RELEASING HORMONE AND VITAMIN EFFICIENCY IN THE TREATMENT OF OBSTETRIC AND GYNECOLOGICAL PATHOLOGIES IN BREEDING SOWS

Alex Chekan[1]
achekanne@gmail.com
Sergey Khilko[1]
[1]*Department of Obstetrics and Surgery*
Sumy National Agrarian University
160 Herasyma Kondratieva str., Sumy, Ukraine, 40021

Abstract: Reproduction is a crucial issue at the present stage in the pig husbandry development. Infertility of breeding sows leads to excessive use of feed, increased costs associated with failed inseminations, insufficient breed and early culling of sows.

Aim of the research. Study of infertility types and prevention of postpartum diseases in sows in order to develop methods to control them.

Methods. A two-stage experiment was carried out in 2019–2020 at the LLC "Ryasnyanske" farm in Sumy region, Ukraine. The first stage involved development of a method for prevention and control of infertility in sows. The second stage focused on the method of postpartum pathology prevention.

Results. The conducted research established that surfagon and vitamins manifested the highest efficiency in case of alimentary infertility as they increased fertilization by 20.8 %. In terms of symptomatic infertility, the best results were achieved through a combined use of surfagon and gonadotropic hormone for both primary and multiple fertilization of sows, especially considering extremely low values in the control group - 15 % and 6.5 % of piglets, respectively. Aminazine proved to be the most effective remedy for immune infertility, the obtained results were 17.2 % higher than in the control group. Surfagon at a dose of 5 ml together with estrofan twice a day fully prevented inflammatory postpartum pathologies in sows.

Conclusions. Pathologies of the reproductive organs in sows are widespread at pork-producing farms. Individual use of surfagon was justified for treatment of alimentary, symptomatic and immune infertility of sows and prevention of postpartum pathologies. A combined use of tissue therapy and biologically active drugs proved to be the most effective. The treatment regimens described above reduce infertility and prevent postpartum pathologies in sows.

Keywords: reproduction, sow infertility, releasing hormone, surfagon, immune, symptomatic, alimentary infertility.

1. Introduction

Productivity of pig-breeding farms mostly depends on the frequency of using breeding stock and the reproductive potential of sows. However, this production-related issue is studied insufficiently. There are numerous violations in the animal management and feeding, their technological exploitation and artificial fertilization which leads to suppression of the reproductive cycle in sows due to alimentary and symptomatic infertility, fertilization disruptions due to an increased sperm antibody titer, which is characteristic of the immune infertility [1, 2].

Sows during birth and the postpartum period are particularly susceptible to adverse exogenous and endogenous factors [3]. Frequent postpartum genital diseases eventually cause infertility in sows and insufficient quality and quantity of young animals [4].

A difference in the number and size of follicles is also observed depending on the season [5]. In summer, most sows have yellow masses instead of follicles [6]. Follicle development is inhibited during lactation, consequently, they reach a size of 0.3 cm to 0.6 cm [7]. Genetic issues cause a decrease in the reproductive capacity, which, in its turn, leads to a decrease in the number of young animals and their vitality [8, 9].

Moreover, retention of afterbirth in sows is associated with an increased period until the next productive fertilization [10].

Therefore, the **aim** of the research was to develop and test methods to control the main forms of infertility in sows, prevent postpartum diseases and achieve increased vitality of piglets.

2. Material and Methods

The research involved various biologically active drugs, primarily surfagon (releasing hormone). Its efficacy and safety provide for its use separately or in combination with other drugs to treat numerous obstetric and gynecological pathologies.

The research was carried out at a pork-producing farm with breeding stock of 800 sows in Krasnopillya district, Sumy region, Ukraine.

In the course of four seasons of 2019–2020, we studied the distribution of the main infertility forms. The research found that, after weaning piglets, alimentary infertility was registered in 17.0 % of the main sows and 35.2 % of tested ones. These were mostly thin sows which did not manifest their reproductive cycle for 25–30 days after weaning.

