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MODERN PROBLEMS IN NEUROSURGICAL TREATMENT OF PHARMACORESISTANT FACIAL PAINS

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Современные проблемы нейрохирургического лечения фармакорезистентных болей лица

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Сучасні проблеми нейрохірургічного лікування фармакорезистентного лицьового болю

Modern problems in the neurosurgical treatment of pharmacoresistant facial pains (prosopalgias) are examined on the basis of a review of literature and the author's researches. Prosopalgias develop in lesions of different parts of the facial nervous system as the result of inflammatory, vascular, neoplastic and other pathological processes. Their clinical picture is similar, differential diagnosis often being extremely difficult. Present classifications of prosopalgias are far from satisfying requirements of the modern medicine to the full. With an increase in the duration of the disease the percentage of pharmacoresistant forms increases too. The tactics of treatment, indications and contraindications for a differentiated use of different surgical techniques have not been sufficiently defined. The biggest problems appear in the treatment of patients with atypical pharmacoresistant prosopalgias.

Key words: prosopalgia, facial pain, trigeminal neuralgia, atypical prosopalgia, facial sympathalgia, ganglionitis

На ґрунті огляду літератури та власних досліджень розглянуті сучасні проблеми нейрохірургічного лікування фармакорезистентного болю лиця (прозопалгій). Прозопалгії розвиваються при ураженні різних відділів нервової системи лиця в результаті запальних, судинних, пухлинних та інших патологічних процесів. Клінічно вони мають подібну картину, диференціальна діагностика часто надзвичайно складна. Існуючі класифікації прозопалгій далеко не повною мірою відповідають вимогам сучасної медицини. Зі збільшенням тривалості захворювання збільшується і частка фармакорезистентних форм. Тактика лікування, показання, протипоказання до диференційованого застосування різних хірургічних методик визначені недостатньо. Найбільші проблеми виникають у лікуванні хворих з атиповими фармакорезистентними прозопалгіями.

Ключові слова: прозопалгії, лицьовий біль, невралгія трійчастого нерва, атипові прозопалгії, лицьові симпаталгії, гангліоніт

На основе обзора литературы и собственных исследований рассмотрены современные проблемы нейрохирургического лечения фармакорезистентных болей лица (прозопалгий). Прозопалгии развиваются при поражении различных отделов нервной системы лица в результате воспалительных, сосудистых, опухолевых и других патологических процессов. Клинически они имеют сходную картину, дифференциальная диагностика часто чрезвычайно сложна. Существующие классификации прозопалгий далеко не в полной мере отвечают требованиям современной медицины. С увеличением длительности заболевания увеличивается и доля фармакорезистентных форм. Тактика лечения, показания, противопоказания к дифференцированному применению различных хирургических методик определены недостаточно. Наибольшие проблемы возникают в лечении больных с атипичными фармакорезистентными прозопалгиями.

Ключевые слова: прозопалгии, лицевая боль, невралгия тройничного нерва, атипичные прозопалгии, симпаталгии лица, ганглионит

The problem of surgical intervention in a pain syndrome belongs to basic problems of the norm and pathology in medicine, since first of all is the issue of classification of the pain as a physiological or pathological phenomenon [1—3]. In the latter case the pain turns into a separate nosological unit, because it is this symptom that causes persistent sufferings, which destroy the patient's personality and result in disability, significant metabolic changes, functional and morphological organ pathology [3, 4].

Facial pains (prosopalgias) are rather widespread. The sickness rate of trigeminal neuralgias averages 16 cases per 100,000 people a year, its prevalence being 50—100 patients per 100,000 people. In Ukraine, more than 27,000 people suffer from trigeminal neuralgia only [4—6]. No information about other forms of chronic facial pains is available: epidemiological studies were not carried out. According to out data, atypical prosopalgias comprise about one half of all facial pains.

Neurogenic facial pains develop when different formations of the nervous system are affected: sensory cranial nerves, parasympathetic cephalic (ciliary, pterygopalatine, submandibular, sublingual, otic) ganglia and sympathetic nerve formations (cervical sympathetic nodes, periarterial sympathetic plexuses of the common carotid, external and internal carotid arteries and their branches), central pain pathways, formations of the antinociceptive system, as well as in cases of their combined involvement [7—9].

