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Induction of parturition in ewes (local breeds) and subsequent survival of neonates

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ABSTRACT

Twenty –four pregnant ewes of local breeds were used in two equal groups in a study of induction of parturition and subsequent survival of neonates. Ewes were treated with either 15mg dexamethasone or saline solution (control) intramuscularly on day 145 of gestation. There were significant differences between the 2 treatments in the mean of the interval from treatment to lambing (162 and 59.7h for control and dexamethasone, respectively) and in the proportion of that lambed by 48 hr after treatment. Injection of 15mg dexamethasone resulted in short and less variable intervals from treatment to lambing. There were no significant differences between the two treatment groups in birth weight (3.8 and 4.2 kg for control and dexamethasone, respectively) and in the mean of the live weight at one month of age (9.4 and 10.2 kg for control and dexamethasone, respectively).There were no significant differences between the two treatment groups in the survival rate of lambs at birth (92.8 and 93.3% for control and dexamethasone, respectively)and at one month of age (71.4 and 66.6% for control and dexamethasone, respectively). This study confirms the effectiveness of the dexamethasone to induce the parturition in ewes of local breeds with no adverse effect on the survival of subsequent neonates.

Key Words: *Parturition , Dexamethasone, Induction.*

INTRODUCTION

Synchronization of lambing is important because animal owners have to plan use of barns, feeding and labor depending on the intensity of lambing. One of the main purposes of hormonal treatment in sheep is to synchronize estrus and subsequently lambing. Nevertheless, since there are many genetic and environmental factors affecting gestation length, the synchronization rate observed for estrus is not well represented in lambing. Maximum synchronization in lambing could be achieved using various hormonal treatments that applied during the last days of gestation **(Peters, and Dent, 1992).**

Parturition is believed to be initiated when adrenocorticotropic hormone(ACTH), from the fetal pituitary gland, causes a release of cortisol from the fetal adrenal cortex **(Barth, A.D.(1986), Whittle et al., 2000 and Jacobs et al., 1994)**. The fetal cortisol reduces placental progesterone production resulting in release of

prostaglandin $F_2\alpha$ ($PGF_2\alpha$) from the uterus (Barth, 1986). Consequently, uterine activity causes the corpus luteum undergoes luteolysis, and parturition is initiated (Barth, 1986). Dexamethasone and other synthetic glucocorticoids mimic fetal cortisol and have been successfully used to induce parturition in the ewe (Harman and Slyter,. (1980).

There is no available data on the use of hormonal treatment for induction of parturition in ewes (local breeds) in Dohuk Governorate (Kurdistan Region North of Iraq). Therefore, the purpose of this study was to evaluate use of dexamethasone for induction of parturition in ewes (local breeds), and its effect on viability of the newborn lambs.

MATERIALS AND METHODS

Animals and Hormonal Treatment:

This study was carried out at the Agricultural College Research Farm, Dohuk University. Twenty four pregnant ewes (local breeds) of mixed ages (2- 4 years) and known gestational stages were used. Gestational stage was calculated from the date of natural mating.

Ewes were randomly distributed into two similar groups, each was assigned to 1 of 2 treatments (intramuscular injection): DEX, 15 mg dexamethasone (Colvasone, Norbork) or control, 5 ml of 0.9% sterile saline. The interval from treatment to lambing was recorded. Lambs were weighed shortly after birth and 30 days later and lamb survival was also recorded.

Animal Housing and feeding :

The animals were kept indoors at night and outside for most of the day. Indoors, the animals were offered diets based on barley grains and wheat straw and supplemented by vitamins. Outside, they had free access to natural available grazing lands. Water and mineral licks were available ad libitum.

Statistical Analysis:

Analysis of variance was used to determine the effect of treatment on the interval from treatment to lambing. Means were compared using the Student-Newmankeuls test. Bartlett's homogeneity of variance test was used to determine differences between groups in the interval from treatment to lambing. Chi-square analysis was used to determine differences between groups in the proportion of ewes that had lambed by 48 hr after treatment and also to determine the differences between groups in the lamb survival. Student- Newmankeuls test was also used to determine the differences in lamb birth weight and body weight at 30 days later. (Daniel, W.W.(2005)

RESULTS AND DISCUSSION

There were significant differences ($P < 0.05$) between the two groups in the mean of the interval from treatment to lambing (162 and 59.7 h for control and DEX, respectively) and in the proportion ($P < 0.01$) of those lambed 48 h after treatment (Table 1). Injection of 15 mg dexamethasone resulted in short and less variable interval from treatment to lambing. Ten of 12 ewes treated with dexamethasone had lambed by 48 h , whereas just 3 of 12 ewes treated with saline had lambed by 48 h (Figure 1). There were no significant differences between the two groups in birth weight (3.8 and 4.2 Kg for control and DEX, respectively) and in live weight at 1 month of age (9.4 and 10.2 Kg for control and DEX , respectively) There were no significant differences between the two treatments in the survival rate of lambs at birth (92.8 and 93.3 % for control and DEX , respectively) and at one month of age (71.4 and 66.6 % for control and DEX , respectively). Total number of lambs born was 14 and 15 lambs in control and treatment groups, respectively. Number of those born alive was 13 and 14 lambs in the two groups, respectively, and of those stayed alive at 30 days of age was 10 lambs in each. There were no ewes with retained placenta.

