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Effect of hormone administration during peripartum period in crossbred sows

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ABSTRACT

Efficacy of $PGF_2\alpha$ and/or oxytocin was evaluated in four groups of sows (n=80) $PGF_2\alpha$ 5mg I/m on day 111 (group I), PG on day 111 and oxytocin 20 IU I/m after the birth of first piglet (group II), PG after the birth of first piglet (group III) and oxytocin after the birth of first piglet (group IV) along with suitable controls (group V and VI). The induction interval ranged from 26.85±0.52 to 28.16± 0.43 hours in group I and II, respectively. Duration of second stage of farrowing in all the four treatment groups was less than three hours, whereas, it was more than four and half hours in control groups. The overall piglet interval in this study varied from 6.57±0.41 to 7.92±0.92 minutes.

Key words: parturition induction, sows, $PGE_2\alpha$, oxytocin, lutalyse, farrowing duration, piglet interval

Induction of farrowing with $PGF_2\alpha$ and/or other combination at predetermined time offers many advantages. Besides this, administration of $PGF_2\alpha$, or oxytocin after the birth of first piglet is thought to enhance parturition process and involution of uterus. Parturition, being a critical stage of reproduction requires extra attention in order to avoid subsequent infertility after farrowing by reducing chances of puerperal infection. Present study was undertaken to investigate the effects of administration of $PGF_2\alpha$, before impending parturition and after the birth of first piglet. The parameters studied were induction interval, duration of different stages of parturition and piglet intervals.

MATERIALS AND METHODS

Study was conducted on Tamworth X Desi, Tamworth and Large White Yorkshire (WLY) breed of sows maintained at Pig Breeding Farm of Ranchi Veterinary College. One hundred twenty sows due for parturition belonging to different genotype, age and parity were randomly allotted to six experimental groups and twenty animals were assigned to each group.

Group I (n=20) The sows of this group were injected 5 mg (1 ml) of $PGF_2\alpha$ (Lytalyse)* I/M route on day 111.

Group II (n=20) The sows received 5 mg (1 ml) of $PGF_2\alpha$ I/M route on day 111 along with 20 IU (4 ml) oxytocin (Evatocin)** I/M route after the birth of first piglet.

Group III (n=20) The animals were injected with NSS on day 111 along with of 5 mg of $PGF_2\alpha$ I/M route after the birth of first piglet.

Group IV (n=20) The animals received NSS on day 111 along with 20 IU oxytocin I/M route after birth of first piglet.

Group V (n=20) The animals were injected with NSS through the same route at two occasion i.e. on day 111 (1 ml) and after the birth of first piglet (4 ml).

Group VI (n=20) The animals were injected 1 ml of Normal saline solution (NSS) through the same route to serve as control.

RESULTS AND DISCUSSION

Treatment groups I and II did not differ significantly from each other (Table 1). Addition treatment with oxytocin (group II) had no benefic effect on induction which contradicts Huhn *et al.* (1996). Greene *et al.* (1984) had also observed simila effect of oxytocin along with $PGF_2\alpha$ treatment fo

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farrowing induction. The results suggest that $PGF_2\alpha$ injected before parturition, enhances the farrowing process and supports the earlier findings (Hughes and Varley, 1980, Jainudeen and Brandenburg, 1980, Bearden and Fuquay, 1997). This might be due to the fall in progesterone level in treated animals (Vaje *et al.*, 1980 and Itoh *et al.*, 1994) and triggering the cascade of events leading to parturition.

Stages of parturition

It was evident that the durations of second and third stage of parturition in treatment group I, II, III and IV were significantly shorter from the control groups V and VI respectively, but there were no difference among the treatment groups (Table 1). Duration of both second and third stages of parturitions recorded in this study were shorter than earlier reports (Hughes and Varley, 1980, Singh and Singh, 1989 and Xu *et al.*, 1999). The total duration of farrowing was significantly shorter ($P<0.01$) in each treatment group as compared to the controls, but duration of farrowing among the four treatment groups did not differ significantly (Table 1). The results obtained in this study are in agreement with the finding of Ray (1996).

Greene *et al.* (1984) reported that PG and oxytocin had no significant effect on the duration of farrowing. Stephens *et al.* (1988) observed no difference in farrowing duration in sows, which were, administrated with 0.5 mg of a long acting PG analogue on day 112, 113 of gestation. Sinha *et al.* (1990) obtained no significant difference within the treatment groups of sows but a significant ($P<0.05$) effect of PG administration on the farowing duration was observed. Itoh *et al.* (1994) observed that treatment with different doses of Fenprostalene on different days of pregnancy did not significantly affect total duration of parturition.

Results obtained in group II, where $PGF_2\alpha$ was given along with oxytocin were similar to the findings of Ray (1996). Pejsak *et al.* (1983) also reported that the combination of $PGF_2\alpha$ and oxytocin shortened the duration of farrowing. Stephens *et al.* (1988) reported that duration of farrowing reduced significantly ($P<0.05$), where oxytocin was injected after the birth of first piglet. This fact was in accordance with the present finding as recorded in group IV. Similarly injection of PG enhanced delivery of first piglet stages and duration of farrowing as in group III. It is evident that either PG or oxytocin injection after delivery of first piglet reduces the duration of farrowing by reducing contractile activity in the uterus (First and Bosc, 1979).

Table 1: Average farrowing characteristics in different treatment groups of sows.