During almost one hundred years in the history of development of the science of prosopalgias about 50 classifications of facial pains have been suggested, but none of them reflects the topography and character of the lesion and hence the tactics of treatment [10, 11]. In this connection it is necessary, first of all, to pay attention to creation of a new classification of facial pain syndromes, which would be built on the information about the localization, aetiology and pathogenetic mechanisms of pain development.

The aetiology of prosopalgias is quite various. The affection of the sensory nervous system of face can result from vascular, neoplastic, inflammatory, degenerative and other factors, which cause a larger flow of nerve impulses along pain-conducting fibres. More seldom pains develop in case of involvement of the antinociceptive nervous system, which controls the flow of pain impulses [3, 4, 6—10, 12, 13, 15].

The use of neuroimaging techniques of examination and results of analysis of protocols of microsurgical operations for neuralgias of the trigeminal and glossopharyngeal nerves have considerably changed notions about the aetiology and mechanisms of development of cranialgias. The latter most frequently result from the vasculonervous conflict: a long-term irritation of the sensory fibres of cranial nerves with some closely approximating blood vessel(s) and development of a focal de myelination of the sensory nerve fibres in the place of their entrance into the cerebral stem [12, 13]. But the issue of neoplastic and other kinds of compression of sensory cranial nerves still remains urgent [15].

The adequate use of the proper surgical intervention and achievement of a satisfactory result of the treatment of prosopalgias depend to a large degree upon the correct understanding of pathogenetic mechanisms. Scientific investigations have produced the data, which demonstrate that the above mechanisms are extremely complex and necessitate their further comprehensive study [3, 14—16].

Modern literature reflects the pathomorphology of neurogenic facial pains only in a few publications [17]. This circumstance can be explained by difficulties in taking bioptic material of the facial tissues and nerve formations. Besides it should be noticed that collection and generalization of the factual material concerning structural (macroscopic and microscopic) changes in prosopalgias are rather urgent and promising [18].

By their clinical manifestations all nosological forms of facial pains have a strong resemblance, that is why their diagnosis and differential diagnosis are extremely difficult. Even the special literature, which deals with prosopalgias, does not clearly define clinical manifestations of some prosopalgias [8, 10, 13, 19—21].

Trigeminal neuralgia (TN) is traditionally isolated from a large group of facial pain syndromes as a separate nosological unit; this is also most commonly diagnosed [6, 8, 10, 13, 15, 17, 21].

Glossopharyngeal neuralgia (Sicard syndrome), which occurs considerably less frequently than TN, develops mostly in compression of the glossopharyngeal nerve and upper roots of the vagus with the vertebral or posterior inferior cerebellar arteries [4, 6—8, 10, 13, 15, 19, 20].

A large proportion is formed by facial denervation pains, which develop after herpetic lesion of facial nerve formations and after excessive surgical denervation [4, 6, 8, 20].

Trigeminal and glossopharyngeal neuralgias should be differentiated from syndromes of a lesion of parasympathetic and sympathetic nerve formations; in the latter case the pain spreads outside the region of innervation of the sensory cranial nerves and is of a specific character [4, 6, 20, 24].

Differential diagnosis of some prosopalgias, especially atypical ones, is quite often extremely difficult, thereby causing a great number of diagnostic mistakes and reduced efficacy of treatment [4, 6, 13, 20, 21]. A need to improve and develop new techniques for diagnosing is evident [18].

If we want to assess the treatment of prosopalgias on the whole, it is possible to conclude that at present most cases of treatment of facial pains begin with use of combined medicinal therapy (preparations of carbamazepine and lamotrigine; analgetics, nonsteroid anti-inflammatory drugs, ganglion blockers, vitamins, anti-inflammatory, antioedematous and other medicines). In the overwhelming majority of cases their conservative therapy is effective at the initial stages of the disease. This is ineffective or produces little effect from the very beginning approximately in 10 % of patients with prosopalgias. With time more than half of the patients develop resistance to pharmaco- and physiotherapy [2, 4, 6, 24].