Table 1 Mean and standard deviation*(S) of the interval from treatment to lambing and the proportion of ewes lambed by 48 h flowing treatment

	Group		Level of significance
	CNTROL	DEX	
Treatment to Lambing (h) Mean	162	59.7	P<0.05
S	130.734	75.275	Proportion
Lambed by 48 h	3 of 12	10 of 12	P<0.01

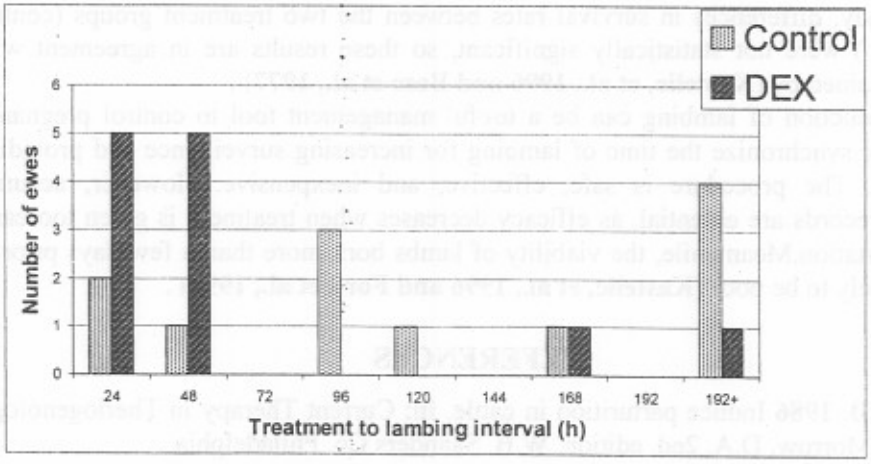

Figure 1. Lambing distribution of ewes treated with saline (control) and dexamethasone (DEX).

Although induction of birth has been quite widely used in cattle and is extensively used in pigs, it remains a relatively fragile procedure in sheep. A major limitation to the technique in sheep is the poor survival of premature lambs and the frequent lack of precise information concerning the stage of gestation of ewes. Induction of parturition to facilitate lambing in groups of synchronized ewes can be very successful. However, the adverse economics of sheep industry in recent years may have precluded it more widespread use **(Ingldby and Jackson, 2001).**

The result of the present study confirms the findings of (1,7,8 and 10) who showed that dexamethasone injected at the dose rate of 8 to 16 mg intramuscular is the most commonly used corticosteroid resulting in completion of lambing between 24 and 62 h of treatment .

The glucocorticoids administered to pregnant ewes provoke the modification of placental steroidogenesis, that physiologically precedes parturition. Thus, they reproduce the action of fetal cortisol, which reaches the placenta with the fetal blood circulation. In general, corticoids can induce parturition near term, and their efficacy depends on their attitude to pass the placenta **(Thorburn, et al., 1977 and Ptak et al., 2002).**

In sheep, the prepartum surge in fetal cortisol stimulates placental steroidogenic enzymes that initiate the fall in maternal plasma progesterone and lead to the final hormonal cascade. Exogenous glucocorticoids mimic the fetal prepartum surge, causing a gradual fall in progesterone and concomitant changes in placental estrogen and prostaglandin before labor begins **(Whittle et al., 2000 and Kastelic, et al., 1996).**

The values related to birth weight and growth rate in the present study between control and dexamethasone group did not statistically differ significantly. These results are in agreement with results obtained by **Bosc *et al.* (1977)(Bosc et al., 1977)**

High survival rate is one of the important lamb production characteristics (14). In this study, differences in survival rates between the two treatment groups (control and DEX) were not statistically significant, so these results are in agreement with results obtained by **(Kastelic, et al., 1996 and Bosc et al., 1977)** .

Induction of lambing can be a useful management tool to control pregnancy toxemia or synchronize the time of lambing for increasing surveillance and providing assistance. The procedure is safe, effective, and inexpensive. However, accurate breeding records are essential, as efficacy decreases when treatment is given too early during gestation.Meanwhile, the viability of lambs born more than a few days prior to term is likely to be poor **(Kastelic, et al., 1996 and Ford et al., 1990) .**

REFERENCES

Barth, A.D. 1986 Induce parturition in cattle. In: Current Therapy in Theriogenology. By Morrow, D.A. 2ed. edition. W.B. Saunders Co. Philadelphia.

