Volume 5, issue 7, 2016 • e-ISSN: 1857-8187 • p-ISSN: 1857-8179

Research Article

Dynamic Changes of Blood-Metabolic in the Cows with Post Partum Pathology

Healthcare

Keywords: metabolic and hematologic indicators in cows, hemato-biochemical changes, NEFTA, post-partum metritis, buffaloes, etc.

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Abstract

This study has the aim to measure some metabolic and hematologic indicators in cows with pathologies of post partum (endometritis and metritis). In post partum cows happens a various number of changes in their internal indicators (metabolic changes). These changes are more emphasized when process of post partum in compromised with pathology like endometritis and metritis. Farms with dairy cattle have a higher tendency to be affected by these pathologies. For this reason the farm we took in study is dairy farm for milk production and we focused in hemato-biochemical changes. To our cows in study we got whole-blood samples from jugular vein according to the standard procedures and the examination test were performed in GAMMA Laboratory (Chemical-clinical, microbiological and hormonal laboratory) in Tirana. For biochemical indicators were analyzed glucose level, total Bilirubin, Calcium, Phosphorus and Magnesium. While for hematological indicators were evaluated, WBC, RDW, LY, etc. From the data obtained it results that and biochemical indicators as well as hematological have visible changes in cows with port partum pathologies.

1. Introduction

Post partum is moment of big metabolic disorders for the cows that have just give birth; energy requirements over the last month before calving grow about 23% compared with normal physiological needs. The situation is worse by the fact that rising energy demands, the cow manifest loss of appetite for food. This decrease of appetite can reach up to 30% of daily needs of food. A mismatched of energy requirements mainly, as a result of insufficient food intake levels, are leading to the mobilization of fat reserves which are reserves of emergency. Between metabolic changes registered in transition cows which is subject to fatty changing, have an increase of NEFA (non-esterifies fatty acid) in the blood plasma, and then when the phenomenon of fat mobilization is mainly big, can be registered beginning of a lipid hepatic. In such a moment, glucogenetic capacity of hepatocytis is inhibited, and has a predisposition of beginning metabolic disease on the next pregnancy. It was announced that quantitative growth of NEFA (non-esterifies fatty acid) that circulates in the blood is a risk factor for the onset of several pathologies, specifically regarding of dystonia, placenta residue, ketosis, abomasums displacement and mastitis for the entire period of post partum.

Immune-suppression during the post partum is attributed by a number of factors, associated with endocrine changes and critical reduce of food intake also. The reduction of food intake and increase of NEFA (non-esterifies fatty acid), transition cow shows a significant increase in hepatic triglycerides, an increase of mobilization of proteins and endocrinology changes correlated directly with post partum and lactation. According to different authors, it is possible to maintain protein mobilization and increase of NEFA (non-esterifies fatty acid), by treated the cow in dry period with diet with high contents of energy and protein.

Diets with high energy concentration are dealing with intake from the animal of about 1.65 Mcal/kg versus 1.3 Mcal/kg of dietary standards; this difference gives us a negligible increase in milk production, but significantly reduces the concentration in plasma of NEFA (non-esterifies fatty acid) in calving. Another effect of these diets is the influence exerted on hepatic triglyceride concentration, an important fact which is considered as accumulation of these molecules in liver tissue which is one of the main reasons of hepatic obesity (fatty liver). According to some studies, it is shown how increasing protein in the diet of cows in dry period does not influence at least any of the above parameters, but has an important role by dissolving protein in muscle tissue.

To put large quantities of food to animal is not enough, as a single measure to improve metabolic conditions at post partum. All changes in diet don't seem to be proposed without calculation, but is necessary to allow an adaptation of ruminal flora to the new ration of food. Changes in diet, pressing a clear influence and to the structure of ruminal tissue. Diets with high levels of concentrates contribute to the selection of a microbial flora that respond better to dietary soluble and stimulates the development of the ruminal papilla (Aknazarov B.K (1988). To keep the cows in lactation in dietary regime with high energy, allows a fast regeneration of body reserves used in the last period of conception.

Regarding the effects from the administration of protein-rich diets, some studies have shown that administration of a meal with high protein content of transition cows doesn't bring a significant increase in milk production. Especially noticeable positive effects of management based on the single principle in food, such as the positive effect of arginine on the levels of insulin, growth hormone GH and prolactin over the milk production over 10% by comparing with non-treated animals. Being aware that increase of nutrient levels in diet doesn't ever give proper effect, as evidenced by the National Research Council on 2001, which has been noticed a reduction of obtaining of the dry substance. An example of the effects coming from a critical reduction of food actually is the reduction of neutrophil phagocytises, which is depended by the reduction of concentrations of vitamin E, circulated (alpha tocopherol). Daily administration of 1,000 UI of vitamin E in the final period of drying is a way to limit the reduction of circulated alpha tocopherol typical in post partum, without effects in the immune system (Bertics S.A., at al 1992).

2. Materials and methods

The study is realized during 2015 on Natural Farming in Kashar, Tirana. For the study we selected 7 dairy cows with post partum pathologies (endometitis and metritis). Before taking blood samples from the cows, they were diagnosed and evaluated unhealthy apart from the clinical signs. Blood taken from the jugular vein was sent to GAMMA Laboratory to evaluate some biochemical and metabolic indications. The dynamic of changes is followed in the three sessions, 6-day intervals. Attention of biochemical assessments is oriented in some indicators such as: level of glucose in blood, the total Bilirubin, Calcium, Sideremi and Magnesium. While for hematological indicators were evaluated WBC, LY, RBC, etc. Data obtained from the following results are shown on the below tables.

