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Blood haematological and biochemical changes befor and after treatment with Tolzan in bovine with chronic infestation with *Fasciola spp*.

Modificari hematologice si biochimice sanguine ante si postterapeutic tratamentului cu tolzan la bovinele infestate cronic cu *Fasciola spp.*

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ABSTRACT

The fasciolosis on adult bovines evoluate usually chronic or subclinic, but it has a very strong pharaclinic sign. The purpose of this work was monitoring of biochemical changes in the chronic infestation with Fasciola hepatica before and after treatment with Tolzan, oral oxiclozanide suspension 3,4% concentration.

In examinated samples of leucocytes and erythrocytes, before and after treatment with Tolzan, the values are in right levels for bovine species. The hemoglobin level is in normal parameters for bovines, even if the level falls down from 13,248 g/dl, before treatment, to 9,732 g/dl, after treatment. The level of liver enzymes GGT and PAL is in normal limits for bovine species(taken from the literature).

In leucocytes formula, the lymphocytes, the neutrophils, the basophils and the monocyte are in normal limits for bovine species, but the values of eosinophilic are higher than normal values for bovine species, this shows infestation with fasciolosis.

Key words: haematology, biochemistry, fasciolosis, bovine

Introduction

Chronic fasciolosis is accompanied by weight loss, weakening, pallor of mucous membranes, anemia, ventral oedema, appetite changed, soft stool consistency or diarrhea, stomach hypotonia, decreased milk production, and altering the quality of. Palpable liver area is increased significantly(4). Evolution takes many months, the animals do not wake in terms of supplementary food(7). The incidence of morbidity is high in winter. The low infestation may trail subclinical disease, in moderate infestations clinical events is incomplete: weakening, anemia, diarrhea and decreased milk secretion.(1,2)

Paraclinical is found increased serum globulins, transaminases, reduction in serum albumins, in calcium, magnesium, potassium. The cattle are found to reduce the number of red blood cells from 5.9 to 2,9 million / mm ^{3}, a decrease in hemoglobin from 58.1 to 33.6%, and hematocrit to 10-13%, eosinophils increase from 3.5% to 18.0% increase alkaline phosphatase and gamaglobulins. Bovine subclinical forms shows increased glutamate dehydrogenase, and gamma glutamyl transferase, which are indicators of acute hepatitis and chronic relapsing hepatofibrosis.(1,10)

Material and methods

The investigations were conducted during December 2006-January 2007, in the Department of Parasitology, and Parasitic Diseases, Faculty of Veterinary Medicine, Cluj-Napoca, in cooperation with the Jucu farm(Cluj) with a herd of 100 cattle. The animals were divided into two experimental groups: group T (treated with Tolzan, Oxiclozanid 3,4%) and M represented the control group, untreated.

It is collected a total of 20 blood samples from cattle from the Jucu farm, in Tolzan group and in the control group. Whole blood was collected to obtain serum and blood with anticoagulant, to assess the levels of hematological and biochemical indices, tested by conventional laboratory methods of exploration haematological.

To make the leucocytes formula it is used Dia-Quik-Panoptic color. For the evaluation of haematological indices determination of erythrocytes was done through Turbidity method, hemoglobin determination by colorimetric method, and determination of total leukocytes was performed using Turk solution. The methods of liver exploration. The methods of liver exploration included the determination of γ-glutamyltransferase activity using one reagent, and determination of alkaline phosphatase activity using amethod with a single reagent. The results were interpreted in statistical terms using the Microsoft Office Exel 2007.

Results and discussion

To reflect the paraclinics changes occurring in bovine fasciolosis were performed serological and blood tests before and post-therapeutic after using Tolzan- Oxiclozanid 3,4%. The results obtained in the two experimental groups are presented in Table 1:

Table 1 – Blood and serological laboratory values

		The values recorded before treatment	The values recorded post-treatment
Blood Components	Total leucocyte (**thousands**/mm^3)	5335	5125
	Erythrocytes (**million**/mm^3)	7,556	4,669
	Hemoglobin (g/dl)	13,248	9,732
Leucocitary formula (%)	**Lymphocytes**	52,5	51,7
	Monocytes	4,5	1,9
	Eosinophils	16,7	13,5
	Neutrophil	24,8	29,3
	Basophils	0,1	0,2
Liver enzymes (U/l)	GGT	28,3	14,5
	PAL	96	76

Following laboratory tests in group T before therapy total leukocyte values were 5335(thousands/mm^3) and post-therapy are 5125(thousands/mm^3). Values fall within the normal bovine species(6), and before treatment and after treatment differences obtained in group T are not statistically significant($p>0,05$).

