Postpartum therapy of reproductive organs in high-yielding cows after multiple pregnancy

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Abstract. The article presents data on the frequency of twins in dairy cows, an analysis of cases of postpartum pathologies and the results of treatment and preventive measures in an agricultural enterprise in the Volgograd region. The work was carried out in the Limited Liability Company "SP "Donskoye" of the Volgograd region on Holstein cows with a milk productivity of 8,000-10,000 kg. At the first stage of the work, an analysis of the level of multiple pregnancy in cows in the herd was carried out, for this purpose, indicators of zootechnical and veterinary records and reporting for 2022-2023 were used. Ultrasound examination was used to determine twinning in cows. Cows with multiple pregnancy were monitored until parturition. Animals identified with pathologies of the genital organs in the postpartum period of multiple pregnancy, depending on the nature of the pathology, were subjected to treatment. The results of the study of the twinning rate in cows in the agricultural enterprise of the Volgograd region show that the number of twins in the total structure of calvings for the analyzed periods amounted to 4.2-2.4%, respectively. It was found that the level of diseases in the studied cows with uterine subinvolution was 37.2%-24.7%, placenta retention - 22.0%-27.2%, endometritis 34.0%-39.5%, respectively. The effectiveness of 1 treatment regimen for endometritis in the postpartum period in cows was determined. The study of the phenomenon of multiple pregnancy in cattle seems to us to be a promising direction that allows us to develop measures to reduce unfavorable factors during twin pregnancy, as well as to avoid various negative phenomena associated with twinning.

1 Introduction

Currently, there is an increase in the number of multiple pregnancies in cows in dairy production, which is probably due to the increased use of hormonal agents to control reproductive processes in animals. High-yielding cows are characterized by singleton pregnancy, but in dairy cattle the frequency of multiple pregnancies, namely twins, is 3 - 4%. Multiple pregnancy in cows is an undesirable phenomenon in dairy production, since they develop a number of pathologies associated with the reproductive system, as a result of

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which the amount of milk yield decreases [6, 9]. The Holstein breed is considered one of the most prone to multiple ovulations, which is why it needs more attention [6-7]. And also it is necessary to correctly compose the diet of pregnant cows. The diet was balanced according to the period of pregnancy of the cow. It was very important to understand that it is impossible to overfeed the cow [1].

One of the important factors in preventing the development of postpartum pathologies was the correct assistance provided during obstetrics [4].

In case of multiple pregnancy, the presentation of the fetuses and pelvimetry in the prenatal period are taken into account for the accurate provision of obstetric assistance.

The classic symptoms of approaching calving include: the udder increases in size due to the presence of milk in it, swelling of the vulva is noticeable and transparent discharge is observed. The tail is slightly raised in the form of an arc, the cow often turns to the stomach. She makes loud moos and shows anxiety [9].

Determining the presentation of the fetus plays an important role in obstetrics, so if the first (closest) calf comes out head first, it is necessary to put it in a position in which the forelimbs are extended in front of the body, and the head rests on them. In the case of a posterior position, both hind limbs should be straightened. In a transverse position, the calf should be turned in any direction convenient for the veterinarian [4].

It is important to pay attention to the position of the cow: if the pelvis is too close to the wall of the stall, this can hinder the exit of the calf from the birth canal, after the appearance of the limbs, the first calf comes out completely no more than half an hour later. Following the birth of the calf, we carry out a similar analysis of the presentation of the second calf and help it to be born [2]. If the fetus is too large to pass through the birth canal, then loops of treated ropes (with a diameter of at least 1 cm) are placed on the calf's limbs. Then they begin to pull slightly upward and towards themselves, synchronizing the movements with pushing. This will be enough to provide assistance [8]. Then we observe the birth of the second calf and make decisions separately for it. Nowadays, there are many different treatment regimens for postpartum pathologies in cows with multiple pregnancies, but not all are effective [3, 5].

Therefore, treatment and prevention of the genitals in highly productive cows in the early puerperal period after multiple pregnancies is an important task for a veterinary specialist.

2 Materials and methods

The scientific and economic research was conducted in the conditions of LLC "SP "Donskoye" in the Kalachevsky district of the Volgograd region from 2022 to 2023. To conduct the research, we selected a building for 3,400 dairy cows in the livestock building "Derzhava". We monitored the level of multi-pregnancy of cows, and also took into account data on postpartum pathologies. We developed treatment regimens for each pathology separately. The objects of the study were highly productive dairy cows of the Holstein breed aged 2 to 5 years in the postpartum period.

Multiple pregnancy is determined using timely ultrasound diagnostics, which helped us determine the presence of one or more fetuses. We used the EASI-SCAN E3 device for rectal and ultrasound examination. The selected animals were transferred to a separate maternity block: soft, clean bedding (changed every day). Unlimited watering, access to a feeder.

