	20	04	13	04	13	2	07	02	07	-	-	147.6	Nor	200

*Significant than control ($P<0.05$).
Preg.= pregnant Kid.= kidding S.= single T.= twins Tr.= triple
G.L.= gestation length Par.= parturition P.d.= placental drop.