Ciência Rural, Santa Maria, v.45, n.10, p.1887-1889, out, 2015 http://dx.doi.org/10.1590/0103-8478cr20141759
ISSN 0103-8478 ANINAL REPRODUCTION

Porcine luteinising hormone given at oestrus onset by intramuscular route does not advance ovulation in gilts

Hormônio luteinizante suíno aplicado no início do estro pela via intramuscular não antecipa a ovulação em leitoas

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- NOTE -

ABSTRACT

This study aimed to evaluate the use of porcine luteinising hormone (pLH) given at oestrus onset in gilts to synchronise ovulation. A total of 120 gilts (40/treatment) were assigned in three treatments: control - application of placebo by intramuscular (i.m.) route at oestrus onset; pLH2.5 - application of 2.5mg of pLH by i.m. route at oestrus onset; pLH5 - application of 5mg of pLH by i.m. route at oestrus onset. On average, the interval onset of oestrus to ovulation did not differ (P>0.05) among treatments (control - 28.7±1.6h; pLH2.5 - 28.2±1.6h; pLH5 - 27.5±1.6h). The frequency distribution of gilts ovulated in different moments after oestrus detection was not affected (P>0.05) by the treatment. In conclusion, the use of 2.5mg or 5mg of pLH given at oestrus onset in gilts by i.m. route does not advance and synchronises the interval onset of oestrus to ovulation.

Key words: *ovulation induction, swine reproduction, reproductive biotechniques.*

RESUMO

Este estudo teve como objetivo avaliar o uso do hormônio luteizante suíno (pLH) aplicado no início do estro em leitoas para sincronização da ovulação. Um total de 120 leitoas (40/tratamento) foram distribuídas em três tratamentos: controle - aplicação de placebo por via intramuscular (i.m.) no início do estro; pLH2,5 - aplicação de 2,5mg de pLH por via i.m. no início do estro; pLH5 - aplicação de 5mg de pLH por via i.m. no início do estro. Em média, o intervalo início do estro e a ovulação não diferiu (P>0,05) entre os tratamentos (controle - 28,7±1,6 h; pLH2,5 - 28,2±1,6h; pLH5 - 27,5±1,6h). A distribuição de frequência de leitoas ovuladas em diferentes momentos após a detecção de estro não foi afetada pelos tratamentos (P>0,05). Assim, o uso de 2,5mg ou 5mg de pLH aplicado no início do estro por via i.m. em leitoas não antecipa nem sincroniza o intervalo início do estro e a ovulação.

Palavras-chave: *indução da ovulação, reprodução suína, biotécnicas reprodutivas.*

Several hormonal protocols to synchronise ovulation are available for weaned sows (MARTINAT-BOTTÈ et al., 2010; ZAK et al., 2011; FONTANA et al., 2014). However, little information is available regarding synchronised ovulation in gilts. Usually the hormonal protocols for gilts include the use of progestogens to synchronise oestrus before the application of follicle growth and ovulation inductors (DEGEINSTEIN et al., 2008; MARTINAT-BOTTÈ et al., 2010). However, these protocols are laborious and expensive. Alternative protocols to induce ovulation using porcine luteinising hormone (pLH) at oestrus onset were proposed by ZAK et al. (2011) and FONTANA et al. (2014) for weaned sows. In this way, this study aimed to evaluate the use of pLH given at oestrus onset in gilts to advance ovulation.