The animals we identified with pathologies after multiple pregnancy were treated according to the following schemes.

1. With slow reverse development of the mucous membranes and the uterus itself after birth to the state characteristic of the organ in a non-pregnant female, a disease such as subinvolution of the uterus is characterized. We proposed the following treatment regimen:

- 1-3 days: Uteroton 10 ml + Biostimulgin 30 ml subcutaneously - 1 time per day.
- 4-5 days: Uteroton 10 ml - 1 time per day.
- 6 days: Rectal examination of the cow (presence of discharge, temperature indicator, as well as the general condition of the animal)

2. Pathology: retention of placenta - is a slowdown in the release of postpartum membranes after calving, and this occurs after a certain period of time. Treatment regimen:

- 1-5 days: Ceftonit 30 ml intramuscularly + Uteroton 10 ml intramuscularly - once a day.
- 6 days: Day of checking the mucous membranes and rectal examination.

3. Postpartum endometritis is a pathology characterized by acute inflammation of the uterine mucosa.

We proposed two treatment regimens.

Treatment regimen 1:

- For five days, we administer the following drugs: Ceftonit 30 ml intramuscularly + Uteroton 10 ml intramuscularly + NSAIDs 20 ml subcutaneously, once a day.
- Day 6: Rectal examination

Treatment regimen 2. Milk withholding – 5 days*:

- 1 day: Amoxicillin (1 ml per 10 kg IM) + Uteroton 10 ml IM + NSAIDs 20 ml IM.
- 2 day: Uteroton 10 ml IM + NSAIDs 20 ml IM.
- 3 day: Amoxicillin (1 ml per 10 kg IM) + Uteroton 10 ml IM + NSAIDs 20 ml IM.
- 4 day: Uteroton 10 ml IM + NSAIDs 20 ml IM.
- 5 day: Amoxicillin (1 ml per 10 kg IM) + Uteroton 10 ml IM + NSAIDs 20 ml IM.
- 6 day: Rectal examination.

4. Postpartum therapy for ruptures of the vulva and birth canal consists of using ointment or liniment. We directly use Ichthyol ointment, which has local anesthetic, anti-inflammatory and antiseptic effects. When this drug is applied to the skin and mucous membranes, it can cause minor irritation of sensitive nerve endings, which leads to the activation of reflexes that change tissue nutrition. As a result, the mechanism responsible for regulating vascular tone and restoring blood circulation is launched.

Data collection was carried out using the Dairy Comp 305 program and veterinary journals.

According to the animal registration log, 226 cows with multiple pregnancies were identified during the study period. The average annual milk yield per cow over two years was 9,575 kg. There were 3,400 dairy cows at the Dervava livestock complex at the time of the study.

The data obtained were analyzed using Microsoft Excel 2007.

3 Results

The data we collected revealed the most frequently encountered pathologies in the postpartum period at the enterprise Limited Liability Company "SP "Donskoye" (Table 1).

Table 1. Postpartum pathologies in dairy cows for 2022-2023.

No.	Type of pathology	Number of identified pathologies			
		year	heads	year	heads
1	Vulvar rupture	2022	120	2023	116
2	Uterine subinvolution		142		160
3	Retained placenta		130		140
4	Postpartum endometritis		135		150
5	Rupture of the birth canal		3		5

We have found that in 2022, subinvolution of the uterus occurs in 4.2% of cases, which is 142 heads. At the same time, in 2023, 80 heads (2.4%) fell ill with this pathology. The lowest percentage in the years studied were pathologies associated with rupture of the vulva and birth canal - 244 heads, which is 6%. We also established postpartum pathology in multiple pregnancies, shown in Figures 1a and 1b.

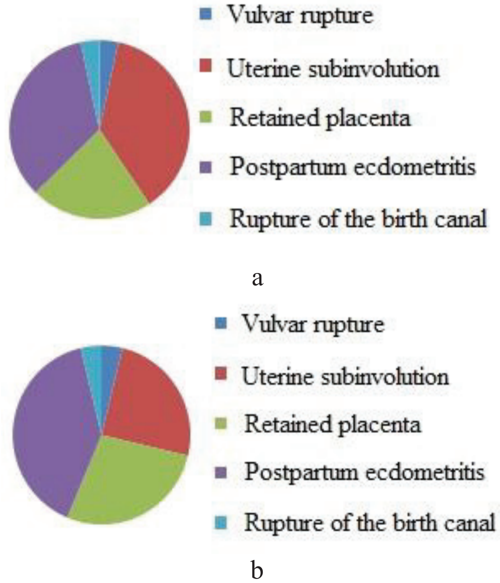

Fig. 1. The number of postpartum pathologies in multiple pregnancies in dairy cows: a) for 2022; b) for 2023.

