depending on the form of the disease. The new and traditional in the studies of modern medical science representatives. The proceedings of international scientific conference. 2015 February 27-28; Lviv, Ukraine: Lvivska medychna spilnota; 2015; 78-81.

17. Shypko AF. Actual issues of improving medical care for children with respiratory diseases. Medytsyna siohodni i zavtra. 2014; 1(62): 110-116.

18. Shypko AF. Problematic issues of resource maintenance of regional children's hospital and ways to improve health care for children. Eksperymantalna ta klinichna medytsyna. 2015; 1(66): 196-200.

19. Shypko AF. The health of children in Kharkiv region. Medytsyna siohodni i zavtra. 2014; 4(65): 75-79.

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Визначення потреби та алгоритм оцінки обсягів діяльності регіональних центрів діагностики та лікування бронхолегеневої дисплазії

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Резюме. Вперше обгрунтовано та складено і запропоновано для використання графічну та поліноміальну (кількісну) регіональну модель поширеності БЛД, залежно від кількості серед дочасно народжених дітей, що дозволяє виконувати узагальнений порівняльний (на держаному рівні) аналіз рівня діагностики БЛД. Визначені коефіцієнти інцидентності БЛД в групах дочасно народжених дітей з різним рівнем дефіциту МТ шляхом обчислення співвідношення між кількістю дітей з БЛД та загальною кількістю дітей у конкретних групах, стратифікованих за рівнем деффіциту МТ.

Вперше обгрунтовано та розроблено розширений (багатокритеріальний) алгоритм кількісного визначення обсягів діяльності Центру діагностики та лікування БЛД з урахуванням регіональної частоти дочасно народжених дітей та ступеня дефіциту їхньої маси. Виконано інверсну верифікацію цього алгоритму та доведено його востатньо високу точність для практичного застосування організаторами охорони здоров'я.

Новою є обгрунтована за результатами дослідження та розроблена номограма (графічний та табличний варіанти) для оперативного планування очікуваної абсолютної кількості хворих на БЛД залежно від регіональної кількості дочасно народжених дітей, що може застосовуватися при плануванні нових та оптимізації діяльності існуючих центрів діагностики та лікування.

Ключові слова: соціальна медицина, бронхолегенева дисплазія, інцидентність, регіональний центр, моделі, алгоритми, планування.

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Morphofunctional Peculiarities of the Sciatic Nerve Fibers Under the Action of Exogenous Factors

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Abstract. In the experiment on mature male cats the structural peculiarities of the sciatic nerve in terms of physiological norm, in degeneration, regeneration in conditions of low laser irradiation were examined. There were used methods of myelinated fibers' staining after Kulchytsky, non-myelinated ones – after Renson. The dynamics of morphological changes above and below the scar, while the influence of laser irradiation of the red spectrum, was studied.

It was determined that the laser irradiation reduces the time of ascending degeneration and accelerates regeneration and myelination of nerve fibers in the proximal segment of nerve, dilates blood vessels, accelerates wallerian degeneration, myelin resorption, intensifies neuroticism of the distal segment.

Keywords: sciatic nerve injury, degeneration, regeneration.

Problem statement and analysis of the latest research.

It is known that between the clinical manifestations of histopathological states of peripheral nerves and their structural organization there is some close connection. It serves as the cause of studies on the patterns of their internal stem structure [3, 10]. However, many aspects of this problem remain unresolved today. These include, in particular, the question of the distribution, quantitative and group composition of myelinated and non-myelinated nerve fibers, and their reactive changes in peripheral nerves' injury and effects of various physical therapeutic facilities.

Damage to the peripheral nerves occupies a significant place in the structure of the nervous system lesions both in wartime and in peacetime and often leads to disability [6]. Unfortunately, there is steady growth of their specific weight in connection with the improvement of war equipment [4]. Among the injuries of the somatic nerves and nerve plexus, sciatic nerve ranks first (22.3%) [2, 4]. Therefore, the problem of recovery processes study after injuries of peripheral nerves does not lose its relevance [5].

Despite the use of a wide arsenal of medical and physical therapy facilities in traumatic injuries and diseases of the peripheral nerves, the results of their treatment are not effective enough [7]. Today satisfactory results of treatment of several neurological diseases with the help of helium-neon laser (HNL) are received [1, 8]. In medical publications there are single reports about the positive impact of laser energy onto the regeneration of peripheral nerves [6]. However, there are many unclear issues of justification of the mechanism of these results.

The objective: morphological study of the sciatic nerve fibers in norm, in the degeneration and regeneration, and the impact of HNL irradiation on the course of recovery processes.

