THE INDUCTION OF TWINNING BIRTH IN FATTY TAIL EWES BY USING LOW DOSE OF PMSG

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Abstract

The aims of the research were to know the effect of low dose of PMSG for inducing twinning birth in Fatty Tail ewes. Thirty ewes were divided into two groups, each ewe of the first group (control, n=15) was given 5 mg PGF2α by intramuscular injection. Another 15 ewes in the second group were given combination of 100 IU PMSG and 5 mg PGF2α intramuscular each. The results showed that 100 % of ewes in second group revealed estrus in 33.95 ± 9.45 hours after injection and had 2-3 lambs twinning pregnancies. The ewes in the first group showed that only 80% revealed estrus in 36.51 ± 10.25 hours after injection and 83.35% of those had 1 – 2 lambs twinning pregnancies.

Key words: Fatty tail sheep, PMSG, $PGF_{2\alpha}$, Estrous, Lamb

INTRODUCTION

East Java is one of the province in Java island in Indonesia. Mostly the farmer in East Java raise Fat Tail Sheep. The development of the sheep is still slow. Data shows that population increase only 0.56% per year, and it is still far from the target of 2% per year [1]. The slow development is due to the system of rearing the sheep which is mostly subcistence farming.

In order to increase the sheep population, one of the effort is to administer the use of hormon to enchance reproduction efficiency through tight breed selection, estrous syncronization, superovulation, artificial insemination (AI) and to improve rearing management. Hormon treatment is still expencive for subsistence farmer, therefore the efficiency is difficult to achieve. This problem motivates the researchers to find an alternative by using low dose of hormon. One of common used hormon is PMSG (Pregnant Mare Serum Gonadotrophin) which its function is to induce on set of estrous, speed estrous cycle, pregnancy and stimulate twinning birth [2].

The objective of the research is to know the capability of combination between low dose of PMSG (100 IU) and PGF2α in term to induce on set of estrous, speed onset of estrous, pregnancy and twin lambing in Fat Tail sheep.

MATERIAL AND METHOD

This research used thirty head of Fat Tail non pregnant ewes and divided into two groups and four adult ram as semen resources. Data was analyzed by Completely Random Design with two groups of treatments. Group I consisted of 15 ewes as control and was injected by 5 mg $PGF_{2\alpha}$ intra muscular. Group II consisted of 15 ewes and was injected by combination of 100 IU PMSG followed by 5 mg $PGF_{2\alpha}$ intra muscular.

In case of ewes in both groups showed estrous sign, and then inseminated artificially using fresh semen which has been diluted 10 times by egg yolk citrate. The semen was collected by artificial vagina from four ram.

Observation of estrous is done since the first injection of both treatments. After 2 – 3 month the ewes inseminated, pregnancy detection is done by abdominal palpation. Then the number of lamb was counted after birth. Data on speed to reach estrous and the

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number of lamb yielded from birth, were collected and analyzed by T test [10]. Data on the number of ewes reach to estrous and the number of pregnant ewes were analyzed by Ecsac Fisher [4].

RESULTS AND DISCUSSIONS

Increasing livestock population needs do be accompanied by control of breeding. Controlled breeding of sheep involves artificial control of estrous and ovulation with exogenous hormone treatments [3]. This research also deals with administering exogenous hormone to induce estrous and pregnancy.

Gonadotrophins such as PMSG administration have been shown to stimulate follicular growth and increases ovulation rate and fertility and induce a tighter synchrony of ovulation in both anestrous and cycling sheep [1]. Prostaglandin F2α is the luteolytic factor in ewes, as in other ruminants and the use of prostaglandin F2α or one of its analogs causes luteolysis in sheep having a functional corpus luteum at the time of treatment [1]. After treatment by using hormones, the result on the number of ewes getting estrous and pregnant is showed in Table 1.

Table 1 shows from 15 ewes which were syncronized by 5 mg $PGF_{2\alpha}$ intramuscularly, only 12 ewes came into estrous or about 80%. Whereas injection of combination of PMSG and $PGF_{2\alpha}$ yielded all the ewes come into estrous (100%).

Table 1 The number of ewes getting estrous and pregnant after injected by PGF2α and combination of PMSG dan $PGF_{2\alpha}$.

Treatment	N	Estrous		Not estrous	n	Pregnant		Not pregnant
		Σ	%			Σ	%	
$PGF_{2\alpha}$	15	12^a	80^a	3	12	10^a	$83,33^a$	2
PMSG & $PGF_{2\alpha}$	15	15^a	100^a	0	12	12^a	100^a	0

The same superscrip within the same coulomb show no significant difference (P>0.05)

Table 1 also shows that injection of 5 mg $PGF_{2\alpha}$ intramuscularly lead to 83.33 % ewes get pregnant or ten out of 12 ewes which were inseminated. Whereas injection of combination of PMSG and $PGF_{2\alpha}$ yielded all the ewes come into pregnant (100%). Table 2 shows the number of lambs delivered from both groups.

Research result shows the number of ewes come into estrous and the number of ewes getting ptregnant is no significant different (P>0.05) between control group and treatment group (Table 1). As well as the number of lambs delivered shows no significant different (P>0.05) between control group and treatment group (Table 2). Whereas the speed to reach estrous shows a significant different between control group and treatment group (P>0.05) as showed in Table 3.