Indications for use of surgical treatment of prosopalgias appear in cases of inefficacy of their conservative treatment. The problem of reasonability of surgical interventions in cases with a diagnosed aetiological factor (e. g. tumour), an indistinct pain syndrome and presence of general somatic contraindications for the operation is debatable [20, 23, 24].

Despite the fact that surgical treatment of facial pain syndromes is a long-standing and traditional problem of medicine, the present situation necessitates further profound investigations, particularly with revealing of indications for a differentiated use of different surgical interventions in certain nosological forms of the diseases, improvement of the available techniques and development of new ones for surgical treatment [2, 3, 7, 8, 20, 23].

In our opinion, good results were achieved in the development of the tactics of "growing radicalness", which presupposes to use at first more simple techniques, in particular blockades of peripheral nerve formations with solutions of local anaesthetics, including their combinations with glucocorticoids and other medicines. Then, at the next stage, operations of microsurgical decompression are used, the latter being aimed at elimination of the aetiological factor of the disease. If an open surgical intervention is impossible (there are some contraindications or the patient refuses an open neurosurgical intervention), puncture operations are made: percutaneous microballoon compression of the trigeminal ganglion as well as laser, cryosurgical and electrothermal destruction of peripheral branches and/or a sensory root of the trigeminal nerve, pterygopalatine and other cephalic autonomic ganglia; these operations need further improvements too [20, 23, 24].

According to the mechanism of their medical effect all surgical interventions in prosopalgias can be divided into three groups [8, 20, 24]:

a) aimed at interruption of an excessive flow of pain nerve impulses (blockades, neurotomies, neurectomies, denervations) at different levels of the peripheral and central parts of the nervous system;

b) aimed at elimination of the aetiological factor of prosopalgias (microvascular decompression of the roots of cranial sensory nerves; microsurgical removal of tumours and other masses, which compress formations of the facial nervous system);

c) neuromodulating.

According to the technique of their performance they can be divided into classical (open) and mini-invasive (puncture and stereotactic) ones [8, 20, 21, 24].

At present, classical surgical interventions are made with help of microsurgical equipment, while mini-invasive ones use modern stereotactic and neuronavigation systems [7, 12, 20].

Nowadays the techniques of chemical (alcoholic, phenolic) and hydrothermal destruction are applied more and more rarely because of the development of pronounced cicatrical-adhesive changes within a remote period [18].

Cutting of pain pathways at different levels, from a peripheral nerve to the brain, is actually the classical variant of a surgical intervention in a pain syndrome. But, as the available experience shows, the above cutting of pain pathways in some cases is not effective or seldom results in the development of severe denervation syndromes, thereby aggravating the patient's sufferings [8, 20, 24].

In the presence of a vasculonervous conflict microvascular decompression is the operation of choice. Its main advantage consists in the full postoperative preservation of functions of the trigeminal and glossopharyngeal nerves [7, 19, 21]. But this operation requires the highest professional skills of the neurosurgeon and special conditions for its performance.

In recent years, techniques of endoscopic visualization of the cerebellopontine angle region have been developed and made it possible to carry out surgical interventions with minimum injuries and a high efficacy [25].

Surgical treatment of ganglionitis in parasympathetic ganglia of the head has not been developed sufficiently. Only some publications exist that deal with treatment

of Sluder's syndrome with bipolar high-frequency destruction of a ganglion as well as use of blockades and chemodestruction [24, 26].

Neurosurgical treatment of sympathalgias is at the initial stage of its development [24].

In cases of an inefficient surgical treatment of facial pains at the level of peripheral nerve formations stereotactic tractotomy on the level of the myelencephalon and mesencephalon is used [8, 20, 25]. But is should be noticed that surgical interventions on the structures of the second and third neurons of the trigeminal nerve have not become widespread due to their complexity, high injury rate, insufficient efficacy and presence of dangerous complications [20].

Electrical neuromodulation is a promising neurosurgical technique in treatment of pharmacoresistant forms of facial pains [20, 28, 29].

