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Histomorphological Changes in the Testes Depending on the Days After Receiving Cranio-Cerebral Trauma

Rakhimova Gulnoz Shamsievna
Bukhara State Medical Institute, Uzbekistan
https://orcid.org/0009-0003-5023-0656

Annotation. Traumatic brain injury is one of the most important aspects of medical research, due to the greater frequency, difficulties in diagnosis and severity of its course, often with a fatal outcome. It has a generalized effect on the body, causing a general adaptive response, manifested in a complex of pathophysiological, biochemical and morphofunctional changes not only in the area of direct mechanical damage but also in the nervous, endocrine, cardiovascular and other systems. Mostly men die or become disabled from this injury, and more often at working age, which gives the whole problem a social significance.

Keywords: brain injury, testis, gland cells, morphological changes.

Introduction

Purpose of the study: was to characterize the pathomorphological and morphofunctional changes in the testes in rats after traumatic brain injury in the experiment.

Materials and methods of research: As the object of this study, 150 mature male rats weighing 115-150 grams and 90 days old were selected. During the experiment, rats were first anesthetized with isoflurane, while the induction to achieve mild anesthesia was 1-2 minutes, the state was determined by the reflex reaction to pinching the rat's tail. After that, the rat was attached to a square platform, a soft pad was placed on the jaw to prevent jaw fracture, and the platform was released. Due to the effect of the inertia of the weight and the angle of inclination, the platform that was released downwards hit the barrier. At this time, the rats received brain damage of varying severity. For morphological studies, testis fragments were fixed in 10% formalin with pH=7.2 for several hours, which were then washed under running water for an hour. According to the standard, alcohol in high concentrations was poured into paraffin blocks after dehydration. Using a MS-2 microtome, cross sections of 4-6 × 10-6 m were formed and rehydration was carried out using the standard deparaffinization method. It was stained with hematoxylin-eosin, as well as Van Gieson pyrofoxine for microscopy of connective tissue components.

Results and discussions: We investigated morphological changes in the testis tissue of white mongrel rats at different times after acute traumatic brain injury (Fig.1). Changes in the testes varied on the first, third, and seventh days after experimental traumatic brain injury, as well as after correction with neuroprotectors. When measuring the connective tissue of the testes, an increase in the protein envelope in size was noted, respectively, in the trabeculae and septa of the testis. At the same time, there was a decrease in gland cells, i.e. Sertoli cells, Leydig cells, spermatogonia, spermatocytes and spermatids.

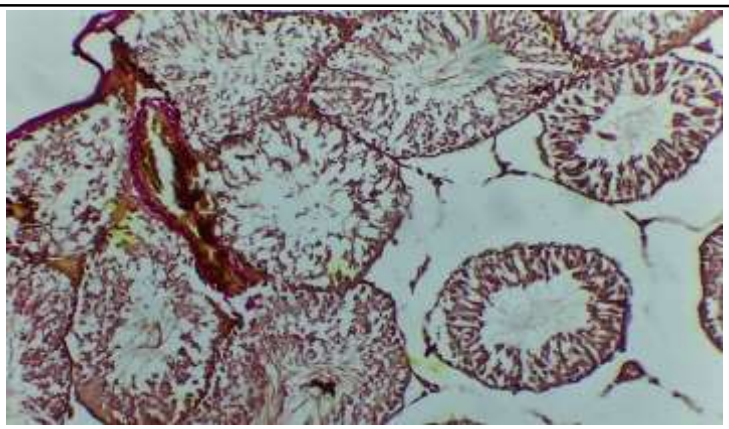

Fig. 1. 7-day after TBI. Thinning of the protein shell. Vasoconstriction. Reduction of the diameter of the convoluted seminal tubules (Van-Gieson:x200)

The cells of the convoluted seminal tubules are degranulated, many cells with vacuolated cytoplasm and swelling. The dystrophically altered spermatogenic epithelium has a reduced percentage of spermatogenic cells compared to the control group. All these changes indicate a decrease in testicular function. The boundaries between the cells of the spermatogenic epithelium in the tubules often lost their clarity. Many cells lost their connection with Sertoli cells, supporting cells, and therefore their loss into the lumen of the tubules was observed, where lysis of their nuclear apparatus subsequently occurred.

Various destructive changes in the testicles of rats at a later date after a simulated TBI lead to transient germinal aplasia, that is, first to focal, and then to total Sertoli cell-only syndrome. The volume of tissue components that make up the organ decreases: the protein membrane, interstitial tissue, convoluted seminal tubules. Due to the sharp destruction of testicular tissue, the reproduction and maturation of cells does not take turns, the layers of the epitheliospermatogenic layer do not differ, spermatogonia can be found in the center of the tubule, other spermatogenic cells are located randomly, this is called "variegated atrophy of the genital glands" (Fig. 2).

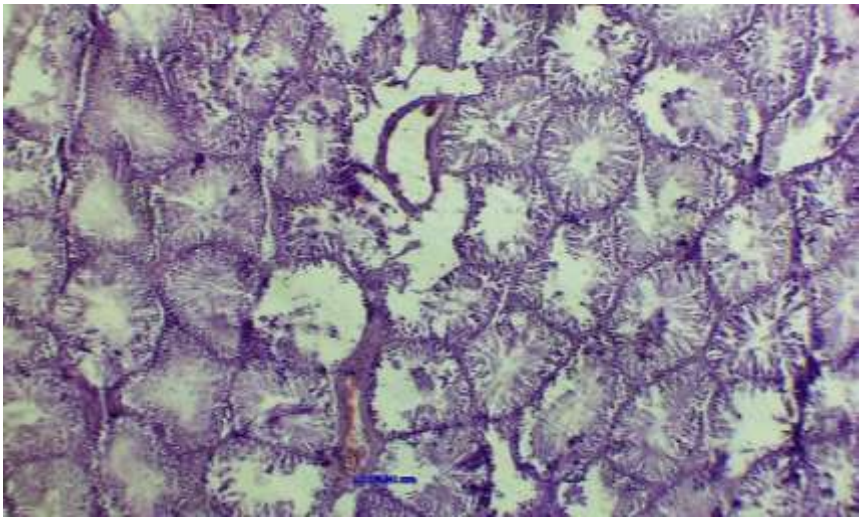

Fig. 2. 21-day after TBI. The syndrome of "variegated atrophy of the genital glands". A detached layer of spermatogenic epithelium and the appearance of voids between cells of various sizes (reduction of spermatogenic epithelium) (G-E: x200).

Conclusion: In the acute period of traumatic brain injury, structural changes develop in the testicles, affecting all their constituent parts: tubular apparatus, stroma, endocrine structures. The greatest changes are observed in the epithelial-spermatogenic layer of the convoluted seminiferous tubules, the changes of which are directly proportional to the duration of the course of the craniocerebral brain injury. Morphological indicators of damage to the epithelial-spermatogenic layer in the acute period of traumatic brain injury are: a decrease in the number of spermatogenic cells (up to their complete disappearance from

the seminiferous tubules), an increase in the wall thickness of the tubules due to increased peritubular sclerosis.

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