HISTOLOGICAL CHANGES UPON TRANSECTION OF INTESTINAL NERVES IN THE EXPERIMENT

Shamatov Islam Yakubovich. Senior Lecturer

Department of Otorhinolaryngology No. 1.

Samarkand State Medical University

Abstract. In the article, under morphological experimental conditions, the structure, localization, and sources of the submucosal innervation of the small intestine were studied, as well as the histological changes in the nerve tissues of its tissues in response to various types of denervation. The materials were processed using general histological methods and neurohistological methods, including the Bielschowsky-Gross method and Nissl staining for nerves. The intramural nerve nodes of the small intestine are also rich in sensory terminals. After removal of the dorsal root ganglia, the intestinal nerve apparatus was studied at various intervals, and in all cases, the same type of changes in the large nerve cells of the small intestine nerve bundles were observed. The crypts in the mucous membrane of the intestines also underwent morphological changes.

Keywords:rabbit, small intestine, experiments, cutting of mesenteric nerves, solar plexus, dorsal root ganglia, denervation.

ГИСТОЛОГИЧЕСКИЕ ИЗМЕНЕНИЯ ПРИ ПЕРЕСЕЧЕНИИ НЕРВОВ КИШЕЧНИКА В ЭКСПЕРИМЕНТЕ

Шаматов Ислам Якубович. Старший преподаватель

Кафедра оториноларингологии № 1.

Самаркандский государственный медицинский университет

Резюме: В статье изучены исследовании методом морфологического эксперимента изучены структура, локализация и источники чувствительной и двигательной иннервации тонкого кишечника, а также реакция его тканей на ту или иную денервацию. Материаы обрабатывался общегистологическими

методами, методом Бильшовского-Гросс, и по Нисслю. Интрамуральные нервные узлы тонкой кишки также обильно снабжены чувствительными окончаниями. Исследуя нервный аппарат кишечника в разные сроки после удаления спинно мозговых узлов во всех случаях мы наблюдали однотипные изменения крупных нервных клеток кишечных сплетений. Инфильтративным и атрофическим изменениям подвергались и крипты кишечника

Ключевые слова: кролик, тонкой кишка, эксперименты, перерезка брыжеечных нервов, солнечного сплетения, спинно-мозговых узлов, денервация.

Introduction. Studying the innervation relationships of organs is necessary to understand the mechanism of connection between organs and the central nervous system, as well as their integration into the system of the whole organism. Innervation relationships in hollow organs are characterized by a number of specific features. Among them, first and foremost, is the presence of an intramural ganglionic apparatus associated with the central nervous system and numerous afferent instruments, which provide these organs with subtle adaptation to living conditions and broad possibilities for reflex functioning as constituent elements of the whole organism. Experimental studies conducted to clarify questions related to the study of sensory terminals in the small intestine are not numerous [1,2]. In this study, using the method of morphological experiment, the structure, localization, and sources of the sensory and motor innervation of the small intestine, as well as the reaction of its tissues to various denervations, were examined [3].

Research Objective. To study the reaction of changes in the sensory and motor innervation of the small intestine in the experiment.

Materials and Methods of the Study. To solve the assigned task, the following series of experiments were conducted on 75 healthy rabbits: 1) transection of mesenteric nerves, 2) removal of solar plexus nodes, 3) transection of greater splanchnic nerves, 4) bilateral removal of sensory spinal cord nodes (thoracic and lumbar), 5) removal of a part of the small intestine. After the operation, the animals were sacrificed at various intervals starting from 24 hours and ending at 12 days.

The material was processed using general histological methods, the Bielschowsky-Gross method, and Nissl staining.

Research Results. As a result of the conducted experiments and the study of the material, it was established that all parts of the small intestine wall are abundantly supplied with nerve instruments of a receptor nature of varying degrees of complexity. A characteristic feature of their structure is the great length of the terminal branches. The fibers forming the receptors are mostly non-myelinated, occasionally covered with a thin, barely noticeable layer of myelin, which gradually disappears. Along their course, these fibers most often divide dichotomously, sometimes into a large number of branches. It is necessary to highlight one extremely important feature of the sensory terminals in the small intestine. Apparently, a large number of receptors are represented by the final ramifications of the processes of nerve cells located right there in the intestinal wall as part of the Auerbach and Meissner plexuses. The intramural nerve nodes of the small intestine are also rich in sensory terminals. However, in terms of their structure, they are shorter and do not extend beyond the ganglion. We succeeded in establishing the cytoarchitecture of the plexuses, where cells of the first type predominate in the submucosal plexus nodes and are always located in large clusters. Changes in the nerve cells of the spinal cord nodes were expressed in two forms of damage. In one case, it was true chromatolysis, proceeding with the displacement of the tigroid substance to one edge of the cell and with sharp wrinkling and shifting of the nucleus to the periphery. The sensitivity of the small intestine wall is ensured by the presence of local second-type Dogiel cells in the composition of the Auerbach and Meissner plexuses and sensory spinal cord nodes. In the intermuscular plexus nodes, there are more large neurons, and in the nodes closer to the serous membrane, their number increases even more. Small nerve cells have a large number of processes, which are thin and short, departing from the cell body and ending in close proximity to it, and one long process, which, as a rule, enters the composition of a thin trunk of non-myelinated fibers. Large cells are not provided with such synaptic apparatuses; their size is much larger, and finally, the processes of these cells form undoubted receptor endings in all parts of the intestinal wall. Based on these characteristics, these cells can be attributed to Dogiel's type 2 cells, cells of a sensory nature. The neurites of the first-type cells, in terms of their external properties, are completely identical to the postganglionic fibers of the autonomic nervous system and, like the latter, always travel accompanied by a large number of Schwann cells. Studying the intestinal nerve apparatus at different intervals after removal of the spinal cord nodes, in all cases we observed the same type of changes in the large nerve cells of the intestinal plexuses. When removing the spinal cord nodes of the middle and lower thoracic region, dilation of blood vessels is noted, accompanied by filling of the vessels with polymorphonuclear neutrophil leukocytes (especially in late periods after the operation). From the dilated vessels, leukocytes penetrate into the surrounding tissue, including the nerve nodes. Round cell infiltrates appear in the submucosa. After removal of the solar plexus nodes, pronounced vasodilation is observed; arterioles turn into smooth-contoured tubes, flaccid muscle cells become flat and low. Phenomena of vessel dilation, neutrophil and round cell infiltration are observed throughout the experiment period. The intestinal crypts also underwent infiltrative and atrophic changes.

Conclusion. Thus, taking into account our data on the innervation of the intestine, we evaluate the changes described above as follows: Infiltration by neutrophils and dedifferentiation of a number of tissue elements is a consequence of sensory denervation of the small intestine. Infiltration of the intestinal tissues by polymorphonuclear leukocytes, in contrast to the data obtained during deafferentation of other organs, did not reach extreme degrees, which can be explained by the incomplete sensory denervation due to the presence of afferent neurons in the composition of its intramural plexuses.

References

1. Shamotov I. Ya., Shopulotova Z. K. Features of differential diagnosis and treatment of paradoxical movement of vocal folds in women // Eurasian Journal of Medical and Natural Sciences. – 2024. – Vol. 5. – No. 1. – P. 45-49.

2. Mamatliev A., Oripov F. Histological structure of the intramural nerve apparatus of the common bile duct and gallbladder in rabbits, in the norm and after gallbladder removal // Journal of Biomedicine and Practice. – 2021. – Vol. 1. – No. 3/2. – P. 117-125.

3. Mamatliev A., Oripov F. Histological structure of the intramural nerve apparatus of the common bile duct and gallbladder in rabbits.