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COMPARATIVE HEMATOLOGICAL PROFILE OF EXPERIMENTALLY INFECTED WITH TRICHINELLA SPIRALIS, TRICHINELLA BRITOVI AND TRICHINELLA PSEUDOSPIRALIS MICE

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ABSTRACT

The study aimed to observed hematological changes occurring during experimentally induced infection with *Trichinella spiralis*, *T. britovi* and *T. pseudospiralis* in mice. We performed hematological blood profile, tracking 15 blood indicators. In statistical analysis made by Two-way ANOVA, there were significant differences of HGB, MCHC, PLT, Lymph%, Gran% in all three types of trichinellosis compared to control animals. Capsule-forming T. spiralis showed statistically significant differences in HGB, MCHC, Lymph% and PLT compared to the other two species. Non capsule- forming *T. pseudospiralis* showed statistically significant differences in Lymph%, Gran% relative to the control and in Gran% relative to *T. spiralis*.

Key words*: Trichinella spiralis, Trichinella britovi, Trichinella pseudospiralis*, hematological test

INTRODUCTION

Trichinella spp. is one of the most widespread parasite infecting humans, mammals, and birds all over the world (Pozio, 2005; Pozio, 2009). Surveys on Trichinella parasites in domestic and sylvatic animals collected in Western Europe showed that the distribution of *Trichinella spiralis* and *Trichinella britovi* (known as the parasite that affects especially wild animals) is influenced by both environmental and human behaviour factors. (E. Pozio et al., 1996). The occurrence of human cases caused by *T. pseudospiralis*, for whom until very recently thought to occurs only in animals, requires changes in our handling of clinical trichinellosis, because existing knowledge is based mostly on cases due to classical *T spiralis* infection. (F. Bruschi, K. Murrell, 2018). Penetration of Trichinella larvae into striated skeletal muscle cells results in ultrastructural and metabolic changes (Despommier, 1998). Migration of larvae causes the typical symptoms and signs of the disease. Eosinophilia is a characteristic and consistent sign of human trichinellosis and occurs simultaneously with the common signs and symptoms of disease; as patients recover, eosinophil levels return to normal. Eosinophilia correlates with the intensity of the infection; elevated eosinophil values are detected between the second and third week following infection. (Campbell, 1983).

The aim of present study is compare hematological profile of experimentally infected with Trichinella species.

MATHERIAL AND METHODS

In this study we used a total of 140 white mice, 35 per each trichinella species. Blood samples were taken in 10, 14, 18, 24 and 35 day post- infection and 35 controls. The infestation was produced by oral administration of amount of 200 trichinella larvae. Mice were sedated and euthanized by exsanguination**.**

Hematological blood profile, were determinated in blood samples with EDTA. We measure 19 blood indicators (RBC, HGB, HCT, MCV, MCH, MCHC, RDW, WBC, Lymph%, Gran%, Mon%, PLT, MPV, PCT, PDW) in Mindray BC-2800.

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Statistical analyses were performed according to GraphPad Prizm v6.0. Software package. The data was submitted to a column analysis, T-factor and Two-way ANOVA for each species group, for each species and control group, and for all groups.

RESULTS AND DISCUSSION

In the data processing and analysis, statistically significant differences were found in the percentage of lymphocyte (Lymph%) and granulocyte(Gran%) content. The increase in lymphocytes is inversely proportional to granulocytes in the non-capsular *T. pseudospiralis* compared to the other two species and the control. Significantly and statistically significant decrease the amount of amount of hemoglobin (HGB) in experimentally infected mice compared to control animals. The difference in the amount of HGB between *T. spiralis* and the other two trichinella species is also mathematically significant. Similar results are obtained after analysis of mean cell hemoglobin concentration in erythrocytes (MCHC). Two-way ANOVA analysis confirmed the reduction of platelets (PLT) compared to non-infected animals as well as between the tested trichinella species.