The experiment was performed in a breeding herd (6,200 sows), located in Southern Brazil, Santa Catarina State. A total of 120 gilts Camborough® (Agroceres PIC, Patos de Minas, MG, Brazil) were used. After arriving at the farm, gilts were housed in collective pens with 40 animals to perform oestrus induction once a day, using mature boars and physical contact. At first oestrus, gilts were weighed and those weighing at least 120kg were moved to individual crates. Fence-line boar contact combined with the backpressure test was performed three times a day (8am, 16pm, 12pm) starting 17 d after the first oestrus and continuing until the end of oestrus. Gilts found to be in oestrus in different shifts of oestrus detection, were assigned into three

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Received 12.04.14 Approved 02.21.15 Returned by the author 05.19.15
CR-2014-1759.R1

treatments: control (n=40) - application of placebo at oestrus onset by intramuscular (i.m.) route; pLH2.5 (n=40) - application of 2.5mg of pLH (Lutropin-V® Bioniche Animal Health, Belleville, Ontario, Canada) by i.m. route at oestrus onset; pLH5 (n=40) - application of 5mg of pLH by i.m. route at oestrus onset. Transcutaneous ultrasonography (TUS) of the ovaries was performed by a real-time ultrasonography using a convex linear transducer 5MHz (Aloka® SSD 500, Aloka Co. Ltd., Tokyo, Japan). TUS started at oestrus onset and was performed at 8h intervals up to ovulation to determine the interval from onset of oestrus to ovulation (IOEO). Data were analysed using the Statistical Analysis System – SAS 9.1 (SAS, 2005). Results are expressed as LSmeans ± SEM and percentages according to the variable type. The continuous variables such as oestrus duration and IOEO were analysed using the MIXED procedure with a comparison of means by the Tukey-Kramer test, including the week as a random variable. The frequency of IOEO at each period was analysed through Chi-squared test.

The frequency of oestrus expression was 48.3% in the morning, 26.7% in the afternoon and 25.0% at night. On average, the IOEO did not differ (P>0.05) among treatments (control - 28.7±1.6h; pLH2.5 - 28.2±1.6h; pLH5 - 27.5±1.6h). Differences in the oestrus duration among treatments were not observed (P>0.05; Table 1). The relative and cumulative frequency distribution of IOEO did not differ (P>0.05) among treatments in each moment of evaluation (Figure 1).

The use of 2.5mg pLH 56h after 600UI of eCG given at weaning in sows was proposed by VIANA et al. (2005), showing a reduction in the interval pLH application to ovulation (40.0±5.9h) in relation to control sows using only eCG at weaning (62.9±14.8h). However, in the same study, doses lower than 2.5mg (1.25 and 0.625mg of pLH) were not effective to advance ovulation. Similarly, BENNETT-STEWARD et al. (2007) showed a reduction in the interval between pLH application and ovulation using 2.5mg (39.2±7.1h) or 5mg (41.6±3.6h) of pLH injected by the i.m. route 80h after 600UI of eCG compared to control sows where only placebo injection was used after eCG application (55.0±11.1h).

Table 1 - Interval onset of oestrus to ovulation (h) and oestrus duration (h) of gilts submitted to application of porcine luteinising hormone (pLH) at oestrus onset using different dosages.

Treatment	n	IOEO	Oestrus duration
Control	40	28.7 ± 1.6	50.0 ± 1.8
pLH2.5	40	28.2 ± 1.6	54.0 ± 1.8
pLH5	40	27.5 ± 1.6	52.2 ± 1.8

Control – application of placebo at oestrus onset; pLH2.5 – use of 2.5mg of pLH at oestrus onset; pLH5 – use of 5mg of pLH at oestrus onset.
IOEO – interval oestrus onset to ovulation.
Averages expressed as LSmeans±SE.
No differences among treatments (P>0.05).

Synchronisation of ovulation in gilts was suggested by DEGENSTEIN et al. (2008) using a protocol with altrenogest, cloprostenol, eCG and 5mg of pLH by i.m. route 80h after eCG application. This study showed a reduction in the interval between pLH application and ovulation (43.2±2.5h) in relation to gilts that received only placebo 80h after eCG (59.5±2.5h). Although the results cited above in weaned sows and gilts showed a positive effect of pLH after eCG on the advancement of ovulation, the observations in this study showed that the application of 2.5 or 5mg of pLH by the i.m. route at oestrous onset did not advance ovulation in gilts. This result corroborates those of FONTANA et al. (2014), who did not observe any advance in ovulation time when 5mg of pLH was given by the i.m. route at oestrus onset in weaned sows submitted to oestrus detection once a day. However, ULGUIM et al. (2014) showed that the use of 2.5mg of pLH by vulvar submucosal route at oestrous onset in pubertal gilts submitted to oestrus detection twice a day reduced the interval from pLH application to ovulation (32.3±1.4h) compared to gilts with no ovulation induction at oestrous onset (34.7±1.4h). In the same study, the application of 5mg of pLH by i.m. route did not affect the interval between pLH application and ovulation (32.3±1.4h) in comparison to the use of 2.5mg pLH by the vulvar submucosal route and control gilts.