Material and methods of the study

The work was performed on 82 mature adult male cats weighing 2.35-3.20 kg; in which the sciatic nerve was examined. In 10 of them the sciatic nerve was studied in norm, in 36 animals sciatic nerve was crossed and sewed with epineural sutures – the control group, the other 36 cats, after crossing and stitching, sciatic nerve was irradiated with HNL through the skin in the area of the middle third of the thigh – the research group. Exposure of irradiation was 5 min. at a density of the light energy of 2.5 mW/cm^2. The course of treatment was 15 sessions, the total irradiation energy – was 90 J. During every term (7, 14, 30, 90, 180 and 300 days) in the control and experimental groups there were used by 6 animals. The methods of staining of myelinated fibers after Kulchytsky, non-myelinated fibers – after Renson were used. The obtained results were treated statistically using averages and reliability of differences with the help of Student's t-criterion.

Results of the study and their discussion.

After neurotomy and subsequent suturing of the cat's sciatic nerve in its proximal segment, retrograde degenerative changes develop. Morphometric analysis showed that the number of myelinated nerve fibers in control animals compared to intact, has significantly reduced during the 7th-15th-30th day of the experiment at 1.19-1.24 times, and during the 90th day as a result of regeneration, their number has normalized. The number of

non-myelinated nerve fibers has reduced only to the 15th day, and during the 30th day after injury has significantly increased at 1.38 times and during the 90th day it was normal. In exposed animals compared with control ones, the number of myelinated nerve fibers has decreased only to the 15th day, and during the 30th day as a result of active regeneration and their number has increased at 1.24 times (P<0.01). The number of small and medium caliber nerve fibers has increased respectively, at 1.42 and 1.68 times, and the number of large myelinated nerve fibers has not changed. In the next terms of the experiment, differences in quantitative composition and distribution of various groups of myelinated nerve fibers were not found. Number of non-myelinated nerve fibers has increased during the 7th day at 1.23 times (P<0.05), and during the following dates (30th and 90th day) their number was normal.

In the first two weeks after cutting the sciatic nerve in its distal part all the myelin fibers are at different stages of wallerian degeneration. There is considerable amount of some large lumps of myelin, whereas areas of grainy breaking of myelin are very few. During the 7th-14th day there is a significant reduction of the number of myelinated nerve fibers of all sizes. Thus, the number of members of small and medium caliber nerve fibers decreases, compared with the norm, respectively at 3.8-10.9 and 2.9-9.9 times (P<0.001), and large ones – only at 1.3-3.17 times (P<0.001). Total amount of myelinated nerve fibers during these terms reduces at 1.8-4.6 times (P<0.001). During the 30th day in the distal segment there is the beginning of active myelination of nerve fibers. During this period, myelin nerve fibers are represented by small and medium-caliber nerve fibers.

During the 90th day we have found a small number of major myelin fibers, and the number of small and medium-sized nerve fibers is higher than normal, respectively, at 2.06 and 1.35 times (P<0.001). During the 180th day in the distal nerve segment there are regenerating myelinated nerve fibers, mainly of small and medium caliber; their number, compared with the previous period, increases slightly, and during the 300th day – it is reduced. The number of large nerve fibers is gradually increasing, however, during the 300th day the ratio of groups of myelinated nerve fibers with different diameter is not normal. Non-myelinated nerve fibers are degenerating to the middle of the second week. This is confirmed by the reduction of their number during the 7th day at 8.6 times (P<0.001). Since the 15th day, as a result of regeneration, the number of these fibers are gradually increasing, and during the 90th day their number exceeds the normal rate at 2.3 times (P<0.001). In terms of laser irradiation in the distal nerve segment the processes of granular disintegration of myelin and rapid elimination of degeneration products dominate, and in the endoneurium there are only a few fragments of the destroyed myelin membranes. Morphometric analysis showed that during the 7th day after the experiment the number of non-myelinated and myelinated nerve fibers in distal nerve segment was lower compared with the control, respectively, at 1.17 and 1.41 times (P<0.05). During the 14th day, active regeneration of axons leads to the increase of non-myelinated nerve fibers at 2.00 times (P<0.01). Number of myelinated nerve fibers is slightly reduced. During the 30th day the number of non-myelinated nerve fibers exceeds the control at 1.96 times (P<0.01). Beginning from the 30th and 180th days the number of myelinated nerve fibers also increases at 2.12 and 1.40 times (P<0.02-0.001), and later (300th day), their number reduces.

