



## **PRINCIPLES OF STUDYING LIVER MORPHOLOGY IN EXPERIMENTAL DIABETIC FOOT SYNDROME**

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### **Abstract:**

Study of the treatment of alloxan diabetes in the liver, taking into account pathomorphological aspects in the complex treatment of experimental diabetic foot syndrome.

**Keywords:** experimental model of diabetic foot, experimental animals, diabetes mellitus, alloxan, surgical debridement.

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**INTRODUCTION.** Diabetes is a disease with insufficient insulin. Due to insulin deficiency, metabolic disorders are observed that lead to late complications [1]. Treatment of DM is considered one of the priorities of national health systems due to high mortality and early disability [2]. For this reason, the search for new treatment drugs with such qualities as minor side effects on the liver and convenience remains an urgent problem [3]. In the field of diabetology, different models of diabetes mellitus are used for these studies. One of them is the alloxan model [4].

**AIM OF STUDY.** Study of the treatment of the liver in artificially created diabetes using the drug alloxan, taking into account pathomorphological aspects in the complex treatment of experimental diabetic foot syndrome.

**MATERIALS AND RESEARCH METHODS.** The work was done on experimental material. Experimental studies were carried out on white rats. The rats were kept in the vivarium of the Tashkent Medical Academy. All surgical manipulations on them were carried out in compliance with the principle of humanity and using general anesthesia. Animals were divided into 2 groups - the 1st group - the main - intact; 2nd control group - creation of experimental models of diabetic feet caused by alloxan using traditional complex therapy;

After 24 hours of fasting, the rats were weighed. And then a solution of alloxan 2 diluted in 0.9 saline was administered intraperitoneally to animals in the form of single doses corresponding to a dose of 20,15,12 mg of alloxan per 100 grams of weight.

Only 30 minutes after the administration of the drug, the animals were given food and water. Blood sugar levels were assessed over 3 days.

Determination of glucose concentration in the peripheral blood of animals. Diabetes was confirmed 3 days after the determination of blood glucose concentration. An experimental model of diabetes mellitus (DM type I) was obtained. The day of confirmation of diabetes mellitus was considered the zero day (DM) of its development.

**SURGICAL PROCEDURE.** On the day of the test, the skin surface of the right ball of the foot was shaved and cleaned with a cloth made from 70% ethanol. Using a scalpel on the skin of the paw pads of the right hind paw of each rat, they created a full-thickness rectangular wound 2 mm by 5 mm thick. The scalpel and scissor wounds (Day 0) were of similar size and shape, with minimal or no bleeding in all groups. Every day, the wounds were treated with the traditional method of treatment (5% alcohol solution of iodine and levomekol ointment) until the end of the experiment.

The development of the disease was assessed by the condition of the animals, mortality was recorded in groups, recorded by clinical symptoms (polyuria, polydipsia, polyphagia, weight loss, coat) and blood glucose levels. Animal hair usually has a characteristic sheen and usually sticks to the skin.

The amount of water drunk by the rats was determined individually by measuring its volume with a measuring cylinder before and after the animals took water. Individual urine collections were performed using urine collectors to assess daily diuresis values.

Rats were removed from the experiment by decapitation on days 1, 3, 7, 10, 14.

Evaluation of the effectiveness of the drug was also carried out on the basis of a visual examination of the animals and their wounds. The criteria for the effectiveness of the drug for the wound were: focusing on the severity and duration of inflammatory manifestations in the wound area (edema, hyperemia, wound exudate), the condition of the base of the wound; the appearance of granulation tissue; reduction in the area of the wound defect; the appearance of marginal epithelialization; acceleration of wound healing time.

The Student's t-factor was used to determine the accuracy of the results obtained. Differences in the frequency coincidence of the studied trait, amounting to no more than 5%, were recognized as reliable ( $P < 0.05$ ).

