

THE EFFECT OF DENATURED SUSPENSION OF SETARIA ON THE ORGANISM OF GUINEA PIGS

O.V. Zhurenko, PhD

Change of morphological parameters of blood after the introduction of boiled setaria suspension to guinea pigs in 1, 12 and 24 hours gives reason to believe that this substance contains thermally stable compounds and can cause changes in animals that are typical at allergic reactions.

Denatured suspension, laboratory animals microsetaria, native suspension, setaria, setariosis

In the pathogenesis of setariosis processes caused by secondary factors are dominated. These primarily include toxic allergic and immunopathological reactions leading to the dysfunction of the regulatory systems of the organism – neurohumoral and enzyme [5]. Under natural conditions, parasitism is ecologically balanced. Parasites create biodiversity of ecosystems by themselves and control its qualitative and quantitative composition at the same time [1].

A large number of studies on the toxic effects of parasites on the organism were carried out by the action of extracts of parasites on the organism of experimental animals [4]. On the mechanical action of helminths host organism reacts by local inflammatory response followed by involvement of other specific protection mechanisms which is allergy. Secretions of helminths react with components of animal tissues, violate the integrity of cells, influence on the nerve receptors and mobilize nervous and endocrine systems of the host [6]. In addition to direct mechanical damage of human organism tissues, parasitic worms create conditions for the penetration of microorganisms and development of inflammation at the site of damage. Inflammation in various organs observed due to the migration of the larvae of helminths. Integrity of tissues violates at the site of larvae penetration (skin, intestines, blood vessels) and in the path of the larvae (intestine, blood vessels, liver, lungs, heart) throughout the body. Helminth and products of its life are genetically alien for the human body. Their introduction in the blood and tissue causes a reaction of their ejection from the body or for neutralization as for any antigen [10]. Allergy is caused with intestinal products secreted by the parasite, as well as substances that are formed by dissolving the helminths eggs shells. Severe allergic conditions arise at helminth antigenic substances re-entering when the sensitivity of the host organism increase dramatically. It is often registered

inflammations with swelling on the skin and mucous membrane with next densified foci formation. Sometimes with tissue necrosis [9].

The aim of the research is to investigate the effect of denatured suspension of setaria on guinea pigs organism.

Materials and methods. For the purpose of the study groups of laboratory animals were formed: guinea pigs 250–300 g, rabbits – 2–2.5 kg, rats – 200–250 g, 36 animals in each. The animals were kept at 18°C in vivarium conditions of the department of physiology, pathophysiology and immunology animals. The animals of experimental groups were injected intramuscularly with setaria suspension in dose 100 mg protein / kg of body weight. The animals of the control groups were injected with saline in same dose. The suspension was cooled and centrifuged at 5-6 thousand rpm within 5-7 minutes (to precipitate proteins). Obtained suspension was injected intramuscularly at the thigh area of 36 guinea pigs of experimental group in a dose 0.1 cm³. Blood samples were taken at 1, 12 and 24 hours after the suspension introduction.

Results. In order to study the causes of allergies, helminths tissues effect, and exclusion of their protein nature suspension was heated. The results of studies on the introduction of boiled (denatured) suspension of female setaria guinea pigs did not show any reaction. The general condition of the animals of experimental group was assessed as satisfactory. In one hour clinical parameters such as: body temperature, respiratory rate and heart rate had some changes. Animals were inactive. Thus, in one hour after introduction of suspension the body temperature increased significantly to 39.7 ± 0.066 °C against the initial level of 37.2 ± 0.027 °C, and just in 12 hours this indicator increased to 40.3 ± 0.045 °C. In 24 hours after the setaria suspension introduction body temperature in guinea pigs was reduced to normal parameters, but tended to increase. At the same time, it was observed an increase of respiratory rate and heart rate in 1.1 times. In 12 hours, there was an increase of respiratory rate in 1.2 times and heart rate in 1.6 times. In 24 hours the body temperature and respiratory rate were within normal limits.

Thus, the suspension of females setaries after boiling did not lose their pathogenic properties and after introduction in organism caused change of clinical indicators.

Morphological parameters of guinea pigs blood, in one hour after introduction of boiled setaries suspension characterized by decreasing of the number of red blood cells to 5.02 ± 0.024 T/l against 7.55 ± 0.023 T/l, which is by 33.5% less than in animals of the control group. In 12 hours after the suspension introduction it was set significant reduction of the number of red blood cells by 25.1%, and to 24 hour it had a tendency to decrease, though not extend beyond the indexes in the control animals. Hemoglobin content after the introduction of boiled suspension did not changed

much and did not go beyond the parameters of the control animals. There was a significant increase in the number of leukocytes in an hour by 17.7%, after 12 hours by 26.3% and after 24 hours by 22.4% in relation to the control group of animals. Number of basophils in animals of experimental group did not differ from those in control animals. The amount of stab neutrophils in 1 and 12 hours after the introduction of boiled suspension was reliably lower by 16.9% and 37.5% respectively, and in 24 hours also remained below indexes in animals of control group. It was also observed a significant decrease in the number of segmented neutrophils in an hour by 11%, in 12 hours by 31.2%, in 24 hours by 20.7% relatively to the number of neutrophils in control group animals.

