

Use of altrenogest at weaning in primiparous sows

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Summary

Treating primiparous sows with altrenogest for 7 days after weaning increased not only the subsequent total number of piglets born, but also the number of piglets born alive and the number of sows returning to estrus after cessation of altrenogest treatment. Farrowing rates were not affected by treatment.

Keywords: swine, altrenogest, second-litter size, primiparous sows

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Resumen - Utilización del altrenogest al destete en hembras primerizas

Tratar a las hembras primerizas con altrenogest durante 7 días después del destete no solamente incrementó su siguiente número total de lechones nacidos, sino también el número de lechones nacidos vivos y el número de hembras que regresaron al celo después de la interrupción del tratamiento de altrenogest. El porcentaje de fertilidad no se afectó con el tratamiento.

Résumé - Utilisation d'altrenogest au sevrage chez des truies primipares

Le traitement de truies primipares avec de l'altrenogest pendant 7 jours après le sevrage augmenta non seulement le nombre subséquent total de porcelets nés, mais également le nombre de porcelets nés vivants et le nombre de truies revenant en oestrus après le traitement à l'altrenogest. Les taux de naissance ne furent pas affectés par le traitement.

Altrenogest (Matrix; Intervet/Schering-Plough Animal Health, Millsboro, Delaware), a synthetic progestin, is widely used in the pork industry on a worldwide basis. This product is approved for use in sexually mature gilts that have had at least one estrus cycle. It is administered orally for 14 days in North America and up to 18 days in Europe in order to inhibit estrous cyclicity of gilts and synchronize the subsequent onset of estrus. Indeed, after an 18-day treatment regimen, 95% of gilts showed signs of estrus within 4 to 9 days.¹ The treatment was not only effective for estrus synchronization, but the group treated with altrenogest had higher farrowing rates and litter sizes than did the control group.¹ As part of the seasonal infertility complex, primiparous sows often experience a decrease in the number of pigs in their second litter compared to their first litter.² Primiparous sows are also more susceptible to summer infertility than sows of higher parity. Primiparous sows experienced delayed returns to estrus after weaning and reduced conception rates in the summer months in North Carolina.³ One

method used to avoid the reduction in litter size during the second parity was to extend the weaning-to-service interval.² In addition, administration of exogenous gonadotropins at the time of weaning has been used to induce estrus; however, farrowing rates and litter sizes may be negatively affected by the use of exogenous gonadotropins.⁴ Therefore, the purpose of the present study was to determine if oral administration of altrenogest to primiparous sows for 7 days after weaning maintained farrowing rates during the summer and increased the number of piglets born alive at the subsequent pregnancy.

Materials and methods

The farm was PQA Plus certified (National Pork Board; www.pork.org) and animals were treated in accordance with the *Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching*.⁵

Animals

The study was conducted on a commercial farm of 4000 sows. The farm, which was part of a parity-segregation program, had

four farrowing buildings, with eight rooms in each building. For the study, sows were weaned after their first parity between March and August 2012. A total of 3063 primiparous sows (Landrace × Large White) were assigned to either the control group (Control; 1541 females) or the altrenogest group (Altrenogest; 1522 females), with every second sow assigned to the Altrenogest group, while the sows were in the farrowing rooms. Previous lactation length affects the subsequent reproductive performance of a sow during the following cycle. To be certain that our groups were equivalent, this reproductive information was recorded. Lactation lengths were 21.1 and 21.0 days ($P = .47$) in the Control and Altrenogest groups, respectively.

Study design

Sows were moved at their first weaning from the farrowing rooms to the breeding barns and assigned to a group as described. Starting at that time, and each morning for 7 consecutive days, treated sows received 15 mg of altrenogest within a small part of their ration. Control sows were not given a placebo. Anorexic sows were removed from the study. Estrus was detected with boar exposure twice a day starting on the second day after weaning for the control group and the second day after the cessation of altrenogest treatment for the treated group. The first insemination took place on the first day of standing estrus. Sows were artificially inseminated twice at 16- to 24-hour intervals with 3×10^9 sperm cells in each dose.

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Data and statistical analysis

For the first and second litters, information gathered for every sow was group (Altrenogest versus Control), weaning date, breeding dates, farrowing date, total number of piglets, number of piglets born alive, and number of piglets weaned. If the sow was culled, date and reason were recorded. Statistical analysis used a chi-square test for discrete data (farrowing rates, culling rates, rebreed data, percentages of sows returning to estrus within 7 days after weaning or cessation of treatment); analysis of variance for continuous variables (pigs born alive, litter size at weaning); and Tukey test to compare means (Statistix 9; Tallahassee, Florida). A *P* value of < .05 was considered significant.

Results

Farrowing rates at first estrus

Overall farrowing rates from July to December (weaning from March to August) did not differ (*P* > .05; Table 1). The influence of month and treatment was not significant (*P* > .05) and no trend was found between months.