Analyzing the obtained data, we can conclude that at the Donskoye SP Limited Liability Company in 2022, the most common type of uterine subinvolution is 22% and 27.2% more than in 2023. Placenta retention in cows is 22% and 27.2%. Postpartum endometritis was observed in 34% and 39.5%, respectively.

The use of uteroton after multiple pregnancies in combination with biostimulgin during the first hours after birth reduced the incidence of uterine subinvolution and endometritis by 2.5 times and reduced the time of placenta separation by 11 hours.

Also, we cannot ignore such a pathology as postpartum endometritis, which is an acute inflammation of the uterine mucosa, which most often develops on the 8th or 10th day after birth.

Since endometritis can become chronic, which can lead to symptomatic infertility, we have proposed treatment regimens for this pathology. It was found in 2022 that 65 out of 75 cows recovered according to one of the treatment regimens. Consequently, we developed a 2nd treatment regimen and achieved the effectiveness of its use in up to 99.9% of cases of recovery.

Table 2. Results of treatment of cows with signs of postpartum endometritis.

	Scheme 1: n= 75 heads			Scheme 2: n= 75 heads		
	Healthy		Relapse	Healthy		Relapse
Day of recovery	5	74	1	7	65	10
Day of coming into heat	27	73	2	33	67	8
Return of genitals to normal condition	6	74	1	9	64	11

We found that cows treated according to the 2nd treatment scheme had a higher relapse on the day of recovery, which was 13.33%. We developed the 1st treatment scheme, the indicators of which have a much better result. Namely, out of 75 cows, 74 cows were cured on the 5th day, which is 99.9% of the total number of the experimental group. On the 27th day, 73 cows came into heat, which is 6 cows more than in the second group with the 2nd treatment scheme. Considering such an indicator as the return of the genitals to the normal state after this pathology, we can determine that 99.9% of cows recovered faster when treated with the 1st scheme.

Since Holstein cows are prone to large fetuses, the cause of most cases of genital trauma can be during labor.

We collected statistical data on the weight categories of newborn calves in singleton pregnancies (Table 3).

Table 3. Weight category of newborn calves.

Singleton pregnancy			
2022		2023	
Weight, kg.	**heads**	**Weight, kg.**	**heads**
45	60	45	72
50	248	50	375
55	345	55	540
60	190	60	264
65	34	65	48

Table 1 shows that the number of large-fruited calves is growing. Thus, in 2022, calves weighing from 60 kg amounted to 224 heads, then in 2023 this figure was 88 heads more. As a result, the risk of developing pathologies associated with rupture of the vulva, vagina and cervix increases.

Table 4. Weight category of one newborn calf.

Multiple pregnancy			
2022		2023	
Weight, kg.	**heads**	**Weight, kg.**	**heads**
18	44	18	58
20	50	20	54
34	51	34	58

Table 2 shows that regardless of the low weight of the calves, their number increases, which indicates a high load on the birth canal. If the calf's weight fluctuates between 18 and 20 kg, then the birth can take place without such pathologies as rupture of the birth canal, but starting from 21 kg and above, the risk of injury to the cow's genitals increases.

4 Discussion

Thanks to the use of timely ultrasound diagnostics, we have studied the phenomenon of multiple pregnancy. This allowed us to develop a plan for postpartum therapy for pathologies of the reproductive organs of cows both during the birth period and in the postpartum state, since they lead to disruption of the reproductive rhythm, decreased fertility, an increase in the period of the cow's coming into heat and premature culling of the animal. Most often, these diseases develop as a result of infection of the genitals, damage to the mucous membrane, as well as weakening of the contractile activity of the uterus, as well as with incorrect diagnosis of the position of the fetus. Prevention consists of timely transfer of pregnant cows to the maternity ward, observation should be both day and night. It is necessary to monitor the condition of the animal's body until its recovery (take into account body temperature, separation of the placenta, the state of the vaginal mucosa).

A negative consequence of multiple pregnancy may be a decrease in fertility, especially in multiparous cows (e.g., the interval between calvings increased by 20 days, the period of reproductive rest by 10 days, and the period of insemination by 11 days, while the number of inseminations per pregnancy increased by 0.20). In addition, multiple pregnancy in cows reduced the probability of survival until the next calving. Increasing the level of milk productivity in cows shows that special attention should be paid to their early diagnosis. This can help reduce the negative consequences of multiple pregnancy.

Regardless of whether preventive and therapeutic measures are applied on the farm, pregnancy diagnosis is the key to monitoring the likelihood of twins. Rectal palpation can differentiate between singleton and multiple pregnancies. Transrectal ultrasound is the most common method in practical conditions, as it can detect both singleton and multiple pregnancies. In addition, the heartbeat (and viability of the fetus) and the yolk sac can be monitored. In cows with twins, vascular embryonic fusion occurs already at an early stage of fetal development, so there can be no talk of termination of pregnancy. This important process of placental anastomosis is probably the reason for the high frequency of termination of pregnancy after natural or artificial reduction of twins in cattle. To reduce the number of twins in cows on the 28th to 40th day of pregnancy, such methods as manual crushing of the amniotic sac or suction of allantoic fluid under the control of transvaginal ultrasound are proposed. Before making any attempt to reduce the size of the embryo, it is necessary to ensure that both twins are alive.