All the animal studies follow ARRIVE guidelines and have been performed according to the UK Animal Act (Scientific Manipulations) 1986 and the relevant principles [11].

At the site of insemination, 6.4 % of the main sows and 1.9 % of tested ones showed signs of anaphrodisia, which appeared for 25 days after weaning or more, these sows were part of the group showing symptomatic infertility. 9.1 % of the main sows and 11.4 % of tested ones were also diagnosed with immune infertility, these sows showed indications of nymphomania, the number of failed inseminations after weaning ranged from 3 to 6.

Development of methods to control these forms of infertility in the experimental period required four groups formed on the basis of the principle of analogy, namely one control group and three experimental ones. Each group included 20 animals aged 3–5 years and weighing from 480 kg to 550 kg.

Sows showing alimentary infertility in the first experimental group received subcutaneous injections of surfagon at a dose of 5 ml twice: 25 days after weaning for the first time, and 72 hours after the first injection for the second time. Sows of the second group received an intramuscular injection of catozal twice at a dose of 5 ml at similar intervals. The third group combined the use of both drugs at similar intervals and doses. In the control group, no drugs were administered.

The first group sows with symptomatic infertility were also injected with surfagon subcutaneously at a dose of 5 ml twice: 30 days after weaning for the first time, 72 hours after the first administration for the second time. Sows of the second group received catozal twice at a dose of 5 ml at the intervals similar to those of surfagon. Combined administration of both drugs at the established doses with the same interval was used for the third group.

The first group with immune infertility was injected with surfagon administered subcutaneously at a dose of 5 ml, 6 hours before insemination for the first time and 24 hours after the first injection for the second time. The second group sows received chlorpromazine hydrochloride intramuscularly twice at a dose of 5.0 ml at the intervals similar to surfagon administration, the third group combined administration of surfagon and aminazine at the established doses and at the same intervals.

Statistical analysis. The obtained digital materials were processed using variation statistics on the basis of SPSS Data editor, vers. 17.0 proceeding from the Tukey test with a Bonferroni adjustment [12].

3. Results

The results presented in the paper show that various forms of infertility are widespread in the sows.

Data on the treatment of sows with alimentary infertility are presented in **Fig. 1.**

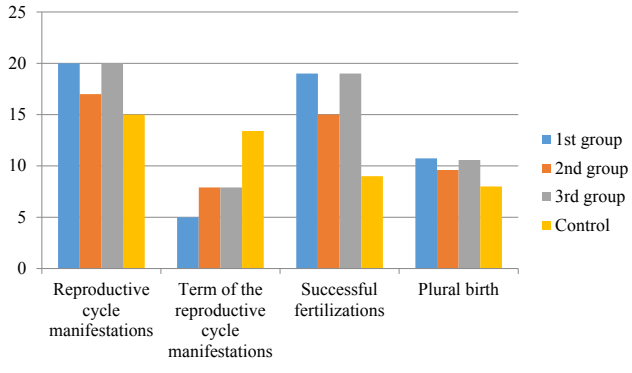

Fig. 1. Reproduction levels when treating sows with alimentary infertility

After stimulation of reproductive function in sows with alimentary and symptomatic infertility in the experimental groups, the percentage of animals which showed manifestations of the reproductive cycle significantly exceeded the control values, except for the use of tetravit.

After tetravit administration for alimentary infertility, the fertilization percentage in relation to the total number of animals in the groups exceeded the control by 20.8 %, after tissue therapy, the first and third groups showed a percentage which is higher by 39.0 % indicating a significantly higher efficiency of surfagon in comparison with vitamins. This is confirmed by plural birth.

