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Determination of the Dose of Medroxy Progesterone Acetate in Intramuscular Combined with Estrogen for Estrus Induction of the Fat Tailed Sheep

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ABSTRACT

The purpose of this study are to determine the optimum dose of the use of Medroxy Progesterone Acetate (MPA) combined with estrogen by intramuscular (IM) on Fat Tailed Sheep and to determine the use of MPA combined with estrogen IM in Fat Tailed Sheep can lead to estrus. It takes as many as 20 Fat Tailed Sheep females who have confirmed once lambing and more than one year of age, who were randomly divided into four groups with each treatment get five replications. After administration of MPA and when estrus as much as 5 cc of blood drawn for examination levels of progesterone and estrogen blood serum with RIA method.The results achieved from this research on Fat Tailed Sheep is that the injection PGf2α 20 mg in the control and injection of MPA 100 mg + 10 mg estradiol benzoas (P1), 75 mg + 10 mg estradiol benzoas (P2) as well as 50 mg + 10 mg estradiol benzoas (P3) is effective for estrus induction in Fat Tailed Sheep. Time onset of estrus symptoms occurred one day after the administration of estradiol benzoas. There is a tendency MPA dose of 75 mg + 10 mg estradiol benzoas is the most effective dose to induce estrus in Fat Tailed Sheep.
KEYWORDS: MPA, estrogen, estrus, Fat Tailed Sheep

INTRODUCTION

In addition to the low population, livestock production in Indonesia especially sheep which is often a problem is reproductive disorders and factor livestock management (1), such as frequent occurrence of mating repeatedly followed by waiting estrus 18 the next day, the incidence of silent estrus and infection after birth, and pregnancy and birth rate sare low. Likewise, artificial insemination is only done when there is a natural desire alone. Technology estrus induction and synchronization of estrus has not been done optimally. In order to improve reproductive efficiency and an increase in population, it is necessary treatment of reproductive disorders, bullying estrus efforts combined with artificial insemination. Hormonal preparations, especially the use of progesterone for the purpose of reproduction repairs done on the field one of which is for the induction of estrus.

Estrus induction techniques or snapping estrus and estrus synchronization when carried out simultaneously in the livestock population in an effort to obtain estrus using PGF2α and progesterone hormone (2) and (3). Currently on the market progesterone preparations are progesterone release intravaginal device (PRID), control internal drug release (CIDR) and implant synchromate B (4).

The use of hormone progesterone group by pasting into the sponge conducted intra vaginal for 10-14 days in sheep and goats produce a low conception rates when mated to the appearance of the first estrus, when done in the next estrus period will get a high conception rates (5). It is necessary for research on the induction of estrus using injections of progesterone combined with estrogen by intramuscular combined in sheep, as a substitute for imported progesterone hormone drugs such as PIRD, CIDR and Syncromate B (which in addition to the price is expensive and rare in Indonesia).

MATERIALS AND METHODS

This research was carried out for 4 months and is located at the Faculty of Veterinary Medicine, Airlangga University as well as the livestock group "Lembu Rejeki" at Kepuhkembeng Village, Peterongan District of

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Jombang, East Java. Furthermore, it takes as many as 20 Fat Tailed Sheep females who have confirmed once lambing and more than1year of age, who were randomly divided into four groups with each treatment get five replications. Before administering estrogen and when estrusas much as 5 cc of blood drawn for examination levels of progesterone/estrogen blood serum with RIA method.

The division of the research group as follows PO (control): sheep given PGf2α injection 20 mg (day of 1); P1: sheep given MPA 100 mg (day of 1) +10 mg estradiol benzoas (day of 12); P2: sheep given MPA 75 mg (day of 1) + 10 mg estradiol benzoas (day of 12); P3: sheep given MPA 50 mg (day of 1) + 10 mg estradiol benzoas (day of 12).

The study design used was completely randomized design and data analysis was performed using quantitative and qualitative analysis proportionally. Some kinds of data analysis used is Analysis of Variance (ANOVA) and the Test Honestly Significant Difference (HSD) (6).

RESULTS AND DISCUSSION

In the estrus cycle in two phases, the follicular and luteal phases are very different hormonal. Luteal phase requires a longer time than the follicular phase. At the controls, prostaglandin F2α (PGF-2α) is luteolitik whose role is to regressing corpus luteum (CL). This resulted in the inhibition conducted progesterone produced by CL to gonadotropins be lost. Its effects are going on the growth and maturation of follicles in the ovaries. According to (7) suggests that the effects of PGF-2α will lower progesterone levels, and will provide a rebound effect on the release of gonadotropin hormone (FSH = follicle stimulating hormone and LH = luteinizing hormone), which is then followed by maturation of follicles causing estrus and subsequent ovulation. This is in line with the opinion of Mahaputra (8) which states that the follicles grow heighten levels of estrogen in the blood, uterine prostaglandins produced in the absence of fertilization. Furthermore, prostaglandins will cause regression of the corpus luteum and progesterone production decline sharply and estrogen dominant for reproduction will lead to estrus.