3. Results and discussion

As described above the survey has been designed to evaluate the metabolic and hematological indices in experiment cows with post partum pathologies. Our data show that the biochemical changes are visible to cows with these pathologies.

Table 1. Blood biochemistry in cows with post-partum pathology (n=7) (First samples).

Parameters	Results	References according to MERCK	References according to Veterinary Medicine
Glucose (mg/dL)	70 (+_4)	53-76	42-74
Bilirubin (mg/dL)	0.3 (+_0.01)	0-1.6	0-0.6
Calcium (mg/dL)	8.2 (+-1.8)	8-11.4	8.9-10.7
Magnesium(mg/dL)	3.6 (+_0.04)	1.5-2.9	2.2-3.1
Phosphor (mg/dL)	3.9 (+_0.1)	5.6-8.0	4.2-7.4

Table 2. Blood biochemistry in cows with post-partum pathology (n=7) (Second samples).

Parameters	Results	References according to MERCK	References according to Veterinary Medicine
Glucose (mg/dL)	76 (+_8)	53-76	42-74
Bilirubin (mg/dL)	0.18 (+_0.04)	0-1.6	0-0.6
Calcium (mg/dL)	8.5 (+-2.8)	8-11.4	8.9-10.7
Magnesium(mg/dL)	2.1 (+_0.02)	1.5-2.9	2.2-3.1
Phosphor (mg/dL)	4.02 (+_0.3)	5.6-8.0	4.2-7.4

Table 3. Blood biochemistry in cows with post-partum pathology (n=7) (Third samples).

Parameters	Results	References according to MERCK	References according to Veterinary Medicine
Glucose (mg/dL)	69 (+_3)	53-76	42-74
Bilirubin (mg/dL)	0.2 (+_0.02)	0-1.6	0-0.6
Calcium (mg/dL)	8.7 (+-2.6)	8-11.4	8.9-10.7
Magnesium (mg/dL)	2.9 (+_0.03)	1.5-2.9	2.2-3.1
Phosphor (mg/dL)	4.64 (+_0.4)	5.6-8.0	4.2-7.4

Table 4. Complete blood examination.

Parameters	Results	Reference
WBC: x 10^9/L	15.4 (+_1.2)	4.0-12.0
LY: x 10^9/L	8.9 (+_0.9)	2.5-7.5
MO: x 10^9/L	1.4 (+_0.02)	0-0.9
GR: x 10^9/L	5.2 (+_1.02)	0.6-6.4
LY%: %	57.5 (+_4)	42-63
MO%: %	8.8 (+_0.6)	0-8
GR%: %	33.7 (+_2.7)	15-53
RBC: x 10^{12}/L	5.94 (+_ 1.1)	5.0-10.0
Hg: g/dL	10.2 (+_0.8)	8-15
HCT: %	29.4 (+_3)	24-46
MCV: fL	49.4 (+_2.8)	40-60
MCH: pg	17.1 (+_2)	11-17
MCHC: g/L	346 (+_11)	300-360
RDW: %	18.2 (+_2.7)	19-24
PLT: x 10^9/L	397 (+_ 28)	100-800
PCT: mL/L	2.26 (+_ 0.04)	0.4-1.0
MPV: fL	5.7 (+_1.02)	3.5-6.5
PDW: %	7.2 (+_ 3)	12-18

The serum total protein of animals with post partum metritis was found to be within the reference range (Radostits et al., 2000). Albumin was also in normal reference range. Albumin globulin ratio was altered. Globulin was higher than the albumin fraction, which is almost equal in normal cattle. This finding is in agreement with observations of Benjamin (1978). He reported that globulin fraction increases in case of bacterial infection. Average glucose level of all the animals was below the reference values. This indicates severe ketosis

in all the animals. Their urine samples were positive for ketone bodies. BUN and creatine was within reference range. But calcium was below reference range indicating hypocalcaemia. Dietary mineral elements are known to affect the physiological functions in general and reproduction in particular (Hidiroglou, 1979). Most minerals act as co-factors or activators of enzymes systems and elements. Calcium sensitizes female tubular genitalia for the action of hormone like oxytocin. So, calcium deficiency can act as a predisposing factor for uterine inertia leading to dystocia, retention of foetal membranes and metritis (Dabas et al., 1987, Mohanty et al. 1984, Arthur G.H., 1983.). Low level of serum calcium and glucose was also observed by Mandali et al. (2002) in cattle and buffalo affected with retention of foetal membrane. Similar findings were also reported by Dutta et al. (1983). Another work by Patel et al. (1999) reported significantly low level of blood glucose and serum total protein, calcium and inorganic phosphorus four weeks post partum in buffaloes which had retention of foetal membrane during parturition.

4. Conclusion

From the above results, it is clear that animal with post-partum metritis having low levels of serum glucose and calcium and an altered albumin globulin ratio with more globulin, whereas serum urea nitrogen, creatinine and total protein values did not show any alteration.

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