5 Conclusion

Based on the results of our study, we can conclude from the animal registration log that 4.2% and 2.4% of the total number of cows with multiple pregnancies were identified in 2022 and 2023, respectively, which is 145 heads in 2022 and 81 heads in 2023. At the Donskoye SP LLC, the most common pathology is subinvolution of the uterus, which was 37.2% and 24.7% in 2022 and 2023, respectively. However, the incidence of such a pathology as retention of the placenta also has interesting statistics, namely, 22% were identified in 2022, which means that there are 5.2% fewer cows than in 2023. In percentage terms, postpartum endometritis accounted for 34% in 2022 and 39.5% in 2023.

In case of subinvolution of the uterus and postpartum endometritis, a comprehensive approach to the treatment of animals is required. The main priority measure in each case should be the removal of the corpus luteum. This action should be combined with subsequent massage of the uterus and the use of therapeutic agents. This approach significantly increases the effectiveness of treatment, and also significantly reduces the number of days during which infertility is observed. As a result, the proportion of successful inseminations in animals increases.

Due to the fact that we have conducted a comparative assessment of two treatment regimens for postpartum endometritis in cows, we can make the following conclusion: according to Table 2, we see that according to the 1st treatment regimen, on the 5th day of recovery, we had 74 heads out of 75, which indicates a high therapeutic effectiveness of this regimen. Comparing such an indicator as the return of the cows' genitals to the normal state, we can see that according to the 2nd treatment regimen, there are 10 fewer cows than according to the 1st treatment regimen. These data confirm that the therapeutic efficacy of the first treatment regimen for postpartum endometritis in cows after multiple pregnancies is 12.9% higher than that of the second treatment regimen.

One of the effective methods of restoring the reproductive capacity of cows is a combination of drug therapy with massage of the uterus and ovaries. Among the drugs that show good results, it is worth noting the use of uteroton in combination with biostimulgin. In severe cases, an antibacterial drug is added - amoxicillin. It should not be forgotten that this is a long-acting drug that requires keeping milk for 5 days from the last administration of the drug.

Also, postpartum therapy of highly productive cows with multiple pregnancies cannot but include preventive measures and highly qualified assistance of a veterinary obstetrician. Preventive measures include round-the-clock monitoring of the pregnant cow, keeping a separate journal with data on temperature readings, activity, availability of diet and exercise, the occurrence of depression - complete supervision of the animal from the moment it is determined that the cow has twins until the birth process itself. And it is especially worth paying attention to providing assistance during childbirth, since the postpartum recovery of the cow will depend on this.

Obstetric care must be carried out taking into account the anatomy of the birth canal and the position of the fetus in relation to it. It is also worth remembering about septic and antiseptic measures during obstetric care. Corrections of incorrect positions, positions and limb arrangement of fetuses should be carried out only in the uterus and in turn, first the first fetus, then the second.

During calving, it is important to minimize the risk of injury to the animal, since it is damage and ruptures of the birth canal during childbirth that are considered one of the key factors contributing to the occurrence of postpartum pathologies. It should be emphasized that such injuries can occur not only during difficult and abnormal births, but also during normal delivery. Damage to the mucous membrane creates conditions favorable for the proliferation of opportunistic microflora, which can lead to the development of various gynecological diseases.

Summarizing our research, we can highlight such an aspect as large-fruited fetuses. From Table 3, we can see that starting from 55 kg, the risk of ruptures of the birth canal may increase, due to the fact that the calf is large and can harm not only its body, but also the health of the mother. And for us, as veterinary specialists, first of all, it is important to preserve the reproductive organs of the cow and the life of the calf. So in 2022, calves weighing from 55 kg are 569, then in 2023 this figure is 283 calves more. As a result, the possibility of various additional postpartum pathologies increases.

However, based on the data in Table 3, we observe small weight indicators: in 2022, calves weighing less than 20 kg amount to 94 heads, while in 2023 - 112 heads. But, during the labor of a cow pregnant with twins, the load on the cow's body doubles, namely on the birth canal: pelvis, sacrum, cervix, vagina, vestibule of the vagina and vulva.

The study of the phenomenon of twins seems to us a promising direction. For example, diagnostics using ultrasound examination of pregnant cows with twins in the early stages of pregnancy will provide an opportunity to organize a special feeding and maintenance regime for these animals. This will help prevent various negative phenomena associated with multiple pregnancy.

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