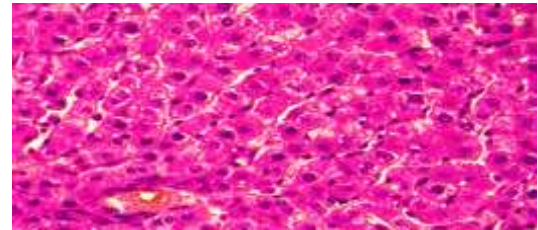
Fragments from the outpatient diabetic system and liver were fixed in Carnoy's solution (fixative composition - glacial acetic acid - 10 parts, chloroform - 30 parts, ethyl alcohol - 60 parts). Fix the parts for 2-4 hours, then put them in 96% alcohol. The wiring is carried out in the usual way and filled with paraffin. Making histological sections with a thickness of 5-6  $\mu\text{m}$  in a sledge microtome, removing paraffinization in a thermostat and staining with hematoxylin and eosin.

This is the most common method of staining histological sections. Paraffin lobules are paraffinized in chloroform and washed in distilled water, then hematoxylin solution is poured onto the lobules for 3 minutes. Rinse in tap water for 10 minutes and inspect cuts.

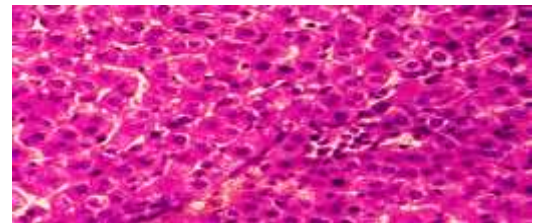
Washing in tap water and sections are stained with eosin from 0.2 to 3 min, clarified in xylene and enclosed in a balm. As a result, the cell nuclei are stained blue-violet. In pink baptized - the cytoplasm. The study was carried out by the luminescent-microscopic method.

**RESEARCH RESULTS.** Control group. Liver. The results of microscopic examination of the liver tissue on the 7th day after the traditional treatment of alloxan diabetes in the liver, the degree of vacuolar degeneration of hepatocytes slightly decreases. More pronounced vacuolar dystrophy remains in the second morphofunctional zone of the liver parenchyma lobules. Where vacuolar degeneration of hepatocytes sometimes ends with necrobiosis and necrosis of liver cells.

In the third and first morphofunctional zones of the liver lobules, hydroptic dystrophy is less pronounced, which is manifested by loosening and uneven staining of the hepatocyte cytoplasm. The nuclear structures of hepatocytes are of various



shapes and sizes, most of them are in a state of karyopyknosis and karyolysis. Perisinusoidal space is somewhat expanded, in some of them the presence of single leukocytes is determined.



On the 10th day after the traditional treatment of alloxan diabetes in the liver, dystrophic changes in hepatocytes are relatively reduced. As mentioned above, in the second morphofunctional zone of the liver lobules, small droplet vacuolar dystrophy (Fig. 1) of the hepatocyte cytoplasm is preserved. The central vein, sinusoids, and space of Disse remain somewhat dilated and plethoric.

On the 14th day of the study, it is noted that in some places the appearance of a small focus of inflammatory infiltration by lymphoid cells in the liver tissue (Fig. 2). On the part of the liver parenchyma, compared with the previous periods, stabilization of dystrophic changes in hepatocytes is noted, only in some hepatocytes small droplet vacuolar dystrophy persists. At the same time, the nuclear structures of the liver cells are somewhat enlarged and hyperchromic.

Figure 1. Morphological picture of the liver, traditional treatment, 10 days. Stabilization of dystrophic changes in hepatocytes. Coloring: G-E. SW: 10x40.

Figure 2. Morphological picture of the liver, traditional treatment, day 14. In the liver tissue, the appearance of foci of inflammatory infiltration. Coloring: G-E. SW: 10x40.



**CONCLUSION.** A morphological study of the liver in dynamics after traditional treatment showed a partial restoration of the functional abilities of the organ. We decided to continue the experiment on the experimental group.

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