Sows rebred and reasons for cull

There were 264 and 242 sows culled in the Control and Altrenogest groups, respectively. The main reason to eliminate a sow from the herd was failure to come into heat (Figure 1). In that subgroup, the number of sows treated with altrenogest was significantly less than the number of control sows (*P* < .01). No difference was found between groups when sows were culled for negative pregnancy check, abortion, or lameness, or because they did not conceive. However, twice the number of sows in the Altrenogest group were culled for vaginal discharge as in the Control group (*P* < .05).

Total piglets born, piglets born alive, and piglets weaned

Total piglets born, piglets born alive, and piglets weaned from the first-parity litters did not differ between Altrenogest and Control sows, and thus, the two groups were equivalent and comparable prior to initiation of the study (Table 1). Taking parity-two results into account, sows in the Altrenogest group gave birth to approximately half a piglet more (*P* < .05) than sows in the Control group (Table 1). However, the number of piglets weaned did not differ between the two groups. An outbreak of porcine reproductive and respiratory syndrome (PRRS) virus

Table 1: Mean (\pm standard error) reproductive performance parameters in sows either treated with altrenogest to synchronize estrus or untreated (controls)*

| Parameter | Control | Altrenogest |
|--|-------------------|-------------------|
| No. of sows | 1541 | 1522 |
| Farrowing rate of sows inseminated at first estrus (%) | 87.2 | 85.0 |
| No. of piglets born alive P1 | 10.33 \pm 0.06 | 10.31 \pm 0.06 |
| No. of piglets weaned P1 | 10.31 \pm 0.03 | 10.30 \pm 0.03 |
| No. of piglets born alive P2 | 10.06 \pm 0.08† | 10.72 \pm 0.08† |
| No. of piglets weaned P2 | 9.78 \pm 0.08 | 9.98 \pm 0.07 |
| P2-P1 average piglets born alive | -0.27† | 0.41† |
| P2-P1 average weaned piglets | -0.53 | -0.32 |
| WSI < 7 days (%) | 77† | 91† |

* Starting at weaning, and each morning for 7 consecutive days, treated sows received 15 mg of altrenogest (Matrix; Intervet/Schering-Plough Animal Health) within a small part of their ration. Control sows were not given a placebo. Estrus was detected with boar exposure twice a day starting on the second day after weaning for the control group and the second day after the cessation of altrenogest for the treated group. Sows were artificially inseminated twice at 16- to 24-hour intervals with 3×10^9 sperm cells/dose.

† Differences between Control and Altrenogest groups were significant (chi-square; *P* < .05). P1 = parity 1; P2 = parity 2; WSI = weaning-to-service interval.

infection during our study may have influenced those results. This outbreak occurred in the farrowing facilities, which housed sows in both groups.

Second-parity decrease in litter size

The farm had an historical problem with a second-parity decrease in litter size. In the present study, sows from the Control group on average gave birth to 0.27 piglet less at parity two than at the first parity. In contrast, sows treated with altrenogest had a greater litter size as parity-two sows (10.72 piglets born alive) than as parity-one sows (10.31 piglets born alive; Table 1). However, this extra 0.41 piglet was not weaned by the sows. The PRRS outbreak that occurred during the study presumably contributed to the diminished survivability of piglets in most farrowing rooms in two of the farrowing buildings.

Weaning-to-service interval (WSI)

The percentages of treated and control sows returning to estrus within the 6 days after weaning (WSI < 7 days) and after the cessation of the altrenogest treatment were compared. As altrenogest stops the reproductive cycle during the time of administration, a WSI < 7 days in a sow from the control group would be comparable to a WSI < 14 days in a sow treated with altrenogest. In the Control

group, 77% of the sows returned to estrus and were serviced within the 6 days after weaning, whereas 91% of the sows treated with altrenogest were mated within the 14 days after weaning (Table 1).