Extremely difficult and insufficiently studied is the problem of surgical treatment of atypical forms of prosopalgias [30], it requiring special studies.

At the same time, despite some difficulties in the substantiation and execution of proper surgical interventions, even today in the majority of cases neurosurgeons have a real opportunity to give an effective aid to patients with pharmacoresistant facial pains.

Reference

1. Melzack R. The problem of pain: measurement in clinical Settings [Text] / R. Melzack, J. Katz // Surgical Management of Pain. — New York, Stuttgart : Thieme, 2002. — P. 78—96.

2. Шабалов В. А. Что делать с «трудной» болью? (Электростимуляция спинного и головного мозга в лечении хронической неонкологической боли) [Текст] / В. А. Шабалов, Э. Д. Исагулян. — М. : «Реал-Графика», 2008. — 102 с.

3. Етіологія, патогенез та нейрохірургічне лікування невралгії трійчастого нерва (огляд літератури) [Текст] / В. І. Цимбалюк, І. П. Дмитерко, М. А. Сапон [та ін.] // Український нейрохірургічний журнал. — 2001. — № 4. — С. 40—46.

4. Вейн А. М. Болевые синдромы в неврологической практике [Текст] / А. М. Вейн, А. Б. Данилов. — М. : МЕДпресс-информ, 2001. — 164 с.

5. Павленко С. С. Эпидемиология боли : обзор [Текст] / С. С. Павленко // Неврологический журнал. — 1999. — № 1. — С. 41—46.

6. Пузин М. Н. Нейростоматологические заболевания / М. Н. Пузин. — М. : Медицина, 1997. — 368 с.

7. Федірко В. О. Діагностика та хірургічне лікування нейроваскулярно-компресійних синдромів черепних нервів [Текст] : автореф. дис. на здобуття наук. ступеня доктора мед. наук : спец. 14.01.05 «Нейрохірургія» / В. О. Федірко; Ін-т нейрохірургії ім. акад. А. П. Ромоданова АМН України. — К., 2010. — 33 с.

8. Сипитый В. И. Криохирургическое лечение тяжелых форм невралгии тройничного нерва [Текст] / В. И. Сипитый, Н. Ф. Посохов, В. А. Пятикоп. — Харьков : Основа, 1994. — 113 с.

9. Посохов Н. Ф. Клинико-анатомическая классификация прозопалгий [Текст] / Н. Ф. Посохов // Российский нейрохирургический журнал им. проф. А. Л. Поленова. Специальный выпуск «Поленовские чтения» : материалы XI Всероссийской науч.-практ. конф. (17—20 апреля 2012, Санкт-Петербург). — СПб., 2012. — Т. IV. — С. 336.

10. Eller J. L. Trigeminal neuralgia: definition and classification [Text] / J. L. Eller, A. M. Raslan, K. J. Burchiel // Neurosurgical Focus. — 2005. — Vol. 18. — № 5. — P. E3.

11. Richard A. Classification and Treatment of Chronic Face Pain [Electronic resource] / A. Richard, A. Lawhern. — Mode of access : URL : http://www.lawhern.org/Diagnosis-Facepain.htm

12. Мікротопографічні співвідношення судин і корінців черепних нервів, що спричиняють нейроваскулярно-компресійні синдроми [Текст] / Ю. П. Зозуля, Р. М. Трош, В. О. Федірко [та ін.] // Український нейрохірургічний журнал. — 2010. — № 1. — С. 51—57.

13. Trigeminal neuralgia : literature review [Text] / M. M. Santos, A. R. Freire, A. C. Rossi [et al.] // J. Morphol. Sci. — 2013. — № 1. — P. 1—5.

14. Adams C. B. T. The physiology and pathophysiology of posterior fossa cranial nerve dysfunction syndromes: nonmicrovascular perspective [Text] / C. B. T. Adams // Surgery of the Cranial Nerves of the Posterior Fossa. — Park Pidge, 1993. — P. 131—154.