Bosc. M.J.; De Louis, C. and Terqui, M. 1977. Control of time of parturition of sheep and goats .In: Management of Reproduction in Sheep **and Goat. Cited by Gordon, I. 1999.** Controlled Reproduction in Sheep & Goats. CAB I.UK.Cambridge.P.268.

Cloete, S.W.and Scholtz, A.J. 1998. Lamb survival in relation to lambing and neonatal behaviour in medium wool Merino lines divergently selected for multiple rearing ability. Aust.J.Exp.Agri. 38: 801-811.

Daniel, W.W.2005. Biostatistics a Foundation for analysis in the health sciences. John Wiley and sons.Inc.Georgia state university. PP.15-53.

Ford, E.J.; Evans, J. and Robinson, I. 1990. Cortisol in pregnancy toxaemia of sheep. Br.Vet.J. 146:539-542.

Gordon, I. 1999. Controlled Reproduction in Sheep & Goats. CAB I.UK.Cambridge.PP.266-270.

Harman, E.L. and Slyter, A.L. 1980. Induction of parturition in the ewe. J. Anim. Sci. 50: 391-393.

Ingldby, L. and Jackson, P. 2001. Induction of parturition in sheep. In Practice. 23: 228-231.

Jacobs, R.A.; Young, I.R.; Hollingworth, S.A. AND Thorburn, G.D. 1994. Chronic administration of low doses of adrenocorticotropin to hypophysectomzed fetal sheep leads to normal term labor. Endocrinology. 134: 1389-1394.

Kastelic, J.P.; Cook, R.B.; McMahon, L.R.; McAllister, T.A.; McClelland, L.A. and Cheng, K.J. 1996. Induction of parturition in ewes with dexamethasone or dexamethasone and cloprostenol. Can. Vet. J. 37: 101-102.

Mati, J.K.G.; Horrobin, D.F. and Barmley, P.S. 1973. Induction of labour in sheep and in humans by single doses of corticosteroids. Brit.Med.J. 2:149-151.

Peters, A.R. and Dent, C.N. 1992. Induction of parturition in sheep using dexamethasone. Vet.Rec. 131: 128-129.

Ptak, G.; Clinton, M.; Tischnes, M.; Barboni, B.; Mattioli, M. and Loi, P. 2002. Improving delivery and offspring viability of in vitro- produced and cloned sheep embryos. Biol. of Reprod. 67:1719-1725.

Thorburn, G.D.; Chllis, J.R. and Currie, W.B. 1977. Control of parturition in domestic animals. Biol. of Reprod. 16: 18-27.

Whittle, W.L.; Holloway, A.C.; Lye, S.J.; Gibb. and Challis J.R.G. 2000. Prostaglandin production at the onset of ovine parturition is regulated by both estrogen –independent and estrogen dependent pathways.Endocinology. 141:3783-3791.

إحداث الولادة في النعاج (السلالات المحلية) وحيوية المواليد الحديثة.

الخلاصة:-
إستخدمت ٢٤ من النعاج الحوامل ومن السلالات المحلية في دراسة لإحداث الولادة فيها ومتابعة حيوية المواليد الحديثة.
أعطيت النعاج عن طريق الحقن العضلي إما ١٥ ملغ من الدكساميثازون أو محلول الملح الفسلجي(مجموعة السيطرة) في اليوم (١٤٥) من الحمل.
لوحظ أن هناك فرق معنوي وعلى مستوى($P<O.O5$) بين مجموعتي العلاج في معدل الفترة بين إعطاء العلاج وحدوث الولادة (١٦٢و٥٩,٧ ساعة لكل من مجموعتي السيطرة و الدكساميثازون وعلى التوالي) وكذلك في نسبة النعاج التي حدثت الولادة فيها خلال ٤٨ ساعة بعد إعطاء العلاج.
لم يكن هناك فرق معنوي وعلى مستوى ($P<O.O1$) بين مجموعتي العلاج في معدل الوزن عند الولادة (٣,٨ و٤,٢ كغم لمجموعتي السيطرة والدكساميثازون وعلى التوالي) وكذلك في معدل الوزن الحي عند عمر شهر (٩,٤ و١٠,٢ لكل من مجموعتي السيطرة والدكساميثازون وعلى التوالي).
لا يوجد فرق معنوي وعلى مستوى ($P<O.O1$) في معدل نسبة الحملان الحية عند الولادة (٩٢,٨ و٩٣,٣% لكل من مجموعتي السيطرة والدكساميثازون وعلى التوالي) وكذلك عند عمر شهر (٧١,٤ و٦٦,٦% لمجموعتي السيطرة والدكساميثازون وعلى التوالي).
أكدت هذه الدراسة على فعالية الدكساميثازون في إحداث الولادة في السلالات المحلية وحيوية المواليد الحديثة.