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PATHOMORPHOLOGICAL CHARACTERISTICS OF THE INTERNAL ORGANS OF RABBITS UNDER THE INFLUENCE OF ALPHA-SHAKTI

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Abstract:

This study investigated the toxic effects of the synthetic pyrethroid insecticide Alpha-Shakti using morphological methods. A total of 9 rabbits were divided into three groups. The first group received a single oral dose of 53.57 mg/kg of Alpha-Shakti via a probe. The second group received 89.29 mg/kg in the same manner. The third group served as the control and did not receive the insecticide. After 14 days, the animals were euthanized, and their internal organs were examined histologically.

The results showed that the 53.57 mg/kg dose did not cause visible toxic effects. However, the 89.29 mg/kg dose led to vascular disturbances, dystrophic and necrobiotic changes in the myocardium, liver, and kidneys.

Keywords: Rabbit, insecticides, alpha-shakti, pathomorphological studies, histological studies, acaricidal activity, cytoplasm, liver cells, squamous epithelium

INTRODUCTION. Synthetic pyrethroids occupy a special place among the variety of insecticides used in agriculture [5]. The advantage of substances in this group is their high insecticidal and acaricidal activity with pronounced selectivity of action, many times exceeding the selectivity of organophosphates [4]. Alpha-Shakti is widely used in this group of drugs, which has a wide spectrum of insecticidal action and is intended to destroy synanthropic cockroaches, flies, bedbugs, ants and mosquitoes [1]. Alpha-Shakti can also be useful for local use in pets to combat fleas [3]. The mechanism of action of synthetic pyrethroids is not much different from the action of natural pyrethrins. They affect the nervous system of insects, quickly disrupting their ability to move, and cause paralysis of the entire body [4]. The drug is a light yellow liquid. Contains 10% alpha-cypermethrin pyrethroid as an active ingredient, as well as solvents and surfactants. This preparation is characterized by contact-intestinal action. It is distinguished by its lightning-fast and completely destructive effect on problematic and specific pests [6]. Substances of this group are characterized by their relative cheapness, low consumption rates per unit area, ease of use and high efficiency [8]. However, if used incorrectly, stored and in accordance with consumption rates, the preparation causes acute and chronic poisoning. International statistics indicate that the toxic situation that has developed in many countries is accompanied by a steady increase in the total number of acute poisonings not only in animals but also in humans [7]. Toxicosis in animals leads not only to a decrease in their productivity, but also to death, which creates great difficulties in providing the population with high-quality and safe products of animal origin. In the literature available to us, we did not find any works devoted to the study of pathomorphological changes in the organs and tissues of rabbits poisoned with alpha-shakti[2]. In this regard, the study of pathomorphological changes in the organs and tissues of animals when using alpha-shakti and the assessment of the remote effects of the drug are of particular interest and determine the content of this article.

THE PURPOSE OF OUR RESEARCH: to determine the nature and degree of expression of morphological changes in the body of rabbits under the influence of alpha-shakti.

MATERIAL AND RESEARCH METHODS. The experiments involved two groups of gray giant rabbits weighing 2.5-2.8 kg. The animals in the experimental and control groups were kept in identical conditions of keeping and feeding throughout the entire study period. Alpha-Shakti containing 10% of the active ingredient alpha-Shakti produced by Heranda Industries Limited, India, was used for the experimental studies. The experimental animals were administered the drug through a probe orally once: the animals of the 1st group received a dose of 53.57 mg/kg, and the second group received 89.29 mg/kg. No animals died in the first group during the entire experiment. Only one rabbit died in the second experimental group. At the end of the experiment, the animals were slaughtered. The corpses of animals that died and were killed at the end of the observation period (14 days) were subjected to pathomorphological examination. The liver, lungs, kidneys, brain and intestines were selected for histological examination. The obtained material was fixed in a 10% aqueous solution of neutral formalin, followed by dehydration in ethanol of increasing concentration, and embedded in paraffin. Sections 5-7 μm thick were made from paraffin blocks on a semiautomatic microtome HEOTION ERM 3100 (Austria), which were stained with hematoxylin and eosin. The material was studied

using a light microscope. For objective confirmation of the obtained results, the most characteristic places were photographed with a Levenhuk D 870 T digital camera. In this work, we studied histopathological changes in the lung and liver tissues of mice exposed to alpha-shakti.

RESEARCH RESULTS. Histological examination showed that the organs of both the control and experimental groups №1 animals had a normal structure and no pathological changes were detected. The liver capsule is thin, the structure of the organ is not damaged. The pattern of the liver structure is clearly expressed and clearly visible, the liver beams are visible. The cytoplasm of the liver cells is uniformly stained, which indicates a sufficient amount of protein. Hepatocytes contain uniformly stained nuclei of the same size, in which the nucleoli and chromatin grains are clearly visible. The bile ducts contain a moderate amount of bile. Small foci of acute emphysema and small extravasates were found in the lungs. Large, medium and small bronchi and bronchioles are free of content, their epithelium and wall are unchanged. The alveoli are thin-walled multifaceted chambers surrounded by a single-layer squamous epithelium. Between the alveoli there is a thin layer of connective tissue. The interalveolar septum consisted of alveolar cells of type I and alveolar cells of type II.

