Programmed Farrowing with Prostaglandin and Oxitocin in the Sow

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Abstract: This research was carried out with the objective of studying different doses of clorprostenol and oxitocin to induce programmed farrowing in the sow at the end of pregnancy. For this purpose, 40 Yorkshire multiparous sows with 2-4 previous pregnancies. Divided at random in groups of 10. On day 111 of pregnancy all groups received an injection of 175 mg clorprostenol im. And 20 h later they were injected with 0, 10, 20 and 30 units of oxitocin to groups 1-4, respectively. PG + saline affected 70% of treated sows and the mean time for delivering the first piglet was 24.17 h. With the administration of clorprostenol + 10 units of oxitocin the parturition time increased slightly to 26.2±0.21 h, but remained statistically similar to the control group (p>0.05). However, when the oxitocin level was increased to 20 units administered 20 h after clorprostenol, 90% of sows initiated labor at an average of 22.1±0.23 h after clorprostenol. When the dosage of oxitocin was 30 units, 90% of sows initiated the delivering of the piglet in about 22.6±0.22 h after the administration of clorprostenol. As shown by the data, the administration of 20 and 30 reduced in about 14% the time needed to parturition compared to control treatment (p<0.05). This difference was higher (16%, p<0.05) when compared with the treatment that used 10 units of oxitocin. The presence of MMA was not of significance and 97% of piglets were viable.

Keywords: Programmed farrowing, prostaglandin, oxitocin, sow, treatment, significance

INTRODUCTION

The aim of intensive pig production is to decrease losses after farrowing, because of the economic advantages of the number of piglets born. There is an increasing need to control the moment of farrowing, this is due to the fact that some sows farrow out of working hours, time when farrowing supervision is not optimal. If the sow farrows during working hours the producer will have a saving in hand work and also improved handling, hygiene and marketing (Provis, 2003). Another advantage derived from the manipulation of farrowing is that the number of piglets born will tend to be the same and piglets from sows with large litters can be fostered by sows with smaller offspring. It has being observed that it is also possible to reduce perinatal mortality and complications when the delivery of placentas is accelerated with the use of prostaglandins (Cerne and Jochle, 1983; Chantaraprateep et al., 1986a; b; Cook et al., 2003; Mueller et al., 2006; Spencer et al., 2004). When using a Prostaglandin (PG) it is possible to synchronize the time of parturition (Spencer et al., 2004), in the other hand, it is recommended that farrowing in pigs must not be induced before the 111 days of pregnancy to avoid the presence of small weak piglets (Butler and Boyd, 1983; Jainudeen and Brandenburg, 1980). When PG is used parturition is present between 24-30 h after injection (Holtz et al., 1983; Jainudeen and Brandenburg, 1980; Mueller et al., 2006; Straw et al., 2008). This variation in time means that there is a 27 h interval from the moment of PG injection to parturition.

Therefore, there is a need to shorten the latter time interval. In previous reports sows were medicated with a PG analog and thereafter, oxitocin was injected 2 h after milk let down (Holyoke et al., 1995; Prunier and Quesnel, 2000), this treatment decreased the time between PG injection and the expulsion of piglets. In another work relaxin was used by injection on days 110 and/or 111, followed by the administration of a PG on day 112 (Butler and Boyd, 1983).

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It is known that oxytocin can produce an effect only when the concentration of plasma progesterone has decreased to low levels during parturition (Taverne et al., 1979). It is also possible that there are more specific doses of oxytocin in order to achieve the best effect. There is also the possibility of inducing undesirable effects on uterine muscles after the administration of excessive doses of oxytocin (Mueller et al., 2006; Straw et al., 2008; Taverne et al., 1979). Therefore, the objective of this research is to determine the minimum effective dose of oxytocin as an aid to more specifically induce a synchronized farrowing when using PG with the aim of inducing a programmed farrowing with in working day hours.

MATERIALS AND METHODS

This research was carried out in a pig farm with a closed cycle, sows under this study were dewormed, washed 8-10 days before parturition date. Thereafter were taken to their farrowing crates. Feeding was conventional and water ad libitum. Sows were fed between 7 and 8 am. And for the purpose of the study 40 sows of 2nd-4th parturitions were chosen at random and allocated to 4 groups of 10. On the 111 day of gestation, referred as day 0, 175 mg of cloprostenol was administered intramuscularly, followed 20 h later by doses of 10, 20 and 30 units of oxytocin to each sow of groups 2, 3 and 4, respectively. Group 1 (control) was treated with saline solution. Rectal temperature was monitored in a daily basis for three days after parturition. Parameters under evaluation in this study were: time of first piglet delivered after the administration of cloprostenol and oxytocin. Also note was taken of death and live piglets delivered. Statistic evaluation was carried out with a t student test and Xi².