The principle of the use of progesterone of this method is to inhibit the secretion of FSH and LH from the anterior pituitary thereby inhibiting de Graaf follicle maturation and ovulation ovum. Progesterone administration would alter ovarian function and in a dose sufficient to inhibit ovulation. The hormone progesterone is a barrier against the release of gonadotrophin hormones which cause the animals to remain in a state of anestrus because it does not happen follicle growth (7).

Estrogen hormone injections typically used on livestock who experienced ovarian hypofunction. Ovalumon is a estrogen commercial product marketed by packing 30 ml containing 600,000 IU of ethinyl estradiol. Only estrogen hormone injections can cause symptoms invisibility of estrus but will not cause occurrenceovulation (9). Furthermore, the use of estrogen is expected to be regressing dominant follicle so that it appears the dominant follicle from the next wave that produces good quality oocytes to improve fertility (10).

Table 1. Levels of progesterone blood of Fat Tailed Sheep after administration of MPA

Treatment Group	Progesterone Levels (ng/ml)
P0 (PGF2α 7 mg IM)	2,16 ± 0,182
P1 (100 mg MPA + 10 mg estradiol benzoas)	2,58 ± 0,217
P2 (75 mg MPA + 10 mg estradiol benzoas)	2,44 ± 0,472
P3 (50 mg MPA + 10 mg estradiol benzoas)	2,36 ± 0,518

Based on test results statistically using Analysis of Variance, in this study shows results that are not significantly different from the results of the progesterone levels. This means that the most even small doses (50 mg progesterone) can still give the same results with a control (PGF2α) or at least a large dose (100 mg progesterone). Based on the results in table1shows the progesterone levels are still high. It is indeed logical because the absorption of progesterone in the treatment of P1, P2 and P3 or P0 as a result of intra-muscular injections of various doses of progesterone in P1, P2 and P3 and P0 as PGF2α. Furthermore, to determine the condition of estrus in Fat Tailed Sheep based on blood test results as shown in table 2 below.

Table2. Levels of estrogen blood of Fat Tailed Sheep after administration of MPA + estradiolbenzoas

Treatment Group	Estrogen Levels (pg/ml)
P0 (PGF2α 7 mg)	$101^{ab} \pm 16{,}733$
P1 (100 mg MPA + 10 mg estradiol benzoas)	$70^{ab} \pm 53{,}735$
P2 (75 mg MPA + 10 mg estradiol benzoas)	$144^{b} \pm 84{,}661$
P3 (50 mg MPA + 10 mg estradiol benzoas)	$20^{a} \pm 11{,}180$

Description: different superscripts in the same column indicate significant differences ($p < 0.05$)

Based on test results statistically using Analysis of Variance, on examination estrogen levels, showed significantly different results between P2 to P3. However, P2 not significantly different from P0 and P1, P3 likewise not significantly different from P0 and P1.

While based on visual observation that at Fat Tailed Sheep generally experiencing estrus all in one day after the administration of estradiol benzoas, namely P1 and P3 each are experiencing estrus 4 of 5 head samples whereas all 5 head sample of P2 experienced estrus. Furthermore, the control of all the estrus retreated one day of treatment using the MPA + estradiol benzoas. This is in line with the examination of blood estrogen levels found in treatment P1 and P3 each sample that one of sample contains no estrogen 0 pg / ml.

Figure 1.The detection of estrus through the ram

Figure 2. The ram shows of "Flehmen" response after detecting estrus of ewes

Although statistical tests no real difference between P2 to P1, but there is a tendency P2 treatment gives the best results. This is evident from the whole of Fat Tailed Sheep to experience all the estrus and reinforced by the results of the blood estrogen level sare more than twice as much, ie 70 pg/ml versus 144pg/ml. That the possibility P2 so of treatment at a dose of 75mg + 10mg MPA benzoas estradiol is the most effective dose to induce estrus in Fat Tailed Sheep. While based on research (11) use of MPA in the form of an implant for the induction of estrus in Fat Tailed Sheep strains of island Sapudi – Madura effective dose is 50 mg. This may occur because of MPA in the form of an implant given croda gelatin that resulting soft release MPA in sheep blood.

CONCLUSION

Based on the results of the study it can be concluded that: administration of MPA (progesterone) + estradiol benzoas effective for estrus induction in Fat Tailed Sheep; time estrus onset of symptoms occurred done day after the administration of estradiol benzoas or the 13th day after the administration of MPA (progesterone); there is a tendency MPA dose of 75 mg + 10 mg estradiol benzoas is the most effective dose to induce estrus in Fat Tailed Sheep.

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