Erythrocyte values also were within normal limits (4,5). Pre therapeutic in T group values were 7.556 million/mm³, and after treatment were 4.669 million/mm³. Erythrocytes value are normal for bovine species(5,6). Differences between group T before and after treatment are distinct statistically significant ($p <0.05$). This decrease can be from central reasons: decreased production of erythrocytes or peripheral because destruction of red blood cells. Blood loss is from direct blood feeding by the flukes: blood has ben recovered from regurgitated caecal contents and from haemorrhage into the parenchyma, the bile ducts and the abdominal cavity as a result of activity of the fluke(2).

Before treatment hemoglobin in group T was 13.248 g/dl and after treatment of 9.732 g/dl. Hemoglobin levels are within normal(5,9), although the after-treatment group T decreased distinctly statistically significant ($p <0.05$) to the lot T before-treatment. The decrease may be due to deficiencies in iron appearing fasciolosis and is a factor involved in failure synthesis of hemoglobin. The rate of erytropoiesis is increased but is limited in the later stage of the infection with flukes(3). Lowering the level of hemoglobin from blood, associated in this case, with reducing the number of erythrocytes, consistently meet in anemia syndrome. Charge reduced in hemoglobin of the erythrocytes is directly related to iron deficiency determined in the case of poliparasitism.

In the leucocytes formula, lymphocytes fall within normal for bovine species(5). Monocytes are normal in group T before-treatment, but were lower post-treatment. Differences between the values of monocytes in group T ante-treatment and post-treatment are statistically significant ($p<0,05$).

A visible change if meets the value of eosinophils was higher than is normal. The group T ante-treatment and post-treatment, value is statistically insignificant, but the values were higher than normal. Before treatment the number of

eosinophils in T group were 13.6 ± 8.708% and after treatment were 13.5±6.974%. Increased number of eosinophils is actually an intolerance reaction of animal body, to the substances distributed through the parasites. It is noted that like the production of antibodies, hypereosinophilic reaction appears depending by terms of parasite contact with host tissues and their amplitudes responded. In general eosinophilia reach the highest level during the invasion of the body then diminishing during the latency period. Ghergariu and colab.,2000, describe that eosinophilia is recorded for parasitism associated with hypersensitivity induced by parasitic infestation. Antiparasitic mechanisms of eosinophilia place under the influence of signals from the extracellular environment. Eosinophils are mobilized and undergo transformation that increase performance from all points of view to be able to cause removal of various substances that have induced activation. Hendrix C.M., 2003 describe that there are 3 main ways in which eosinophilia acts on the parasite.

- the mechanism of cytotoxicity cell mediated Antibody-dependent, in this case eosinophils may be linked the target covered by various immunoglobulins;
- eosinophils may be linked with the targets covered by the C3b fragment of complement, it exacerbates binding functions, causing damages the parasite membrane;
- the interaction between IgE and eosinophils to obtain specific mediators, resulting in parasitic defense in two ways: local accumulation of neutrophils and other leukocytes, leukocyte activation and increased their activity to damage parasites, and last would be action in the local tissue elements, intermediate local inflammation and producing unfavorable conditions for development of parasites.

Neutrophils and basophils values were within normal limits both pre and post therapeutic(4,5).

Neutrophils number pre-therapeutic in the group T were 24.8±9.097% and post-therapeutic 29.3±11.602%(4,5). Differences between group pre-treatment and post-treatment are statistically insignificant ($p>0.05$). Neutrocitopenia is found in hepatosis, gastroenteritis, weaknesses.