RESULTS

The PG + saline affected 70% of treated sows and the mean time for delivering the first piglet was 24.17 h. With the administration of cloprostenol + 10 units of oxytocin the parturition time increased slightly to 26.2±0.21 h, but remained statistically similar to the control group (p>0.05). However, when the oxytocin level was increased to 20 units administered 20 h after cloprostenol, 90% of sows initiated labor at an average of 22.1±0.23 h after cloprostenol. When the dosage of oxytocin was 30 units, 90% of sows initiated the delivering of the piglet in about 22.6±0.22 h after the administration of cloprostenol. As shown by the data, the administration of 20 and 30 reduced in about 14% the time needed to parturition compared to control treatment (p<0.05; Table 1). This difference was higher (16%; p<0.05) when compared with the treatment that used 10 units of oxytocin.

DISCUSSION

When comparing the moment of beginning of labor in sows medicated only with cloprostenol, labor initiated 25.8 h after the administration of PG and it should be noticed that 20% of sows did not respond to the luteolytic effect of cloprostenol, however, the response to this treatment was considered satisfactory because 80% of sows from this group initiated labor with in working hours of the attending staff and the outcome of treatment is similar to other reports (Straw et al., 2008; Provis, 2003).

It is noticeable that when oxytocin is added to the effect of PG a synergic effect was observed, the number of sows responding to the luteolytic effect of cloprostenol increased. Cook et al. (2003) and Spencer et al. (2004) reported an increase in the oxytocin receptors at the end of gestation, such observation coincides with the findings of the present study. However, when the dose of oxytocin is 10 units/sow and administered 20 h after cloprostenol, no difference with sows medicated only with cloprostenol (26.2 vs. 25.8 h) was observed. But when the dose of oxytocin is increased to 20 units/sow it was observed an increase in the number of sows initiating labor (90%) and the time of drug effect from injection to first piglet born was also reduced (22.1 h).

When the dose of oxytocin was increased to 30 units/sow, labor was present with more confidence. And the time effect was slightly decreased (22.6 h). It is interesting that the administration of oxytocin in this research is carried out 20 h after cloprostenol, while in other work oxytocin was administered only when the interval between successive pigs exceeded 30 min (Holyoke et al., 1995). Sows treated with cloprostenol and oxytocin (30 units) farrowed nearly at the same time after treatment and sows treated with 10 and 20 units of oxytocin after cloprostenol initiated parturition with ample variation in time after medication.
This results are similar to other observations (Cerne and Jochle, 1981; Chantaraprateep, 1986a, b) where PG either synthetic or analogs were used, furthermore, this latter observations also reported a decrease in the presence of MMA syndrome. But this latter effect was not able to corroborate in this research due to the small number of animals used per group of treatment. But it can be reported that the number of live piglets is significant among the groups here studied, when compared with the control group compared to the treated only with cloprostenol. Cook et al. (2003) reported that oxytocin facilitates the sequential expulsion of the offsprings, therefore in the present study the amount of piglets death by asphyxia could be decreased, such as it is normal to observe during natural farrowing and/or when only cloprostenol is used to induce farrowing.

When this research was carried out, it was reported that the handling and medication of both the drugs and the sows, was comfortable enough for to recommend this treatment to be used in daily practice. This action also obligates for a more efficient management of the whole pig farm allowing the accommodation of piglets in a more equal numbers between farrowing sows, therefore weaning can be carried out with the maximum number of weaned piglets. In other research, oxytocin is administered 2 h after PG and they found an increase in stillbirths (Struw et al., 2008).

In this study, oxytocin was administered 20 h after PG injection and piglet delivery was initiated in average 2 h after oxytocin administration, i.e. present experiment this procedure was quite efficient because the number of stillbirths was decreased, the latter due to the presence of optimum staffing levels, in this case programmed farrowing will avoid weekends and other period of activity related to farrowing when staff are less in the farrowing area (Provis, 2003).

CONCLUSION

The use of cloprostenol followed by the administration of oxytocin should be a practice included in pig farms with the aim of making more efficient the industry for pig production.

REFERENCES