The data obtained on the basis of treatment of sows with symptomatic infertility, differ significantly from those with alimentary infertility. The results are presented in **Fig. 2.**

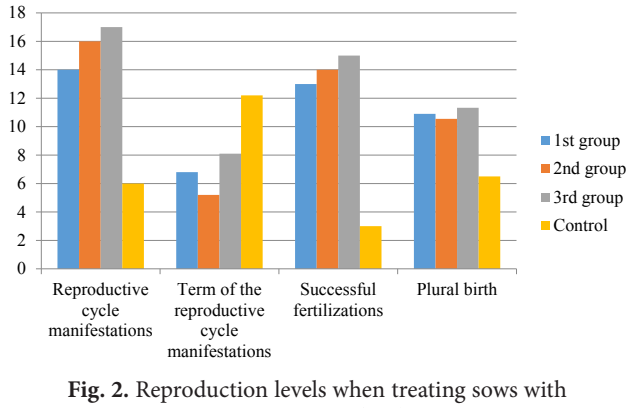

Fig. 2. Reproduction levels when treating sows with symptomatic infertility

In case of symptomatic infertility, surfagon efficacy was slightly inferior to that of gonadotropic hormone, the best results were achieved through their combined use in terms of both fertility and plural birth in sows, especially considering extremely low values in the control group – 15 % and 6.5 piglets, respectively.

Immune infertility in sows and results of the research on treatment of sows with this form of infertility are presented in **Fig. 3.**

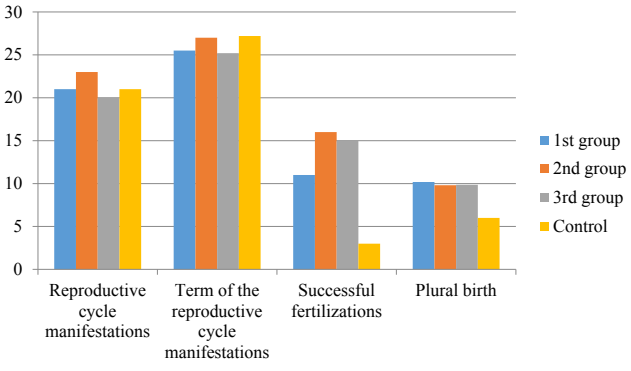

Fig. 3. Reproduction levels when treating sows with immune infertility

Separate administration for treating immune infertility showed that in the 1st group fertility rates were 17.2 % lower than in the 3rd group with aminazine. This can be explained by a probable difference ($P<0.001$) in the decrease in serum antibody titer of sows observed in the first group (from 1:277±37 for 24 hours before treatment to 1:135±19 24 hours after treatment) and the second one (from 1:256±36 to 1:48±15). The combined use of the drugs mentioned above proved more effective, despite a moderate decrease in sperm antibody titer from 1:271±30 to 1:70±8. This indicator in the control group grew from 1:290±37 to 1:495±61.

Stimulating effect of drugs for alimentary and symptomatic infertility confirms a reduced time needed for the sows to return to their reproductive cycle, such a decrease reached 4.1–8.4 days.

The next stage of the research was focused on the development of methods for the prevention of postpartum pathologies. Results of the study are presented in **Table 1.**

Importantly, postpartum pathologies such as endometritis were registered in 9.2 % of sows for a year. Surfagon was used for their prevention, both administered separately and in combination with estrofan, an equivalent of F2α. In the summer of 2020, when this pathology was rather frequent, we formed a control group and three experimental ones: the first group, including the main sows as well as tested ones, received i. m. injections of surfagon at a dose of 5 ml 14 days before birth. On the 112th day of pregnancy 1 ml of estrofan was administered intramuscularly; the second group only received surfagon at a dose of 5 ml twice: 14 days before farrowing for the first time and on the day of farrowing for the second time; the third group used a combination of drugs: surfagon at a dose of 5 ml twice: 14 days before farrowing for the first time and on the day of farrowing for the second time; and administration of estrofan, prostaglandin $F_2\alpha$ equivalent, at a dose of 1 ml on the 112th day of pregnancy.