Treatment group	Farrowing characteristics			
	Induction interval (hr)	Second stage (hr)	Third stage (hr)	Total duration of farrowing
I	28.16^a ± 0.43	1.06^a ± 0.06	1.88^a ± 0.07	2.96^a ± 0.09
II	26.85^a ± 0.52	0.90^a ± 0.07	1.98^a ± 0.05	2.88^a ± 0.09
III	54.53^b ± 1.89	1.05^a ± 0.06	1.83^a ± 0.08	2.98^a ± 0.09
IV	57.08^b ± 2.32	0.97^a ± 0.08	2.01^a ± 0.07	2.98^a ± 0.08
V	57.13^b ± 1.50	2.50^b ± 0.06	2.13^b ± 0.07	4.63^b ± 0.08
VI	57.71^b ± 0.89	2.55^b ± 0.07	2.11^b ± 0.08	4.64^b ± 0.10

All the mean are the average of 20 observations. Means under same superscript did not differ significantly.

Delivery of piglets

Overall piglet interval in this study varied from 6.57±0.41 to 7.92±0.42 minutes. The highest value (7.92± 0.42 minutes) was recorded in group III (PG after birth of first piglet) while lowest value (6.57±0.41 minutes) was recorded in group II (PG + oxytocin). However, the values did not differ significantly with each other in all the treatment groups. Analysis of variance indicated significant ($P<0.01$) effect of treatments on piglet intervals. Nevertheless, all the four treatment groups had significantly ($P<0.05$) shorter piglet interval in comparison to the two control groups. Ray (1996) found that administration of oxytocin tended to reduce the piglet interval. However, combined therapy of PG+oxytocin for induction of farrowing in sows did not have any significant effect on the interval between birth of piglets (Greene *et al.* 1994). The values observed in this study were lower than that of Murayama (1990), Ascher and Tanturier (1994) and Ray (1996). Piglet interval has been observed to be directly related to litter size (Randall, 1972). In normal birth process $PGF_2\alpha$ along with oxytocin produces a stimulus forcing delivery of the piglets (First and Bosc, 1979). Therefore, it is evident that sufficient contractile force is essential for quick delivery.

It could be inferred from this study that injection of $PGF_2\alpha$ and/or oxytocin reduced the induction interval and total duration of farrowing significantly. Addition of oxytocin did not exhibit any advantage in reducing the total farrowing duration.

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REFERENCES

Ascher, F. and Tainturier (1994). Etiprostone as a part of herb reproduction management (Proc. 13th Int. Congr. Pig Vet. Soc. Bangkok, Thailand, 376).

Bearden, H.J. and Fuquay, J.W. (1997). Appl. Anim. Reprod. 4th edn. Practice Hall, Upper Saddle River, New Jersey, 225.

First, N.L. and Bosc, Michel, J. (1979). Proposed mechanisms controlling parturition in swine, J. Anim. Sci. **48**(6): 1407-1421.

Greene, S.T., Boland, M.P. and Gordon, I. (1984). Control of farrowing in the pig using prostaglandin and oxytocin research report 1962-63. Faculty of General Agriculture University, College, Dublin, 100.

Hughes, P.E. and Varley, M.A. (1980). Reproduction in the pig. Ist Edn. Butter Wroth and Co. Ltd. (UK).

Huhn, U., Jochle, W. and Brussow, K.P. (1996). Techniques developed for the control of estrous, ovulation and parturition in the east German pig industry. Theriogenology, **46**: 911-924.

Itoh, S., Sone, M., Suzuki, K., Izumiya, K., Mochizuki, H., Tsutsui, T., Nakazima, C., Ogasa, A. and Nakahara, T. (1994). Induction of parturition in pigs with a prostaglandin F_2 alpha analogue (Fenprostalene). Anim. Sci. and Tech., **65**(9): 834-841.

Jainudeen, M.R. and Brandeburg, A.C. (1980). Induction of parturition in crossbred sows with cloprostenol, an analogue of prostaglandin F_2 alpha. Anim. Reprod. Sci. **3**(2): 161-166.

Murayama, J. (1990). Relationship between litter size and farrowing duration. Japanese J. Swain Sci., **27**(3): 135-139.

Pejsak, Z., Lipowski, A. and Rozaczynski, W. (1983). Effect of some pharmacological drugs on the lowering of intrapartum death of piglets by shortening parturition time. Bulletin of the Vety. Institute in pulewy, **26**: 45-51.

Randall, G.C.B. (1972). Observation of parturition in the sow. I Factor associated with the delivery of the piglets and their subsequent behaviour. Vet. Rec. **90**: 178-182.

Ray, S.K.H. (1996). Role of hormones in Reproduction Management of Swine. Ph.D. Thesis, Birsa Agricultural University, Ranchi.

Singh, B.K. and Singh, B.K. (1989). Studies on different stages of parturition in exotic pigs. Indian Vet. J. **66**(9): 840-843.

Sinha, A.K., Singh, Balraj and Singh, S.K. (1990). A preliminary report on induction of parturition in sows, Indian Vet. J. **67**(5): 430-432.

Stephens, S., Boland, M.P., Roche, J.F., Reid, J.F.S. and Bourke, S. (1988). Induction of parturition in Swine with the prostaglandin analogue fenprostalene. Vet. Record. **122**(13): 296-299.

Vaje, S., Elsasser, F., Elger, W. and Ellenderff, F. (1980). Induction of parturition in the pig with prostaglandin E(Sulproston). Deutsche-Tierarztliche-Wochenschrift, **87**(3): 77-79.

Xu-LiRen, Zhuang, Jingxin, Song, Shisheng, Tian, Yun, Zhou, Chun, Zhao, XiaoNan, Dai, Weittua, Xu, LR, Zhuang, JX, Song, S.S., Tian, Y. Zhou, C. Zhao, X.N. and Dai, W.H. (1999). The effect of Lutalyse on controlling parturition in sows. J. Nanjing Agri. Uni. **22**(1): 90-93.