After cutting of the cat's sciatic nerve in its proximal segment ascending degeneration of nerve fibers develops, which can be traced to the 30th day. It is known that the duration and severity of ascending degeneration depend on morphofunctional characteristic of peripheral nerves, type of animal, the severity of the injury, the general condition of the body, suturing material, etc. [9]. We have proved that exposure of HNL provides more pronounced reactive and degenerative processes in the proximal nerve segment, and reduces their time, and accelerates the regeneration of nerve fibers.

In the distal segment of the nerve the process of secondary (wallerian) degeneration of nerve fibers develops. More resistant to the secondary degeneration are thin myelinated and especially non-myelinated nerve fibers. We found that degeneration of these nerve fibers begins later, but develops faster than major myelinated ones, in which the degeneration is revealed in the first hours after neurotomy and is traced throughout the month. We determined that exposure of HNL increases the severity and reduces the course of the secondary degeneration of nerve fibers. Blood vessels expand, the number of hypertrophied cellular elements of endoneurium increases, myelin resorption is accelerated. This is due to direct activation of Schwann cells phagocytic function by laser energy. We have noted that there is hypertrophy and hyperplasia of these cells. Our results are consistent with literature data.

It is known that in the process of regeneration (neuroticism) of the distal segment of peripheral nerve simultaneously occur: sprouting of axons through the scar, their reparative myelination and "maturation" of nerve fibers (increase of the diameter of the axon and thickening of the myelin sheath), which increases the overall diameter of myelinated nerve fibers [10]. Germination of axons to the nerve distal segment was observed during the 14th day after neurotomy. Since the 30th day axon myelination is significantly activated, and since the 90th day there is "maturation" of myelinated fibers, but during the 300th day myeloarchitectonics of the sciatic nerve does not meet the norm. In general, exposure of HNL speeds the beginning and increases the intensity of regeneration of nerve fibers, as it is indicated by other authors [6]. The dynamics of their germination through the scar from the proximal to distal part also changes. While in control animals the regeneration of axons with each next term is growing, as is evidenced by a gradual increase in their number compared with the previous period, in the irradiated animals – this process is intensively performed already in the early stages (the 14th day), and then gradually decreases (the 30th and 90th day). This change in the nature of axons sprouting into the distal segment of the nerve is associated, in our view, on the one hand, with more severe involution of scar that begins in the early stages, and on the other hand – with stimulation by irradiation of HNL of the spinal cord mononeurons. O.N. Zhuk et al. [1] and P.N. Shcherbakov et al. [8] indicate that the laser irradiation prevents the development of destructive processes and activates reparative reserves of neurocytes of neencephalon cortex, stimulating thus regeneration processes.

Prospects of further research

Since peripheral nerve consists not only of long tract system, but also of hemovessels and connective elements, it is advisable to study the effect of laser radiation on epineural and internal-stem blood vessels, neurovascular relationship, and cellular elements membranes of epineural endoneurium in further research.

Conclusions

After neurotomy the cat's sciatic nerve in its proximal segment the processes of ascending degeneration develop, that continue to the 30th day. Restoration of nerve fibers number above the place of intersection of the nerve reaches the baseline at the 90th day.

Exposure of HNL reduces by half the ascending degeneration time. Regeneration and myelination of nerve fibers begin at an earlier term, leading to the full restoration of their quantitative and qualitative composition in the proximal segment of the nerve during the 30th day.

In the distal segment of the nerve the process of wallerian degeneration develop, which lasts to the 30th day. Restoration of nerve fibers number distal to the injury is only during the 180th day, but the metric division of myelinated nerve fibers is far from the norm even during the 300th day.

For processes that develop in the distal nerve segment under

the influence of HNL irradiation, characteristic are: shortening of the time of the secondary degeneration of nerve fibers to the 7th-14th day; early start of axons regeneration, leading to the restoration of their number already during the 90th day; acceleration of myelination of axons and restoration of myeloarchitectonics of this part of the nerve.

References

1. Zhuk O.N. The influence of low-intensity laser irradiation onto the ultrastructure of neurons of the cerebral cortex in rabbits following cerebral ischemia simulation. Morfologiia. 2006; 129:2:38-39.

2. Korochkin L.I. Neural stem cells and their value in regenerative processes in the nervous system. Morfologiia. 2005; 2:3:7-16.

3. Lupyr V.M. Experience and new methodological approaches in morphological studies of the anatomy of peripheral nervous and vascular systems of the human being. Ukrayinsky morfolohichny almanakh. 2005; 3:2:48-51.

4. Musaev A.V. Gunshot injuries of the peripheral nervous system: questions of classification and diagnostics. Zhurnal nevrologii i psihiatrii im. S.S. Korsakova. 2004; 104:8:10-17.

