INDICATORS EXCHANGE OF CHOLESTEROL IN THE BODY PIGLETS FLUKES AT APPLICATION OF IRON NANOCITRATE

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ABSTRACT

Complex use of nano ferric citrate (1 ml at a concentration of 1 mg / l of active substance) with Brovaferan – 100 (1 ml at a concentration of 100 mg / ml of active substance) promotes the growth of total cholesterol, LDL cholesterol and triacylglycerols in the blood of pigs early age.

Keywords: nano ferric citrate, cholesterol, lipoproteins, piglets.

INTRODUCTION

Our previous studies have shown that the newborn piglets nano ferric citrate injection obtained by using nanotechnology (nano citrate) at a dose of 2 ml shows antianemic effect. However, the intensity of suckling animals growth, compared to piglets ferric dextran intake was slightly lower. Obviously, the prevention of early mortality and providing high intensity of the oxidation-reduction reactions in the tissues are the links of one chain. In this case, the nano ferric citrate intake does not

provide full expansion of the genetic potential of animals because of a lack of the metal for the synthesis of heme and other ferric-containing molecules.

We decided to combine nano ferric citrate and ferric dextran, thereby preventing anemia and supplying the organism requirement for genetic potential expansion and reduced the ferric dextran dose 2 times.

Cholesterol is one of the components of the erythrocyte membrane that's why the cholesterol metabolism studies can greatly clarify the potential of erythropoiesis.

MATERIALS AND METHODS

The experiment was performed at 25 pigs of large white breed, with body weight at birth 1200-1250 g (five animals in the group). The piglets were kept at the sows under the existing rules. The piglets of the control group were injected intramuscularly with 1 ml of saline solution. The piglets of the first experimental group were injected with Brovaferan-100 (100 mg Fe / ml) in the amount of 2 ml. The piglets of the second group were injected with 2 ml nano citrate Fe (ferric citrate at a dilution of 1 mg / ml). The piglets of the third group were injected with 1 ml Brovaferan 100 ml and 1 nano citrate Fe. The medications were injected twice at the third and eighth day of life.

The material for the study was the blood taken from the cranial vena cava at 5, 10, 20, and 30 days of life. The plasma samples were tested for total cholesterol (LDL), triacylglycerol (TAG), high density lipoprotein cholesterol (HDL cholesterol). Low-density lipoprotein cholesterol (LDL-C), extremely low density

lipoprotein cholesterol (ELDL-C) and lipid profile were generally determined using biochemical analyzer RT - 1904C.

RESULTS

The total cholesterol level in the blood of the control group piglets gradually increases to 20 days of life. Up to 10-day age - at 32.5% ($p < 0.001$), and 20-day age still at 12.9%, then slightly decreases to monthly age ($p < 0.05$). The dynamics of triacylglycerols (TAG) in the blood of healthy piglets of the control group differs a bit, although until 10-day age the growth of their content is also observed. The ferric dextran injection to the piglet of the first experimental group was accompanied by rapid growth of total cholesterol content. The 5 and 10-day age index was the highest compared to other research groups and were respectively 1.95 ± 0.08 and 2.99 ± 0.06 mmol / l.

Complex use of nano ferric citrate and Brovaferan – 100 leads to the total cholesterol and triacylglycerol (TAG) increasing in the piglets blood. In particular at 5-day age, this index was higher at 15.4% and 16.7%, and at 16.8% and 10.5 ($p < 0.001$) compared to the control group animals and the second experimental group.

The index of the total cholesterol in the blood of 10-day age piglets of the third experimental group is higher at 12.5% and 10% compared to the control group and the second experimental group, but is lower at 18.7% ($p < 0.001$) compared to the first experimental group at the same stage of ontogeny.

The index analysis of the high density lipoprotein cholesterol (HDL cholesterol) shows the dependence of the index to the ferric level in the animal

blood. In particular, the 5 day age animals that weren't injected with ferric medications showed relatively low level of HDL cholesterol in the blood.

In piglets injected only nano ferric citrate (the second group), 10^{th} and 20^{th} days of life indices show the highest content of HDL cholesterol. Moreover, the content of ELDL cholesterol of 10-day age piglets was the lowest compared to the indices of the other animal group blood.

Complex use of Brovaferan – 100 and nano ferric citrate leads to the higher content of LDL cholesterol in the blood plasma of 20-day age piglets at 21.1% ($p < 0.05$) and 34% ($p < 0.001$) in comparison with the indices of the first and the second experimental animal groups. The third experimental group is also characterized by increasing the content of ELDL cholesterol in the blood plasma from 5^{th} to 10^{th} day of life at 36.8% ($p < 0.001$), so that it is at 20.9% ($p < 0.001$) higher compared to the animals of the second experimental group at the same stage of ontogeny.

CONCLUSIONS

The injection of ferric dextran promotes the growth of total cholesterol and LDL cholesterol in piglets of the tender age. The complex use of nano ferric citrate and ferric dextran positively effects on the cholesterol metabolism without changing the overall dynamics at the certain parameters, although the significant positive changes in the intensity of anabolism were observed at the certain parameters.