Therefore, the first and the third group, where surfagon was used twice, showed no cases of reproductive pathologies, in the second group, one sow suffered from endometritis, which may suggest that this drug is more effective than prostaglandin. In the control group, however, endometritis was observed in one in three animals and was mostly associated with cervicitis and vulvovaginitis.

The preventive effect of the drugs is accounted for by their ability to increase the tone of the genital system, as confirmed by more intensive uterine movements in farrowing and shorter stages of birth, respectively.

Table 1
Prevalence of postpartum diseases, duration of birth and vitality of piglets when using surfagon and estrofan

Drugs	Groups	Number of sows, animals	Duration of birth, min			Average interval between births, min	Prolificacy, animals	Stillbirth, animals	Vitality of piglets, %
			preparatory	birth	afterbirth				
Surfagon +estrofan	1	16	139.7±13.9***	143±17.7**	75±8.3***	27.4±8.6	6.81±0.59	0.44±0.3	70.6
Surfagon twice	2	25	135±18.7***	183±20.9	138±6.4***	28.5±7.9	8.72±0.34	0.20±0.2*	71.9
Surfagon twice + estrofan	3	25	99±11.3***	101±12.1***	96±6.4***	13.4±1.3***	7.40±0.45	0.36±0.21	86.9
No drugs administered	Control	18	215±15.1	211±20.3	183±10.2	27.5±2.4	7.89±0.48	1.50±0.56	64.8

*Note: * – p<0.05; ** – p<0.01; *** – p<0.001*

All the experimental groups revealed a probable reduction (p<0.001) of the preparatory and afterbirth periods, the third group showed even a reduced period of birth. Consequently, the number of stillborn piglets in the experimental groups dropped as well.

Preventive treatments produce a positive influence on the viability of piglets. Survival of piglets after weaning also proved higher in the experimental groups, especially in the third one where surfagon was injected twice along with a single injection of estrofan, prostaglandin $F_2\alpha$ equivalent, the obtained values exceeded those in the control group by 22.1 %.

A higher survival rate of young animals is determined by the releasing hormone which significantly increases milking capacity in sows. Thus, another experiment conducted in autumn 2019 and involving use of pure surfagon for tissues (10 days before farrowing and on the day of farrowing) revealed that the average live weight of piglets on the 21st day was by 0.66 kg higher than in the control group (P<0.001). In the experimental group, survival of young piglets after weaning exceeded the control values by 16.2 %.

4. Discussion

The research results showed that prevention and treatment of infertility in sows are broadly covered in the works of many authors [13, 14].

The research yielded positive results which can be applied in order to increase profitability of pork farms, which is of great importance for owners. Such procedures are able to improve the general sow management. Some authors focus on this issue in their studies [15].

According to the results, the duration of labor in sows in the control group reached 215±15.1 min, which is consistent with the findings of other researchers, who indicate that labor lasts 280 min [16]. The author mentions a 17 % rate of stillbirth in piglets, while the percentage we found was 1.5 %.

Moreover, some authors consider application of the developed methods aimed at prevention of stillbirth and reduction of the farrowing time to be a viable solution [17].

Disadvantages of our methods include time-consuming application, which requires close adherence to the methods and repeated administration of drugs as well as appropriate conditions of animal management and feeding.

The research results show that genital pathologies are frequent in sows at pork-producing farms. Surfagon has proved to be effective in the treatment of alimentary, symptomatic and immune infertility and in the prevention of postpartum pathologies.

The experiment is of practical value as it provides for the development and testing of methods for prevention and treatment of various forms of infertility and postpartum pathologies in sows.

5. Conclusions

Genital pathologies in sows are widespread at pork-producing farms. The use of surfagon proved to be justified in treating alimentary, symptomatic and immune infertility and preventing postpartum pathologies. Combination of tissue therapy and appropriate biologically active drugs, however, was more effective. The treatment regimens were able to reduce infertility and prevented postpartum pathologies.

Conflict of interest

The authors declare that they have no conflicts of interest.

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