The values reported for the basophils pre-therapeutic in the group T had value 0.1±0.3% and post-therapeutic 0.2±0.4%. Differences between group pre-treatment and post-treatment are statistically insignificant ($p>0.05$)

GGT liver enzyme values in group T fall within normal limits for bovine species (8). Mean GGT value, before treatment are 23.8 U / L and after treatment 14, 5 U / L. Differences between ante-treatment and post-treatment group are statistically significantly different($p<0,05$). Increased GGT activity occurs in cholestasis produced by adult parasites *Fasciola spp*.

Liver enzyme values PAL to group T fall within normal limits described in the specific literature (8). Differences between group Tolzan pre-therapeutic and post-therapeutic are distinct statistically significant ($p<0,05$). Pre-therapeutic value was 96U/l and post-therapeutic it slowly decreases to 76 U/l. Increased PAL activity has significance in liver diseases caused by biliary obstruction, jaundice of stasis, cirrhosis, hepatitis, cholestasis, *Fasciola spp*. are incriminated in the production of these diseases.

Conclsions

Before treatment value of liver enzyme PAL were 96U/l and after treatment it decreases in 76 U/l, and in case of liver enzyme GGT in group T, recorded value was 28.3 U/l, compared post treatment where there is a significant decrease (14.5 U/l).

REZUMAT

Fasciololoza la bovinele adulte se manifestă obişnuit cronic, sau subclinic, dar cu puternic răsunet paraclinic. Scopul lucrării de faţă a fost monitorizarea modificărilor biochimice sangvine în cazul infestaţiei cronice cu Fasciola hepatica la bovine, ante şi postterapeutic cu Tolzan, oxiclozanid 3,4% .

La probele examinate s-a identificat faptul ca leucocitele şi eritrocitele, la lotul Tolzan atât ante cât şi post terapeutic sunt în limite normale speciei bovine. Nivelul hemoglobinei se încaredaza în limitele normale speciei, chiar dacă se constată o scădere de la 13,248 g/dl anteterapeutic la 9,732 g/dl postterapeutic. Valorile enzimelor hepatice GGT şi PAL la loturile Tolzan s-au încadrat în limite normale speciei (preluate din literatura de specialitate).

In cadrul formulei leucocitare, s-a constatat faptul că limfocitele, neutrofilele, bazofilele, şi monocitele sunt în limite normale speciei, în schimb, valorile eozinofilelor sunt mult mai mari decât valorile speciei bovine, ceea ce indică prezenţa acestei parazitoze.

Cuvinte cheie: hematologie, biochimie, fascioloză, bovine.

Reference

1. **COZMA V., NEGREA O., GHERMAN C.**, 2002. Diagnosticul bolilor parazitare la animale. Edit. Genesis, Cluj-Napoca, p.130-149.

2. **DALTON J.P.,** 2004. Fasciolosis, CABI Publishing, Dublin City University, p.191-201.

3. **DAWES B.HUGHES D.L.,** 1964. Fascioliasis:the invasive stages of Fasciola hepatica in mammalian hosts, p. 97-160.

4. **DUNN A.M.,** 1978. Veterinary helmintology, Medical books, London, p. 5-6.

5. **GHERGARIU S., POP A., KADAR L.,** 1985. Ghid de laborator clinic veterinar, Edit., Ceres, Bucureşti, p. 132-140.

6. **GHERGARIU S., POP A.L., KADAR L., SPÎNU M.,** 2000. Manual de laborator clinic veterinary, Edit., All Medical, Bucureşti.

7. **HENDRIX C.M.,** 2003. Diagnostic parasitology, Auburn University.

8. **KADAR L.,** 2002. Investigații biochimice în Laborator Clinic Veterinar, Edit., AcademicPres, Cluj-Napoca.

9. **KANAY Z., KURT D., ELITOK B., GUZEL C., DEULI O.,** 2001. Effects of Fasciola hepatica invazion on iron, cooper and zinc levelin liver and kidney of lambs, Veteriner Bilimbri Deregisi, p. 17-20.

10. **MARGARET W., RUSSELL L.**,2001. Veterinary clinical parasitology, Iowa State University Press.

11. **SZASZ G.,** 1996 Reaction rate method for GGT activity in serum, p. 120-128.