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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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EPIDURAL INJECTIONS IN THE TREATMENT OF RADICULAR SYNDROME AND CHRONIC LOWER BACK PAIN IN DEGENERATIVE-DYSTROPHIC SPINE DAMAGE

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Abstract.

Purpose of the study: To investigate the methodology and effectiveness of epidural steroid injection for radicular syndrome and lower back pain caused by degenerative-dystrophic spine damage.

Research methods: bibliosemantic, comparative, systemic approach. The analysis of early and long-term results of treatment of patients with degenerative-dystrophic spine damage using epidural steroid injections by various authors and the author's own experience was carried out.

Results: Literature review and our study proved a high efficacy of both monotherapy and combined epidural steroid injections in the treatment of chronic lower back pain and radicular syndrome caused by degenerative-dystrophic spine damage. Epidural steroid injections are indicated for intervertebral disc herniation, spondyloarthritis, spinal canal stenosis, spondylolisthesis, which cause chronic lower back pain, radicular syndrome. Epidural steroid blockades with stable remission were proved to have positive result in 20 to 100% of cases, averaging more than 80%. Anesthetics, corticosteroids, enzymes, and vitamins are administered into the epidural cavity to relieve pain and inflammation, but most authors still prefer steroids. Corticosteroids reduce the inflammatory response and oedema by inhibiting the synthesis and release of numerous anti-inflammatory mediators and cause the reverse local anesthetic effect. Different approaches are used to administer drugs into the epidural cavity: interlaminar, caudal and transforaminal; the method of long-term local pharmacotherapy is used. Interlaminar epidural steroid injection is as effective as transforaminal epidural injection. The middle interlaminar access is less traumatic. The choice of the administration technique depends on experience and preferences of the specialist. Epidural injections are performed both by a “blind method” (without imaging) and under control (fluoroscopy, ultrasound, and CT) in order to improve the safety and carefulness of pharmacological drug administration. The equivalence of fluoroscopic, ultrasound and CT control of epidural injection in terms of treatment efficacy has been proved.

Conclusions: Taking into account the high efficacy of epidural steroid injections, the possibility of outpatient treatment in the absence of complications, makes it the method of choice in the treatment of radicular and lower back pain caused by degenerative damage of the lower back spine, after ineffective treatment.

Key words. Degenerative-dystrophic spine damage, epidural steroid injections.

Introduction.

Degenerative-dystrophic spine conditions are among the most common in modern society. According to WHO, 80% of the adult population have back pain due to degenerative spine damage. The term degenerative-dystrophic spine damage includes osteochondrosis of the intervertebral discs, protrusions, and hernias of the intervertebral discs, deforming spondylosis, spondylarthrosis, and complications of osteochondrosis – spinal canal stenosis, spondylolisthesis. These spine damages are difficult to treat, both due to the pathomorphological changes themselves in this pathology, and as a result of the lack of a systematic approach, stages of treatment and its methodology, including surgical manual.

Currently, epidural steroid injections are used as part of a multimodal treatment regimen for back pain, radicular syndrome. However, epidural steroid injections have not got widespread use in the medical environment. Epidural steroid injections are the intermediate between therapeutic and surgical treatment. This method of treatment can equally be attributed to both therapeutic and minimally invasive surgical treatment. This review is necessary to fill this gap and aims to investigate both the implementation method and the results of treatment with the administration of steroids into the epidural space in the pathology of degenerative spine damage, both as part of multimodal treatment and as monotherapy. Thus, the high prevalence of degenerative-dystrophic spine damage with the variability of research results regarding the efficacy of steroid injections into the epidural space for the treatment of both radicular syndrome and chronic back pain caused by degenerative-dystrophic spine damage make such research relevant.

Materials and Methods.

Bibliosemantic, comparative, systemic approach. The analysis of early and long-term results of treatment of patients with degenerative-dystrophic spine damage using epidural steroid injections by various authors and the author's own experience was carried out.