Significant increase in the number of eosinophils observed throughout the period of study. Thus, in 1 hour increase of the eosinophils number was by 24.8%, in 12 hours by 35.8%, and in 24 hours by 25% against the control group of animals. Number of lymphocytes and monocytes in one hour after introduction of the suspension was within normal range. Number of monocytes up to 12 and 24 hours of research did not differ from those indexes of control animals.

Thus, changes in the morphological characteristics of blood after introduction of setaria boiled suspension in 1, 12 and 24 hours gives grounds to believe that this substance contains compounds that are thermostable and cause changes in animals typical for allergic reactions.

The content of total protein in one hour after suspension introduction in animals was significantly lower by 8.1%, in 12 hours by 16%, and in 24 hours by 4.7% than in the control group of animals. The content of albumin was significantly high throughout the period of study. AspAT and ALAT activity in 1 hour after introduction of the suspension did not differ from its indexes in animals of the control group, but in 12 hours AspAT activity was reliably increased by 30% and ALAT by 40%. Increase activity of ALAT and AspAT in serum observed at enhanced protein biosynthesis, which is a key prerequisite for regulatory system and amino acids use for biosynthetic processes [5, 7].

So, established by us reliable increase of ALAT and AspAT activity in serum of guinea pigs compared with clinically healthy can be an important diagnostic parameter indicating increase of the hepatocytes and nephrocytes destruction in these animals [8, 2].

Thus, changes in the morphological and biochemical parameters of blood after introduction of boiled suspension, give us reason to believe that the presence of thermostable compounds in it causes changes in animals typical for allergic reactions. These changes are similar to changes occur after introduction of natural suspensions of setaria.

Conclusions

Introduction of denatured suspension of setaria leads to changes in the blood morphological characteristics in guinea pigs. This again gives grounds to believe that this substance contains compounds that are thermostable and cause in animals changes typical for allergic reactions.

References

1. Горохов В.В. Эпизоотологическая ситуация по паразитарным болезням в России – экологический аспект / В.В. Горохов // Материалы IV Всероссийского Съезда Паразитологического общества при Российской академии наук «Паразитология в XXI веке – проблемы, методы, решения». Санкт-Петербург: Лема, 2008. – С. 193—194.
2. Кіндя В.І. Вплив біолаву на протеолітичну активність ферментів печінки зростаючих норок / В.І. Кіндя // В кн.: Матеріали конфер. “Проблеми відтворення, трансплантації та фізіології травлення тварин”. – Полтава, 2000. – С. 149–150.
3. Кондрахин И.П. Клиническая лабораторная диагностика в ветеринарии / Кондрахин И.П. – М.: Агропромиздат, 1985. – 485с.
4. Левченко В.І. Клінічна діагностика хвороб тварин / Левченко В.І., Судаков М.О., Мельник Й.Л. ; за ред. В.І. Левченка. – К.: Урожай, – 1995. – 368 с.
5. Мейер Д. /Ветеринарная лабораторная медицина. Интерпретация и диагностика / Д. Мейер, Дж. Харви; пер. с англ. Л.А. Певницкого; под. ред. Ю.М. Кеда. – М.: Софион, 2007. – 456 с.
6. Наумычева М.И. Антигены *Ascaris suum* и аллергия при аскаридозе свиней: автореф. дис. на соискание ученой степени д-ра вет. наук: спец. “Паразитология” / М.И.Наумичева. – М., 1973. – 32 с.
7. Никонова Е.Б. Белковый обмен у норок и его коррекция на фоне нарушения минерального обмена / Е.Б.Никонова // В кн.: Материалы третьей Междунар. межвуз. конфер. “Предпосылки и эксперименты в науке”. – Санкт-Петербург, 2005. – С. 42—44.
8. Никонова Е.Б. Аланинаминотрансфераза сыворотки крови пушных зверей при нарушении минерального обмена / Е.Б. Никонова, З.З. Ильясова // В кн.: Материалы республ. научно-практич. конфер. “Достижения молодых ученых – аграрному производству”. – Уфа, 2004. – С. 76—78.
9. Сетариоз животных в Украине / В.Ф.Галат, Н.М.Сорока, А.В.Березовский, [и др.]// Ученые записки Витебской гос. акад. вет. мед. – 2004. – Т. 40.– Ч. 1.– С.187–188.
10. Сорока Н.М. Стан гуморального імунітету при хронічному сетаріозі великої рогатої худоби /Н.М.Сорока// Вісник Дніпропетровського державного аграрного університету. – 2002. – № 1. – С. 109 – 111.

Зміна морфологічних показників крові після введення морським свинкам прокип'яченої суспензії сетарій через 1, 12 та 24 години дає підстави вважати, що ця речовина містить сполуки, які є термостабільні і викликають в організмі тварин зміни, характерні для алергічних реакцій.

Денатурована суспензія, лабораторні тварини, мікросетарії, нативна суспензія, сетарії, сетаріоз.

Изменение морфологических показателей крови после введения морским свинкам прокипяченной суспензии из сетарий через 1, 12 и 24 часа дает возможность считать, что эта суспензия содержит вещества, являющиеся термостабильными и вызывающими в организме животных изменения, характерные для аллергических реакций.

Денатурированная суспензия, лабораторные животные, микросетарии, нативная суспензия, сетарии, сетариоз.