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Research Article

THE USE OF OZONE IN THE TREATMENT OF EXPERIMENTAL TRAUMATIC EPIDURITIS

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ABSTRACT

Ozone treatment is currently one of the topical issues. This article discusses treatment of epiduritis with ozone therapy in traumatological patients, its modern methods.

KEYWORDS

Traumatic disease, surgical interventions, epiduritis, epidural hemorrhages, spinal canal.

INTRODUCTION

Relevance of the problem: In the near future, after a fracture of the vertebrae, cicatricial changes often occur in the spinal canal. This is primarily due to hemorrhage into the spinal canal at the time of injury and instability of the spine. The resulting cicatricial adhesive processes lead to aggravation of the course of traumatic disease of the spine and spinal cord, deterioration of the neurological picture of the victim (1,2,3). The existing various methods for preventing the development of scarring, in particular, blowing air, oxygen into the spinal canal, repeated surgical interventions to remove scars, often do not give a good effect, since excision of scar conglomerates does not guarantee the formation of a repeated cicatricial

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process in the spinal canal, in particular the epidural space (4.5).

MATERIAL AND METHOD

In vertebral-spiral injuries, the outflowing blood transforms into a connective tissue scar within 3-4 weeks. To study this process, we conducted experimental work on 45 rabbits in the Department of Experimental Surgery of the Scientific Research Institute of Health of the Uzbek SSR according to the following method: hemilaminactomia was performed from the posterior access on the arch of the 12th thoracic or 1st lumbar vertebra, followed by the introduction of 1 ml of the rabbit's own blood into the epidural space from the ear vein. Surgical induction of trauma is widely used in the work of CITO and UzNIITO employees. Two series of experiments were performed.

1. The processes of formation of adhesions and scars in the epidural space in intact animals (without the introduction of ozone) on 15 rabbits were studied.

2. Study of the effects of ozone on the course of adhesions and scars in the epidermal space when it is introduced into the spinal canal in 30 rabbits. Ozone was injected into the area of damage in the amount of 5-10 cm3 for 5-10-20-30 days after the injury, having received it with the apparatus and methodology developed by us. As an ozonizer, a Darsonval spark-discharge high-frequency apparatus and an electrode are used, which are enclosed in a glass cylinder. Oxygen from the tank enters the latter through the tubes, under the influence of high-frequency spark discharges, the incoming oxygen is converted into ozone (03), which is drawn into the syringe through sterile tubes and the lumen of the tube located in the spinal canal is directed.

To check the formation of ozone, I.A. Vetokhin proposed iodine starch strip of filter paper, which turns blue at a concentration of more than 1%. Work with ozone in the presence of it up to 15% is considered safe in this interval there is no explosive danger of gas.

Results and their discussion: In the control series of experiments after fracture and resection of the processes of the vertebral arch and injection of 1 ml of blood into the epidural space during follow-up up to 10 days after injury, histological examination of transverse sections of the vertebral column and spinal cord on various hematomas in the epidural space and the occurrence in the spinal membranes brain acute circulatory disorders. Serous-proliferative epiduritis with acute circulatory disorders occurs at individual levels in the damaged area. In the area of damage to the vertebral arch, a progressive periosteal and endosteal reaction is noted with a pronounced neoplasm of small bone trabeculae. In further periods of observation up to 20-30 days, there is a complete disappearance of traces of injected blood from the epidural space. At the same time, an unevenly

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expressed proliferation of connective tissue and an increase in the phenomenon of its fibrosis are noted. Such scarring often leads, as a result of their tension, to translocation of the spinal cord with the formation of areas of cicatricial fusion of the dura mater with the periosteum of the inner surface of the vertebrae and in the lateral anterior and posterior parts of the spinal canal. The data of these studies indicate that after an injury to the spinal column, periodically repeated epidural administration of ozone contributes to a significant decrease in the severity of acute circulatory disorders and reactive changes in epidural tissue, and also reduces the severity of its subsequent fibrosis. As a result, the severity of such consequences of fibrosis as the occurrence of cicatricial translocation of the spinal cord and secondary circulatory disorders accompanied by a moderate manifestation of congestion with the expansion of venous vessels and the separation of erythrocyte mass from blood plasma is significantly reduced. However, in contrast to the control series of experiments, no fresh epidural hemorrhages were observed. Judging by the more uniform height of the epi and subdural space, there are no leveled disorders of the blood and blood circulation.

In all cases of the experimental series in the area of bone tissue damage, the preservation of hematopoietic bone marrow rich in cells is noted. In the control series, by the end of 4 weeks, the scar became more rough and formed. In the experimental series of rabbits that underwent ozone insufflation into the spinal canal, adhesion-cicatricial process was not detected in the epidural space by the end of the month. This once again confirms that ozone promotes the destruction and resorption of adhesions and scars in the epidural space of the spinal canal. Thus, in our opinion, the positive effect of the introduction of ozone is due to its physicochemical properties. When introduced into the epidural space, it inflates it, as it were, breaking the resulting adhesions between the dura mater and the inner surface of the spinal canal of rabbits. In addition, this unstable gas is an energetic oxidizing agent; when introduced into the spinal canal, it quickly splits into atomic active oxygen, accompanied by the release of a certain amount of energy. This energy contributes to the enhancement of redox processes in the spinal canal, the resorption of scar adhesions in it. The absence of adhesions of scars in the epidural space leads to the normalization of blood and liquor circulation in the spinal canal, the improvement of the function of the spinal cord, the disappearance or alignment of neurological changes that occurred as a result of a spinal cord injury to the spinal cord. Thus, ozone insufflation into the spinal canal in case of a spinal injury in a rabbit contributes to the prevention of adhesive and cicatricial processes in the spinal canal and to the strengthening of the regenerative functions of damaged bone tissues.

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