Results and Discussion.

Epidural injections for the treatment of lumboischialgia were proposed in 1901 independently by two French doctors – J. Sicard and F. Cathelin. To relieve pain syndrome, they used the only local anesthetic available at that time, cocaine [1]. Epidural injection with cocaine administration was used to treat lumbago and sciatica. In 1903, the French physician F. Cathelin proposed a method of access to the epidural space through the sacral foramen for anesthetic practice. Despite the unsuccessful

application in anesthesiology, he suggested using this technique for epidural injections for sciatica. This became the beginning of the use of epidural blocks in medical practice. The beginning of the use of glucocorticoids during epidural injection dates back to the 50s of the last century. In 1954, a publication by H. Luhmann [2] came out, which described the experience of using the epidural injection for lumbalgia and lumboischialgia. In 1957, J. Lievre et al. [3] reported success in the treatment of radicular symptoms by epidural administration of hydrocortisone. The first report on epidural administration of glucocorticoids in chronic lumboischialgia belongs to J. H. Brown (1960), who noted a complete short-term positive effect in 4 patients with chronic lumboischialgia when using methylprednisolone [4]. H. Goebert et al. [5] reported on epidural steroid administration for the treatment of patients with low back pain and radicular symptoms. Since then, this treatment has gained acceptance for the treatment of acute and chronic back pain.

Epidural injections are often used in the treatment of non-specific back pain. Such injections are especially popular in the United States, where more than 1 million of them are performed annually. Statistics provided by the U. S. medical scheme Medicare indicates an increase in the number of epidural injections from 802,735 in 1998 to 1,776,153 in 2005. They are expected to quadruple in the near future [6]. Indications for epidural administration of drugs is radiculopathy [7].

Methods of epidural injections and the outcomes:

The technique of injecting corticosteroids into the epidural space has gained recognition and widespread use. An important contribution to the development of epidural pharmacotherapy was made by V. D. Troshin, V. S. Lobzin, O. A. Kondrashov, N. E. Polishchuk, Raj, D. D. Denson, D. T. Cannon, C. N. Aprill, M. J. Cousins, A. M. Turkiewicz, C. A. Reale [8,9]. Epidural steroid injections in many countries are performed by a blind method (without fluoroscope guidance), using the technique of palpation of superficial bony landmarks to determine the intervertebral fissure and the loss of resistance technique to determine the epidural space [10]. Surface landmarks may be absent or indistinct due to obesity, previous spinal surgery, deformity, or gross degenerative changes in the spine, so palpation and identification of the intercostal space, according to the location of the pathology, may be difficult. It is noted that even among experienced specialists, the frequency of incorrect localization of the epidural space when using the "blind method" reaches 30% [11].

With the help of fluoroscopic imaging, some advantages were found, as well as a lower traumatic risk of the median interlaminar approach compared to the transforaminal one. According to the authors of the study [12], this allows to recommend the widespread routine use of interlaminar access. I. Evans et al. [13] evaluated the analgesic effect and the degree of functional disability in patients with degenerative diseases of the spine after the administration of epidural steroids with preliminary ultrasound imaging of the spine. The results of this study demonstrate the equivalence of methods of fluoroscopic and ultrasound control of epidural injection in terms of analgesic effect and reduction in the degree of functional disability. Fluoroscopy provides good visualization of bony structures (vertebrae), but soft tissue resolution is poor. This method allows the specialist to control the direction of the needle into the selected interspinous gap and the spread of contrast in the epidural space, thereby ensuring targeted administration of steroids in the immediate vicinity of the pathology site, and also helps to recognize the intravascular position of the needle after contrast injection [14]. The use of fluoroscopic control for needle insertion and identification of the extravascular location of its tip can significantly reduce the risk of complications but does not completely eliminate them. In recent years, studies have appeared that show the benefits of using ultrasound imaging of the spine for spinal and epidural anesthesia, and the ultrasound has proved to help determine the required level of the interspinous gap more accurately than the palpation method.