The epithelial layer of the mucous membrane of the small intestine in all preparations is represented by a single-layer cylindrical bordered epithelium consisting of bordered goblet and enterochromaffin cells located on loose connective tissue, above which there are villi, a covering of bordered epithelium, at the base of the villi there are tubular depressions-crypts. The histology of the kidney tissue of the control and first experimental groups was normal. No pathological changes were detected in the kidneys. The vascular glomerulus is surrounded by the urinary space and is enclosed in the glomerular capsule. The proximal convoluted tubule was lined with high cuboidal epithelium. And the distal convoluted tubules were lined with low cuboidal epithelium. The pia mater is thin, the vessels are moderately filled, the subarachnoid space is defined. The brain substance is unremarkable, the vessels are full-blooded, the endothelial cells contain hyperchromic nuclei.

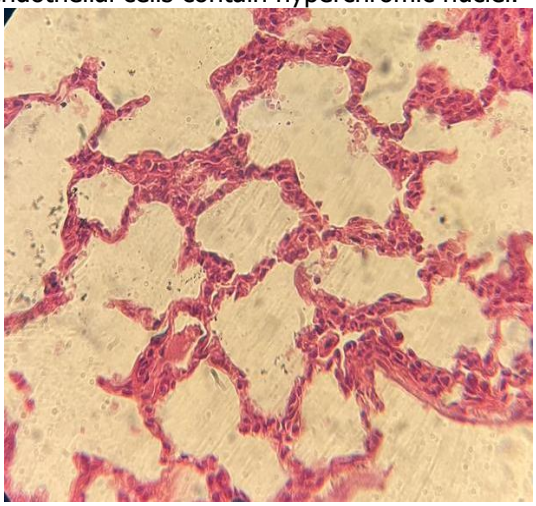

Photo 1. Kidneys. Stained with Hematoxylin and Eosin. X 400.

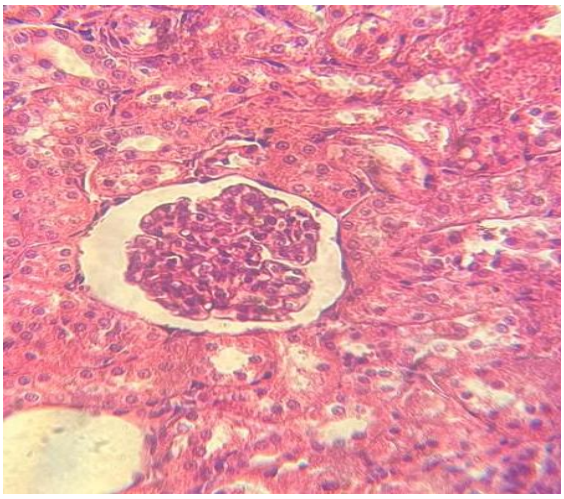

Photo 2. Lungs. Stained with hematoxylin and eosin. X 400.

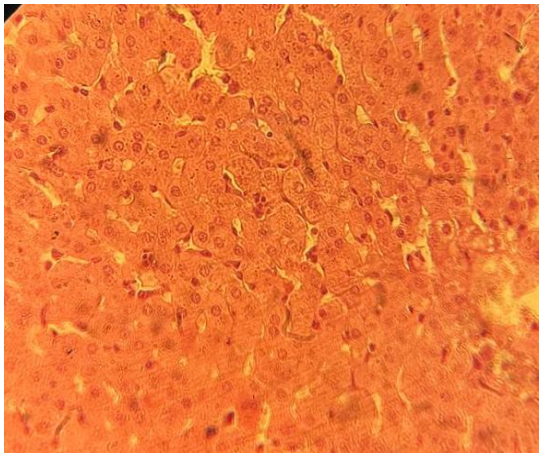

Photo 3. Liver. Stained with Hematoxylin and Eosin. . X 400.

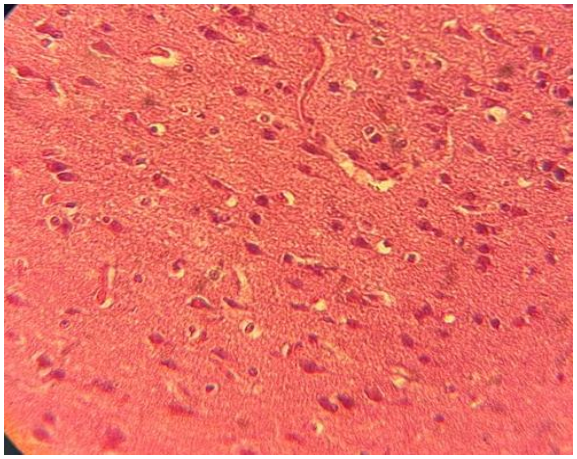

Photo 4.. Brain. Stained with Hematoxylin-Eosigm.. X 400.