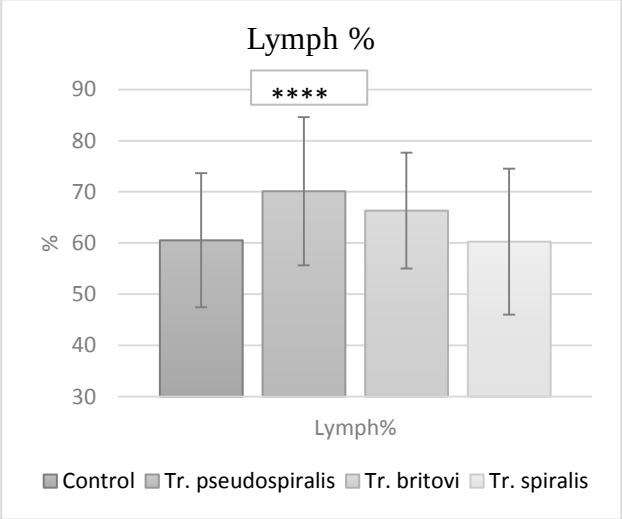

Fig. 1 Two-way ANOVA analysis on precent of Lymphocytes between Control without invasion and Trichinella pseudospiralis, Tr. britovi and Tr. spiralis

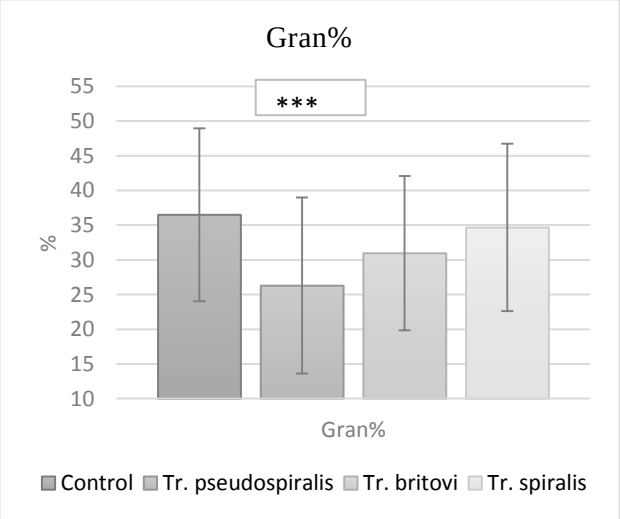

Fig. 2 Two-way ANOVA analysis on precent of Granulocytes between Control without invasion and Trichinella pseudospiralis, Tr. britovi and Tr. spiralis

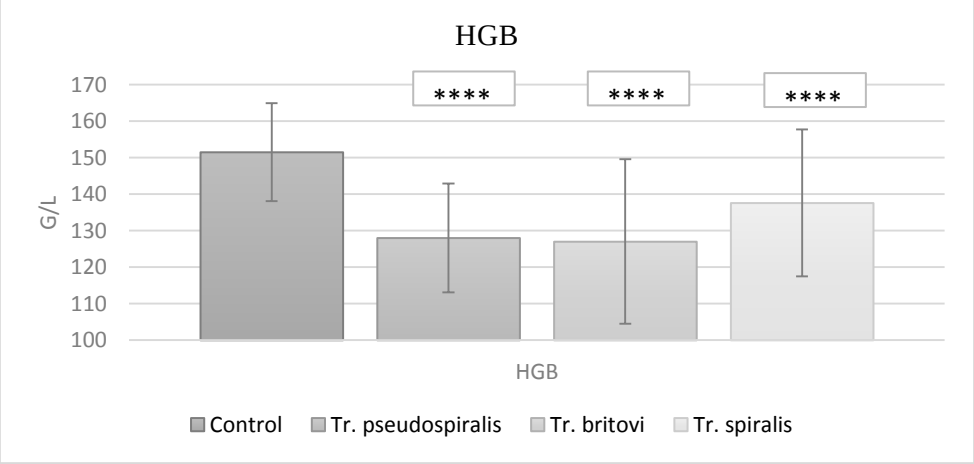

Fig. 3 Two-way ANOVA analysis on Hemoglobin between Control without invasion and Trichinella pseudospiralis, Tr. britovi and Tr. spiralis