According to ULGUIM et al. (2014), the frequency of sows ovulated up to 24h after 5mg pLH by the i.m. route (31.4%) did not differ compared to gilts that did not receive any pLH application (25.5%). Considering that the onset of LH surge can start seven hours before oestrous detection in gilts submitted to hormonal induction with eCG and pLH (DEGENSTEIN et al., 2008) and that the natural LH surge in sows can start five hours before oestrus detection (SOEDE et al., 1994), the application of pLH at oestrous onset could be too late to advance ovulation. Studies that showed a reduction in the interval pLH application and ovulation did not observe any effect on oestrus duration (DEGENSTEIN et

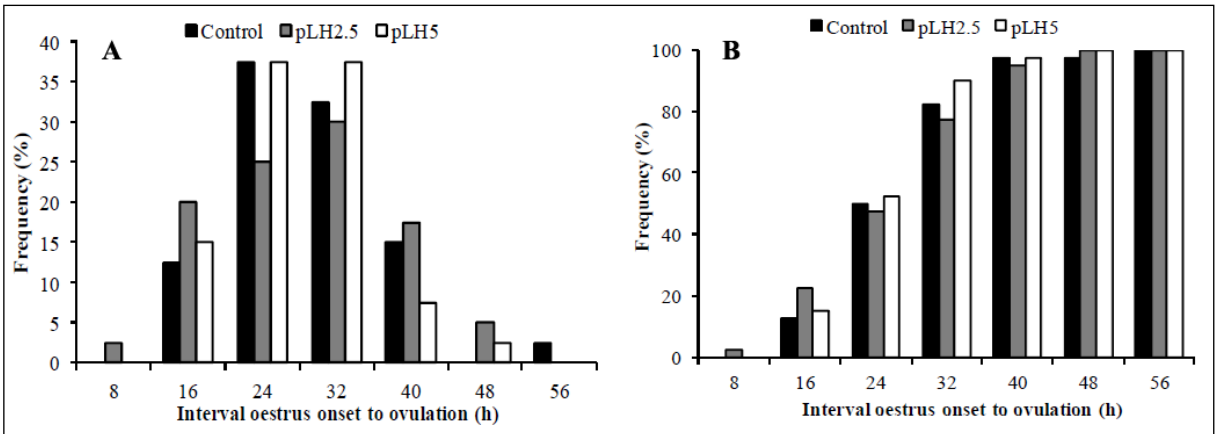

Figure 1 - Relative (A) and cumulative (B) frequency of the interval oestrus onset to ovulation in gilts submitted to application of different dosages of porcine luteinising hormone (pLH) at oestrus onset.
Control – application of placebo at oestrus onset; pLH2.5 – use of 2.5mg of pLH at oestrus onset; pLH5 – use of 5mg of pLH at oestrus onset.
No differences among treatments in each period of evaluation (P>0.05).

al., 2008; ULGUIM et al., 2014), similar to results observed in this study. In conclusion, the use of 2.5mg or 5mg of pLH given at oestrus onset in gilts does not advance and synchronise the interval between the onset of oestrus and ovulation.

ACKNOWLEDGEMENTS

The authors would like to thanks Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) and Agroceres PIC by financial support and the Master Genética Animal for provide farm and animals.

INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE

The project was approved by Institutional Animal Care of Universidade Federal do Rio Grande do Sul (UFRGS) under the protocol number 22979.

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