The authors have different approaches to the route of administration of steroid drugs into the epidural space. For the administration of drugs into the epidural space, various approaches are used: interlaminar (between the arches, dorsal), sacral (caudal) and transforaminal. Selective transforaminal block of the spinal nerve was first proposed by I. Macnab in 1971 [15]. A technique for long-term epidural local pharmacotherapy has been developed [16]. But due to the significant volumes of drugs that are injected into the epidural space with this technique, the course of the disease may worsen. Also, a long stay of the catheter in the epidural space poses a certain threat.

The choice of the route of administration depends on experience and on what the specialist prefers. The literature provides data from comparative studies of three routes of administration of glucocorticoids, but no advantages of any of them are noted [17]. With interlaminar administration, a smaller amount of the drug is used, while the risk of damage to the dura mater is lower than with caudal administration. The transforaminal route allows the drug to be injected directly into the area where the damaged nerve root is located, which, in turn, is associated with the risk of root damage and the development of acute radiculopathy [18]. A number of authors consider the caudal route to be the safest [4]. To improve the safety and accuracy of drug administration, it is proposed to use contrast and perform the procedure under neuroimaging control.

A. E. Barysh [19] uses transforaminal epidural injections using CT control. The clinical efficacy and safety of 4,070 transforaminal epidural steroid injections under intermittent computed tomography control for the treatment of vertebrogenic pain of all localizations in 1,258 patients was studied. In 93.5% of cases, a positive result of treatment was achieved. Minor transient complications that were leveled or did not require specific treatment occurred in 4.1% of patients. Analysis of the results of the use of intermittent CT-guided transforaminal injections of steroid drugs for the treatment of vertebrogenic pain in an outpatient setting allows for the conclusion that they are highly clinically effective and safe. The author also considers minimally invasive interventional procedures as an integral part of multidisciplinary therapeutic measures for the treatment of vertebrogenic pain. Other authors also insist on the efficacy of transforaminal epidural injections [20]. Although there are many skeptics. Their negative attitude towards transforaminal epidural block can be explained by a sufficient number of complications during its implementation. According to the

literature, the complication rate is 10-21.4% and ranges from transient pain at the injection site to numerous and irreversible lesions of the central nervous system up to fatal cases [21-23].

Interlaminar access allows to reach the place where the pathology is located more accurately, requires a smaller dose of medication than caudal access. The caudal approach is easy and safe (minimal risk of dural puncture) but requires a relatively large volume (10-20 ml) of drugs [24].

S.M. Hashemi et al. (2015) in a double-blind, randomized study conclude that interlaminar epidural steroid injection is as effective as transforaminal epidural injection in patients with chronic low back pain [25].

Yu. V. Kobets evaluated the short-term effect after transforaminal and percutaneous epidural blocks with glucocorticosteroids. The paper analyzes the pain syndrome and quality of life in patients with lumbar stenosis 2 and 4 weeks after transforaminal and transsacral blocks. This made it possible to argue that in the case of a pathological process higher than the L4 lumbar vertebra, transsacral block is less effective than transforaminal ones. The author also points out that transforaminal access is safe when using the lower part of the intervertebral foramen [26].

Medicinal drugs used for epidural injections and the outcomes:

For epidural block, anesthetics, corticosteroids, enzyme preparations and vitamins are used to eliminate pain and inflammation [16]. Of the anesthetics, most often – procaine, lidocaine, bupivacaine, and of the glucocorticoids – hydrocortisone, methylprednisolone, triamcinolone, both in the form of monotherapy and in combination (anesthetic + glucocorticoid) [27]. According to the literature, there is no consensus on the use of one or another drug for epidural injections. But most authors still prefer steroid drugs, which is 20-100% (67% on average) [28,29]. Corticosteroids reduce the inflammatory response and edema by inhibiting the synthesis and release of numerous anti-inflammatory mediators and induce an inverse local anesthetic effect. Neuronal block alters the transmission of nociceptive impulse along afferent fibers, regulating the activity of both individual neurons and central neuronal activity [30].