When examining the internal organs of experimental group No. 2, it was established that in certain areas of the animal liver, hepatocytes had a round shape and granular cytoplasm. In individual hepatocytes located in the central part of the lobules, fat droplets of various sizes were found. The central veins and sinusoidal capillaries of the liver

lobules were filled with blood. The nuclei of such cells were round and enlarged in size, the chromatin in them was diffusely located. The histochemical reaction to glycogen was reduced.

In the small intestine, the mucous membrane was swollen, hyperemic, with individual small hemorrhages. Histological examination revealed a picture characteristic of acute catarrhal inflammation.

In the lungs, histologically, expansion of the interalveolar septa was detected due to interstitial edema and hyperemia of the respiratory capillaries. Lymphocytes, erythrocytes and single eosinophils are detected in the thickness of the alveolar walls. Free alveolar cells were constantly present in the lumen of the alveoli. In some areas of the lungs, emphysematous expansion of the alveoli with rupture of the interalveolar septa was observed.

No significant changes were found in the myocardium. However, transverse and longitudinal striations were not clearly expressed. Minor edema of muscle fibers was observed. Against the background of uneven venous congestion, focal granular dystrophy of cardiomyocytes with loss of tinctorial properties and transverse striation were detected.

In the kidneys, the following was observed: swelling of the epithelial cells of the convoluted tubules, cell boundaries were unclear, nuclei in some areas were not determined. Eosinophilic protein granules were found in the cytoplasm of the cells. Nuclei of many cells are in a state of pycnosis and lysis. Renal vessels are dilated and full-blooded.

In the brain, overflow of the vessels of the brain and its membranes is noted, perivascular and pericellular edemas are often detected.

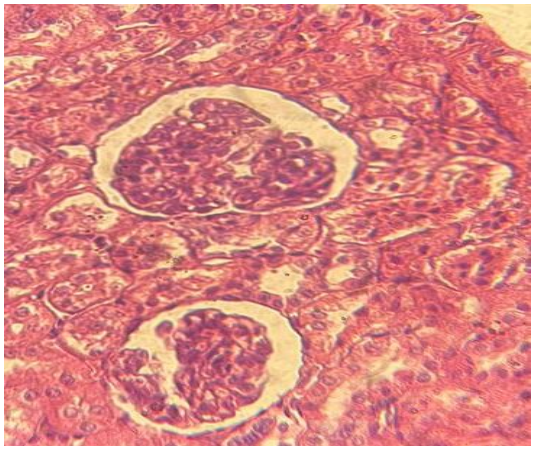

Photo 5. Kidneys. Stained with Hematoxylin and Eosin. X 400

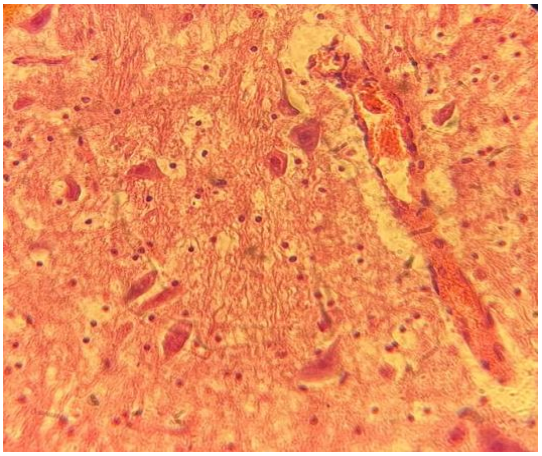

Photo 6. Brain. Stained with Hematoxylin and Eosin. X 400.

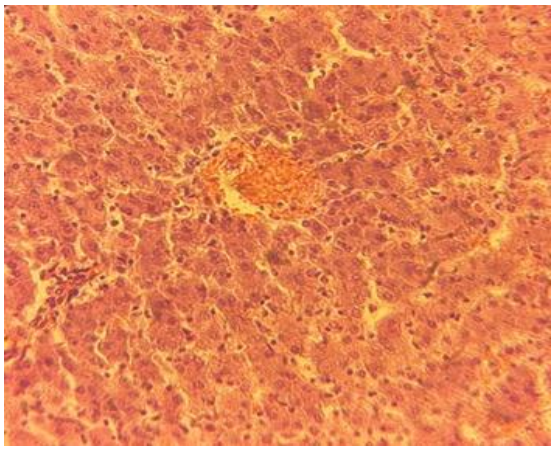

Photo 7. Liver. Stained with Hematoxylin and Eosin. X 400

CONCLUSIONS

1. Analysis of morphological and histochemical data showed that alpha-shakti, when administered to rabbits once at a dose of 53.57 mg/kg, does not have a toxic effect on internal organs.

2. And when administered to rabbits once at a dose of 89.29 mg/kg, it causes vascular disorders and dystrophic changes in parenchymatous organs.

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