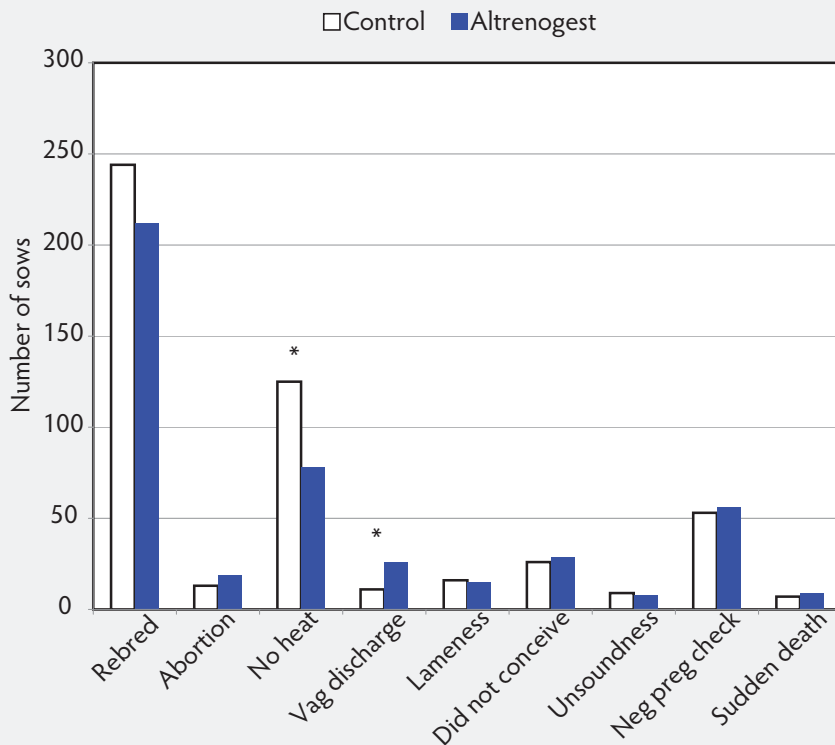
Discussion

As demonstrated in a previous study,⁶ farrowing rates of the sows successfully inseminated at the first detected estrus did not differ between the Control group and Altrenogest group, and variations between months did not disclose any trend during the hot months of the year. Thus, it is evident that altrenogest treatment did not influence farrowing rates.

The increased number of sows culled for vaginal discharge may be due to a change in estrus behavior in sows that would be more challenging to detect by personnel on the farm. Most vaginal discharges are a consequence of wrong insemination timing.⁷ Altrenogest, acting in a fashion very similar to progesterone, may have local immunosuppressive actions in utero, predisposing a sow to endometritis and therefore to vaginal discharge.⁷

One study⁸ found a tendency for the number of piglets born alive to be higher in sows treated with altrenogest for 3 days at weaning, compared to sows returning

Figure 1: In the study described in Table 1, reasons for sow culling during the study and sows bred more than once in order to conceive were compared between Altrenogest and Control groups. The rebred sows were not included in the overall farrowing rates in Table 1 and were not culled. Sows were culled for all other categories. The “no heat” sows failed to exhibit estrus following weaning or cessation of altrenogest treatment. “Failure to conceive” included sows that failed to conceive after mating. “Neg preg check” refers to sows that tested negative with real-time ultrasound at days 35 and 50 of a presumed pregnancy. Sows with a purulent vaginal discharge at 15-19 days after mating and returned to estrus were included in “vag discharge” category. An asterisk (*) over the bars indicates a significant difference between the Control group and the Altrenogest group (chi-square; $P < .05$).



to estrus without altrenogest treatment. In contrast, Werlang et al⁹ demonstrated fewer piglets born alive in the sows treated with altrenogest for 5 days. In this current study, duration of treatment was longer (7 days) than in the previous studies, and more live piglets were farrowed in the Altrenogest group than in the Control group. These divergent findings were explained, at least in part, by an insufficient duration of treatment in the previous studies. Indeed, a treatment of less than 10 to 12 days does not produce consistent results because the first dose of altrenogest given at weaning inhibits luteinizing hormone pulses for 4 hours, thereby resulting in recruitment of follicles that will enlarge and may still be present at the end of treatment, producing low-quality embryos.¹⁰ The fact that the higher number of pigs born alive did not transfer to the number of piglets weaned can be explained, as this experiment took place on a commercial site and circumstances in the farrowing

house, such as the PRRS outbreak, were unpredictable. Therefore, the number of piglets weaned does not necessarily represent the performance of the group. In addition, the PRRS virus infections contributed to preweaning mortality. Since the Control and Altrenogest sows were housed in the same farrowing rooms and farrowing buildings, piglets from both groups likely were affected by the virus. Unfortunately, the precise number of piglets affected was not documented.

It is important to emphasize that the extra 7 days given to primiparous females in the Altrenogest group facilitates their recovery and return to estrus (91% versus 77% in the Control group), as the main cause of reproductive problems in primiparous sows is diminished body condition in the preceding lactation.¹¹ It previously was demonstrated that extra recovery time after weaning improves subsequent reproductive performance.^{6,12} This was supported

by the present observation that fewer sows were culled for not returning to estrus after weaning in the Altrenogest group than in the Control group. Increasing the number of sows that return to estrus after weaning decreases the number of nonproductive days of primiparous females, with a positive economic impact on production.

Implications

- Under the conditions of this study, extending the weaning-to-estrus interval by treating with altrenogest for 7 days enhances the return to estrus in primiparous sows and increases the number of piglets born alive at the following farrowing.
- Under the conditions of this study, extending the weaning-to-estrus interval by using altrenogest does not influence farrowing rates.

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Conflict of interest

None reported.

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