Reproductive function of cows depending on lipid metabolism

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Aims and Objectives

The purpose of the work is to determine the etiopathogenesis of reproductive dysfunction in highly productive cows. To achieve this goal, the following tasks were solved:
- to study the lipid peroxidation and the state of the ascorbant and thiol-disulfide redox system and the content of vitamins A and E depending on the physiological state;
- determine the effect of the lipid spectrum of blood serum of dry cows on the course of labor and the postpartum period.

Table 1. Biochemical blood parameters of pregnant and unfertilized cows

Values	Groups of animals		Difference %
	First (pregnant)	Second (not pregnant)	
Number of animals	20	17	
Total lipids, mg %	426.1±23.4	358.6±21.9	-15.84
Phospholipids, mg %	267.5±18.3	259.0±18.7	-3.18
Free cholesterol, mg %	34.2±2.8	24.4±3.2	-28.65
NEFA, mg %	44.7±3.0	17.05±3.1	-61.91
Triglycerides, mg %	21.64±2.7	3.74±1.9	-59.61
Esters of cholesterol, mg %	58.11±4.7	49.44±4.2	-14.91
Lipid hydroperoxides (MDA), μmol/L	4.89±0.45	5.03±0.62	+2.85
Diene conjugates (rel. Optical units per 1 ml of plasma)	1.48±0.21	2.11±0.26	+42.57
Vitamin E, mg % (tocopherol)		0.712±0.092	-25.65
Vitamin A, mcg %	42.3±2.9	37.5±3.8	-11.3
Ascendant system:			
(ox.form), mg %	0.38±0.06	0.41±0.06	+7.89
(reduced form), mg %	0.39±0.05	0.28±0.04	-26.3
Thiol Disulfide System:			
(ox.form), mol/l	22.0±1.8	29.3±3.1	+33.18
(reduced forms), mol/l	32.8±2.3	28.4±2.5	-13.42

Result

The study found that at an early stage of pregnancy, cows have a significant difference in lipid metabolism and in their peroxidation, in the state of antioxidant systems compared to unstable animals. In the process of pregnancy development in cows, there is a decrease in the level of total lipids and their class, and the accumulation of products of transoxidation of lipids is reduced. In animals with retention of the placenta, a low lipid metabolism and a higher level of peroxidation were established already in the dry period. After calving, this difference increases.

Conclusion

The obtained data can be used to develop an algorithm for the prevention of postpartum complications in cows by using substances with antioxidant properties.

Materials & Methods

The studies were conducted on cows of black–motley breed aged 3–5 lactations with a live weight of 480–520 kg. For this, one group of cows was formed on the principle of paranalogs in the amount of 37 animals inseminated in the first sexual hunt after calving, followed by taking blood samples from them using the Monovet system, considering the duration of pregnancy. During the start-up period, blood was taken 1–4 days before calving and on the first day after calving. A total of 253 blood samples were examined. Subsequently, depending on the effectiveness of insemination, animals were divided into two groups. The first group included inseminated cows after the first insemination (20 animals), the second group included 17 unfertilized cows after the first insemination. Subsequently, blood was taken from animals considering the course of childbirth and the postpartum period. Blood counts were studied according to generally accepted methods using certified equipment.

Table 2. Biochemical indicators of lipid metabolism depending on the manifestation of birth and postpartum pathology

Indicators	Parturition and the postpartum period	Physiological periods		
		dry	before calving in 1–4 days	1–2 days after calving
Total lipids, g/l	without pathology	3,42±0.22	3.38±0.25	3.02±0.23
	with pathology	3.09±0.27	2.99±0.11	2.63±0.08
	difference in %	-9.65	-16.54	-12.92
Phospholipids, mg %	without pathology	233.97±20.19	227.87±17.87	208.49±18.96
	with pathology	207.23±13.47	201.05±17.18	178.45±5.47
	difference in %	-11.43	-11.77	-14.41
Free cholesterol, mg %	without pathology	22.29±1.62	22.30±3.61	18.58±1.71
	with pathology	19.21±2.34	17.65±1.57	15.81±1.25
	difference in %	-13.82	-28.60	-14.91
NEFA, mg %	without pathology	19.36±2.36	24.75±2.02	19.02±2.65
	with pathology	20.71±1.85	22.64±1.88	20.58±1.49
	difference in %	+6.97	-8.86	+8.20
Triglycerides, mg %	without pathology	10.42±1.23	8.96±1.13	9.37±1.05
	with pathology	9.16±0.99	10.76±2.01	8.32±1.03
	difference in %	-12.10	+20.08	-11.21
Esters of cholesterol, mg %	without pathology	48.93±2.23	51.79±6.57	43.75±3.69
	with pathology	46.67±5.01	47.37±4.14	40.23±2.39
	difference in %	-4.62	-8.54	-8.05

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