15. Григорян Ю. А. Тригеминальная невралгия и опухоли мостомозжечкового угла [Текст] / Ю. А. Григорян, А. Р. Ситников // Российский нейрохирургический журнал им. профессора А. Л. Поленова. — 2010. — Т. II. — № 1. — С. 28—41.

16. Сапон Н. А. Вопросы патогенеза невралгии тройничного нерва (постулаты, противоречия и новые подходы). Первое сообщение [Текст] / Н. А. Сапон // Український нейрохірургічний журнал. — 2005. — № 2. — С. 54—59.

17. Truini A. Trigeminal neuralgia [Text] / A. Truini // The Journal of Headache and Pain. — 2015. — № 16. — P. 42.

18. Экспериментально-морфологическое изучение методов алкогольной, крио- и лазерной деструкции нервного ствола [Текст] / Н. Ф. Посохов, В. И. Цымбалюк, О. В. Горбунов [и др.] // Материалы XXXIX Международной науч.-практ. конф. «Применение лазеров в медицине и биологии» (Харьков, 22—24 мая 2013 г.). — Харьков, 2013. — С. 126—127.

19. Glossopharyngeal neuralgia secondary to vascular compression in a patient with multiple sclerosis a case report [Text] / E. Gaitour, S. Talebzadeh, C. Roberts [et al.] // Journal of Medical Case Reports. — 2012. — № 6. — P. 213—219.

20. Щедренок В. В. Хирургия лицевых болей [Текст] / В. В. Щедренок. — СПб. : Изд-во ГУ РНХИ им. проф. А. Л. Поленова, 2005. — 176 с.

21. Zakrzewska J. M. Trigeminal neuralgia: the diagnosis and management of this excruciating and poorly understood facial pain [Text] / J. M. Zakrzewska, R. McMillan // Postgraduate Medical Journal. — 2011. — Vol. 87. — P. 410—416.

22. Криодеструкция чувствительного корешка в лечении тяжелых форм невралгии тройничного нерва [Текст] / В. И. Цымбалюк, Н. Ф. Посохов, Н. А. Сапон [и др.] // Бюллетень Украинской Ассоциации нейрохирургов. — 1997. — Вып. 3. — С. 14—16.

23. Посохов Н. Ф. Дифференцированное хирургическое лечение больных с тяжелыми формами невралгии тройничного нерва [Текст] / Н. Ф. Посохов, А. В. Пыхтин // Международный глобальный симпозиум по проблемам боли «Подходы к пониманию механизмов и лечению симптомов боли» (Санкт-Петербург, 22—24 августа 2012 г.). — СПб., 2012. — С. 90—91.

24. Щедренок В. В. Очерки хирургии вегетативной нервной системы [Текст] / В. В. Щедренок. — СПб. : Изд-во ГУ РНХИ им. проф. А. Л. Поленова, 2004. — 228 с.

25. Oppel F. Selective trigeminal root section via an endoscopic transpyramidal retrolabyrinthine approach [Text] / F. Oppel, G. Mulch // Acta Neurochir. Suppl. (Wien). — 1979. — Vol. 28. — P. 565—571.

26. Lovely T. J. Surgical management of geniculate neuralgia [Text] / T. J. Lovely, P. J. Jannetta // Am. J. Otol. — 1997. — Vol. 18. — P. 512 — 517.

27. Burchiel K. J. A new classification for facial pain [Text] / K. J. Burchiel // Neurosurgery. — 2003. — Vol. 53. — № 5. — P. 1164—1167.

28. Brown J. A. Motor cortex stimulation for central and neuropathic pain: current status [Text] / J. A. Brown, N. M. Barbaro // Pain. — 2003. — № 8. — Vol. 104(3). — P. 431.

29. Buyten V. Peripheral nerve stimulation in the treatment for trigeminal nerve pain [Text] / V. Buyten, J. Pierre // Neurocontact. — 2003. — Vol. 6. — P. 14 — 17.

30. Olesen J. Trigeminal Neuralgia and Persistent Idiopathic Facial Pain [Text] / J. Olesen // Cephalalgia. — 2013. — № 33(9). — P. 629—808.

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