Table 2. Number of lambs delivered by both group of treatment, injected by $PGF_{2\alpha}$ and combination of PMSG and $PGF_{2\alpha}$.

Ewe	$PGF_{2\alpha}$ (head)	PMSG dan $PGF_{2\alpha}$. (head)
1.	2	2
2.	1	2
3.	2	3
4.	1	3
5.	2	2
6.	2	3
7.	2	2
8.	3	2
9.	1	2
10.	2	2
Σ	18	23
X	1.8 ± 0.63^a	2.3 ± 0.48^a

The same superscrip within the same row shows no significant difference (P>0.05)

Table 3 Speed to reach estrous of Fat Tail ewes after injection of $PGF_{2\alpha}$ and combination of PMSG and $PGF_{2\alpha}$.

Ewe.	$PGF_{2\alpha}$ (hour)	PMSG dan $PGF_{2\alpha}$. (hour)
1.	32.50	25.25
2.	25.25	25.25
3.	46.92	42.67
4.	25.25	25.25
5.	32.50	25.25
6.	46.92	42.67
7.	25.25	25.25
8.	48.50	46.92
9.	34.30	31.20
10.	25.25	25.25
11.	46.92	25.25
12.	48.50	46.92
Σ	438.06	407.38
X	36.51 ± 10.255^{a}	33.95 ± 9.49^{b}

Different superscrip in the same row shows significant difference (P>0.05)

Former research indicated that PMSG administration had an important effect on the formation of compact estrous and ovulation [6].

Sign of estrous arrises as a consecuently of luteolitic activity by $PGF_{2\alpha}$ on corpus luteum. After injection $PGF_{2\alpha}$ will flow into *media uterine vein* through vein wall and *arteri ovarica* which are lacated side by side (counter current mechanism) directed to ovary in order to make corpus luteum lysis and lead to decrease progesteron production [5].

The decrease of progesteron stimulates hypothalamus to release FSH-RH followed by LH-RH. By FSH-RH influenced, anterior hypophisa produces FSH. FSH will stimulate follicle to develope become follicle de Graaf. Theca cells and granulouse cells from follicle de Graaf produce estrogen which is responsible to estrous activity [2]. The high level of estrogen in the blood circulation is responsible to create estrous. The high level of estrogen in blood circulation will inhibit FSH as well as to stimulate LH releases from anterior hypophisa.

Under LH influnced, the rape follicle de Graaf will ovulate oocyte. Those activity will also happen by injected PMSG which has the same function as FSH and a little bit LH in luteal phase or on day 12-13 within estrous cycle. Therefore injection to syncronize estrous and superovulate usually be given on day 12-13 in estrous cycle.

Kanagawa 1988, [7] used combination of PMSG and $PGF_{2\alpha}$ in the middle of estrous cycle which resulted good estrous and ovulation. In line with Kanagawa research, the combination doses of 100 IU PMSG and 5 mg $PGF_{2\alpha}$ which is given at the same time, is capable to improve the estrous activity in Fat Tail sheep. On the other hand, Sukra, 1985 [11] stated that to create superovulation in sheep, the optimal dose of PMSG is 500 IU. Administering higher dose i.e. 1000 IU will lead to decrease ovulation and mostly cause corpus luteum percistent.

Pregnancy detection in the sheep is done by abdominal palpation after two month inseminated. The result on pregnancy can be seen in Table 1. Pregnancy periode is started from fertilisation since oocyte is fertilized by sperm, until birth. Factors influencing the succsess of fertilisation after insemination until pregnancy are the accurate estrous detection, semen quality, the time of insemination and deposite location of semen [11].

Insemination is done within 12-18 hour after the sheep showed estrous behaviour. Sperm dose to inseminate is 50-150 million of cells and deposited in uterine cervix. Normally a ewe is able to deliver 1-4 lambs. Injecting a dose of 100 IU PMSG to the ewes in this research, capable to induce birth of 2-3 lambs and in average of 2.3 (Table 2). Therefore, with low dose of 100 IU. PMSG is said capable to induce ovulation. The number of lambs delivered are mostly depend on dam nutrition during pregnancy and genetic [5].

Neo natal lambs are depend on dam nutrition during pregnancy as well as genetic factor. Improving quality and composition of nutrition to be fed to the ewe in two-three weeks before mating will increase oocyte ovulated as well as applying technology of superovulation. But although technology of superovulation can increase the number of oocytes ovulated, it seems there is a limited capability for the dam to maintain pregnancy and deliver the lambs, depend on the genetic as well.

CONCLUSIONS

1. Administering combination of 100 IU PMSG and 5 mg $PGF_{2\alpha}$ intra muscular on Fatty Tail ewes results 100 % reveal to estrus in 33.95±9.45 hours after injection. Compare to a single dose $PGF_{2\alpha}$ results 80 % reveal to estrous in 36.51±10.255 hours after injection

2. Administering combination of 100 IU PMSG and 5 mg $PGF_{2\alpha}$ intra muscular on Fatty Tail ewes results 100 % pregnancy with 2 – 3 lamb birth. Compare to a single dose $PGF_{2\alpha}$ results 83.33 % pregnancy with only 1-2 lambs birth.

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