Національний університет біоресурсів і природокористування України

Факультет ветеринарної медицини

НДІ Здоров'я тварин

«ЄДИНЕ ЗДОРОВ'Я – 2022»

Матеріали Міжнародної наукової конференції

22-24 вересня 2022 р.
НУБіП України, м. Київ

UDC 619:613.25636.082.4636.2

CHANGES IN IMMUNE RESPONSES IN PATHOLOGY OF PREGNANCY AND IN THE POSTPARTUM PERIOD

Zhelavskyi M. M.[1], Doctor of Veterinary Sciences, Professor, Kernychnyi S. P.[2], Candidate of Veterinary Sciences, Docent, Betlinska T.V.[2], Assistant

[1]Academy of Sciences of the Higher School of Ukraine, Isaac Str., 18, Kyiv, 01135, Ukraine

[2]Higher educational institution «Podillia State University», Shevchenko Str., 12, Kamyanets-Podilsky, 32302, Khmelnytskyi Region, Ukraine

The reproductive function of cows is ensured by a homeostasis system, coordinated and harmonized function of all organs and systems, which is maintained during all their live (Duehlmeier et al., 2013; Wankhade et al., 2017; Souto et al., 2019). Only under such conditions will estrous cycles appear in animals. All favorable be created for early gestation, the development of pregnancy. Also the course of normal childbirth and the restoration of the body in the postpartum period (Bernabucci et al., 2005; Yablonskyi & Zhelavskyi, 2014).

The **aim** of this study to investigate scientific data and analyze modern practical approaches related to metabolic disorders. Also investigating immune response in the body of cows in the during pregnant and the postpartum period.

Clinical and experimental investigation was carried out in farms of the Khmelnitsky region of Ukraine. Studies were performed in the period 2018-2022. The

object of the research was the cows *(Bos taurus taurus*) of *Ukrainian Black-and-White dairy breed*, formed on the basis of using the method in groups and periods. The content of circulating immune complexes (CIC) was studied in our modification (Yablonskyi&Zhelavskyi, 2017).

The development of pregnancy pathology in cows was accompanied by significant changes in clinical and status, as well as changes in biochemical and immunological parameters. Symptoms of preeclampsia were impaired cardiac activity, increased blood pressure, and increased breathing. The heart rate in cows increased from 68.2 ± 3.18 to 83.1 ± 1.17 beats / min ($P < 0.001$), the respiratory rate from 17.3 ± 0.45 to 19.2 ± 0.52. Systolic blood pressure: up to 120.2 ± 1.85 mmHg (systolic) and 61.5 to 68.6 ± 2.27 mmHg (diastolic) vs 117.2 ± 2.15 and 58.5 ± 1.24 in the control group (C1).

Laboratory tests of urine of cows with preeclampsia detected proteinuria (1.62 ± 0.03 g / l, $p < 0.05$) and a shift in pH (7.8 ± 0.02 vs 7.3 ± 0.01 in the control).The pathological process in the body of pregnant cows was also accompanied by activation of aminotransferases: AST and ALT. Activation of enzyme systems indicates the involvement in the pathology of not only the placenta but also the liver, kidneys and myocardium. The development of preeclampsia of cows was accompanied by an increase in the content of MSM from 0.2 ± 0.01 to 0.3 ± 0.03 Mol.Wt. ($P < 0.01$), and an increase in the level of average molecular circulating immune complexes. These processes confirm the presence of overstrain, metabolic processes and the growing syndrome of endogenous intoxication and the development of immune reactions in the pathogenesis of this disease.

To date, the relationship with the genetic determination of various breeds of cows, the influence of the conditions of maintenance, exploitation and productivity on their reproductive function are being comprehensively studied. More and more information appears that the dairy herd is most susceptible to metabolic and reproductive diseases both during dead wood and in the early postpartum period (Eremina et al., 2003; Bani Ismail et al., 2008).

Numerous studies show that since the beginning of lactogenesis in dairy farms, the risk of manifestation of metabolic pathologies in cows has increased significantly, which often lead to the development of infertility. Researchers comprehensively study the etiology and pathogenesis of these disorders and often associate the onset of disease development with the moment of the greatest manifestation of negative energy balance (Roche et al., 2000; Kitabchi et al., 2004; Zhelavskyi, 2012).

Metabolic disorders of carbohydrate, protein and lipid metabolism in the early period of lactation are often accompanied by acetonemia (ketosis) and the development of Fatty liver dystrophy. A prolonged energy deficit affects a sharp reduction in milk productivity, weight loss and the development of other minor pathologies. Studies prove that with fatty dystrophy of the liver, its barrier function changes, toxic metabolites accumulate in the body, and the hormone-inactivating function of the organ is disrupted (Schlumbohm et al., 2004; Sahoo et al., 2009).

The toxic effect of metabolites of the liver (in particular *β-hydroxybutyrate*) and a high level of insulin in the blood have been proved to have a negative effect on the development of oocytes. At the same time, a reduced level of insulin shows a decrease

in lipolysis. Catecholamines, in turn, are also activators of lipid breakdown with the formation of a large amount of triacylglycerols, which increases the risk of developing fatty liver (Sathya et al., 2007; Duehlmeier et al., 2013; Wankhade et al., 2017).

It is well known that in the body of ruminants, maintaining a physiological level of glucose passes through the system of hepatic gluconeogenesis (using propionate). This energy-consuming process is directly related to lactation of cows. In the post-hotel period, an insufficient amount of dry matter in the diet leads to a sharp decrease in the level of propionate, and, consequently, a decrease in glucose synthesis.

Of fundamental importance in maintaining the physiological state of the body and the functional state of the reproductive function of cows is the rational provision of livestock with nutrients from the mandatory control of energy balance. This is the cause of metabolic disorders and the manifestation of reproductive pathologies.