5. Herashchenko S.B., Deltsova O.I. et al. Peripheral nerve: (Neurovascular-desmal relationship in norm and pathology). Ukrmedknyha. 2005; 291-241.

6. Raskaley D.V. Ultrastructural changes in the damaged nerve in terms of magnetic field and laser irradiation with varying frequency modulation. Visnyk naukovykh doslidzhen. 2006; 3:21-24.

7. Chelyshev Yu.A. Molecular and cellular aspects of pharmacological stimulation of nerve regeneration. Eksperimentalnaya i klinicheskaya farmakologiia. 2001; 64:2:67-71.

8. Sherbakov P.N. Structural-functional changes of neurons of the sensorimotor cortex of the great brain of white rats in craniocerebral trauma and their correction by means of low-energy electromagnetic and phototherapy. Morfologiia. 2008; 133:2:37.

9. Nukada H. Post-traumatic endoneural neovascularization and nerve regeneration: A morphologic study. Brain Res. 1988; 449:1-2:89-96.

10. Weller R.O. Pathology of peripheral nerves. Naturwiss R. 1985; 34:2-3: 442-453.

Юрах О.М., Попадинець О.Г., Юрах Г.Ю., Грищук М.І, Дубина Н.М.

Морфофункціональні особливості сідничого нерва після впливу екзогенних факторів

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Резюме. В експерименті на статевозрілих котах-самцях досліджували структурні особливості сідничого нерва в умовах фізіологічної норми, при дегенерації, регенерації в умовах низькоінтенсивного лазерного опромінення. Застосували методи забарвлення мієлінових волокон за Кульчицьким, безмієлінових – за Ренсоном. Вивчали динаміку морфологічних змін вище та нижче рубця, під час впливу лазерних променів червоного спектру.

Встановлено, що випромінювання лазера скорочує терміни висхідної дегенерації та прискорює регенерацію і мієлінізацію нервових волокон у проксимальному відрізку нерва, розширює судини, пришвидшує валлерівську дегенерацію, резорбцію мієліну, інтенсифікує невротизацію дистального відрізка.

Ключові слова: сідничий нерв, травма, дегенерація, регенерація.

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Підвищення ефективності хірургічного лікування хворих на генералізований пародонтит з остеопенією

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Резюме. Проблема хірургічного лікування хворих на генералізований пародонтит з остеопенією є особливо актуальною. Численними дослідженнями підтверджуються переваги методик хірургічного лікування із застосуванням остеопластичних матеріалів для стимуляції процесів репарації тканин пародонта. Метою дослідження є підвищення ефективності хірургічного лікування хворих на генералізований пародонтит з остеопенією, шляхом поєднаного використання остеопластичного матеріалу і антирезорбенту в перед- та післяопераційному періодах.

Проліковано та проведено клінічне спостереження у 80 пацієнтів. Пацієнтів було розподілено на три групи. В І групі (20 хворих) хірургічне лікування проводили загальноприйнятим методом, в ІІ групі (20 хворих) хірургічне лікування проводили з місцевим використанням остеопластичного матеріалу «Easy Graft». В ІІІ групі (20 хворих) хірургічне лікування проводили з використанням остеопластичного матеріалу «Easy Graft» і антирезорбенту «Бонвіва». Групу порівняння склали 20 практично здорових осіб. Отримані результати доводять, що хірургічне лікування з використанням остеопластичного матеріалу і антирезорбенту сприяє найбільш вираженому позитивному ефекту, що визначали за динамікою клінічних показників. Поєднане використання остеопластичного матеріалу «Easy Graft» та антирезорбенту «Бонвіва» призводить до стійкої стабілізації процесу, що підтверджується показниками клінічних досліджень як у ранньому, так і у віддаленому післяопераційному періоді.

Ключові слова: генералізований пародонтит, остеопенія, остеопластичний матеріал, антирезорбент.

Постановка проблеми і аналіз останніх досліджень. Генералізований пародонтит (ГП) – поширене захворювання, частота якого збільшується з віком і характеризується запальними й резорбційно-деструктивними процесами у тканинах пародонта хворого [1-3]. Серед численних факторів, що призводять до виникнення ГП особливе місце займають мікроорганізми [4-6]. Пародонтопатогенні види мікрофлори пошкоджують тканини пародонта і сприяють виділенню цитокінів. Вони спричиняють у тканинах підвищення проникності судин, гіперемію, порушення антиоксидантного захисту та інші зміни метаболізму, характерні для запальної реакції [7-9]. Основним етіологічним фактором у розвитку запальних захворювань пародонта вважають пародонтопатогенну мікрофлору (Actinobacillus actinomycetem