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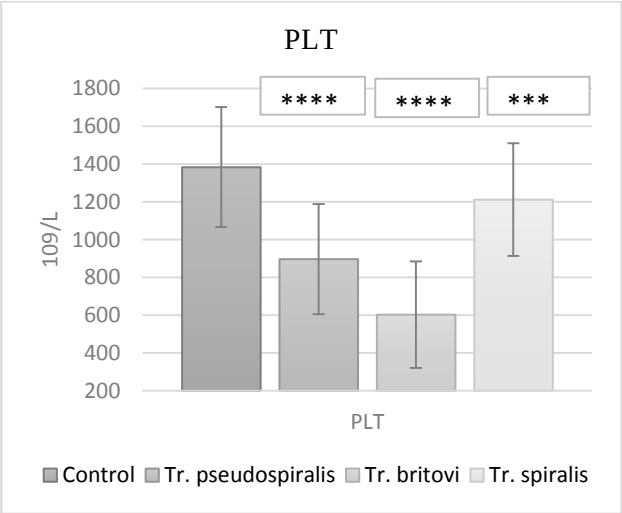

Fig. 4 Two-way ANOVA analysis on Platelets between Control without invasion and Trichinella pseudospiralis, Tr. britovi and Tr. spiralis

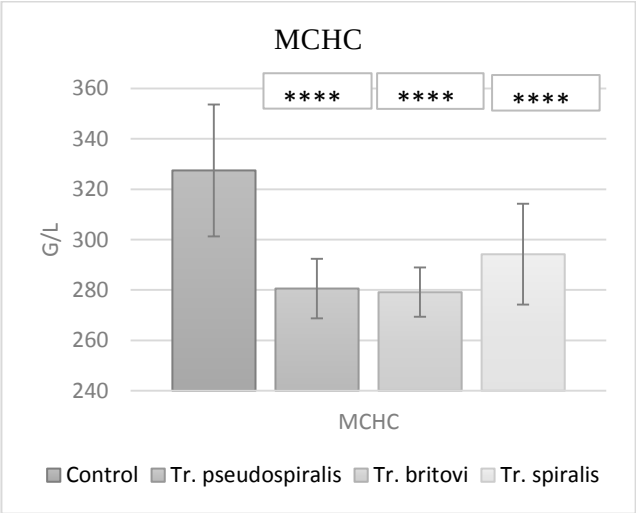

Fig. 5 Two-way ANOVA analysis on Mean cell hemoglobin concentration between Control without invasion and Trichinella pseudospiralis, Tr. britovi and Tr. spiralis

Our results for HGB in mice infected with *T. spiralis* confirm the data obtained from the literature for experimentally infected pigs described by M. Ribicich et al. (2007), namely hematocrit with lower than normal values, with significant differences as compared with uninoculated controls at 28 days post-infection and eosinophil counts significantly higher than in control pigs during the infection but returned to normal by day 42 post-inoculation. In humans, the clinical symptoms are the same and are associated with elevated levels of muscle enzymes and the presence in the blood of 5 to 80% or more of eosinophils (Capo and Despommier, 1996; Kociecka, 2000), which determines white blood cell profile as an important indicator in the diagnosis of infection.

Similar to our results are biochemical and hematological changes related to increased values for eosinophils, observed during *Trichinella britovi* infection in pigs (Miruna, O. et al., 2009).

We did not find enough data of *T. pseudospiralis* and a comparison of clinical manifestations in general and comparison between species. It appears rather substantial the process of capsule formation for prolonged immune response and retention of high content of percentage of lymphocytes(Lymph%) and low of granulocyte(Gran%) in *T. pseudospiralis*, which is contrary to studies for *T. spiralis* and eosinophilia.

Eosinophilia is present, with few exceptions, in most cases of human trichinellosis, inasmuch as it is the earliest and most important host response .Even in human asymptomatic cases, increases in eosinophilia of up to 15% have been observed. Eosinophilia appears at an early stage of infection between the second and fifth weeks of infection (Bruschi, F et all., 2002).

Studies and analyzes of some specific blood profile parameters can provide additional data in favor of early diagnosis and adequate treatment as well as provide a better understanding of acute and chronic trichinosis.

CONCLUTION

Capsule-forming *T. spiralis* showed statistically significant differences in HGB, MCHC, Lymph% and PLT compared to the other two species. Non capsule- forming *T. pseudospiralis* showed statistically significant differences in Lymph%, Gran% relative to the control and in Gran% relative to *T. spiralis*

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