One of the injectable glucocorticoids with a favorable safety profile is diprospan, a prolonged injectable two-component glucocorticoid that has the highest efficacy and duration of action. It contains betamethasone sodium phosphate salt (2 mg), which dissolves quickly and provides a quick onset of action (20-40 minutes since administered), and the microcrystalline depot fraction of betamethasone dipropionate (5 mg) has long lasting (at least 4 weeks) anti-inflammatory effect. The peculiarity of the drug is that its crystals are smaller (5.3 microns): they are 3 times smaller than that of kenalog, and 5 times smaller than that of depomedrol. Diprospan has a more powerful anti-inflammatory effect compared to other long-acting glucocorticoids. In particular, it is 33 times more powerful than cortisone and 5.33 times more powerful than methylprednisolone. The drug is characterized by a combination of fast and prolonged action with high drug safety, as well as a stable and predictable effect [31,32].

The most commonly used steroids for epidural injections in pain treatment are betamethasone (6-15 mg), depomedrol (40 to 120 mg doses), decadron (4 to 12 mg), kenalog (10 to 80 mg) [ten]. As for the frequency and frequency of epidural injections, A. A. Kondrashov notes that with a positive effect of the first procedure, the next one is carried out after 1 week, and the third administration of drugs is possible after one month. More than three procedures are not recommended for a course of treatment; if the first one is ineffective, repeated procedures are not performed [33]. Various authors have developed and tested a method for the treatment of radicular syndrome by introducing non-steroidal anti-inflammatory drugs of the oxicam group into the epidural space in doses approved for parenteral use [34].

S. Novak et al. did not obtain significant differences in the study of the efficacy of single and repeated epidural injections of glucocorticoids [35]. No differences were found when using different glucocorticoids (40 mg triamcinolone or 6 mg betamethasone) [36] and different doses (40 or 80 mg methylprednisolone) [37].

M. V. Shpagin et al. [38] argue that the epidural use of tenoxicam is highly effective in vertebrogenic pain syndromes. According to these authors, epidural administration of oxycams helps to eliminate or reduce regional pathological changes in the area of disco-radicular conflict and leads to a restructuring of neuroreflex, neurohumoral and immunobiological reactions of the body.

L. A. Bublik et al. [39] point at the high efficacy of epidural blocks in patients with severe radicular syndrome using Xefocam. The authors noted the good tolerability and safety of xefocam, which allows it to be used for different categories of patients, especially the elderly.

N. A. Kaukakov et al. [40] used an epidural injection using a mixture of local anesthetics and glucocorticoids in the treatment of osteochondrosis of the lumbar spine. At the same time, glucocorticoid, being a powerful anti-inflammatory and decongestant, relieves inflammation and swelling of the parenchyma and stroma of nerve fibers, which reduces irritation and compression of the spinal nerve roots; as an immunosuppressant it inhibits the autoimmune antigen-antibody reaction, removing the phenomena of aseptic epiduritis; inhibits inflammation activators (histamine, serotonin, bradykinin); in combination with lidocaine, it relieves pain well due to sensory block, creating muscle relaxation and connection of the corresponding part of the spine. According to the authors, this helps to reduce the hernia and break the “vicious circle”: pain - muscle spasm - pain. Drug influence initiates endogenous mechanisms aimed at regression of clinical manifestations of herniated intervertebral discs [41].

A. T. Stashkevich et al. [42] analyzed the course of the disease in 50 patients with hernias and protrusions of the intervertebral discs, combined with instability of the lumbar spine, who were conservatively treated using epidural injections, when an anesthetic with glucocorticoids was injected into the hiatus sacralis. Manipulation is performed at hospital, the best effect of treatment is obtained by 2-3 procedures, which are performed

after 7-10 days. Despite the high efficacy, this procedure is used extremely rarely, due to the complexity of its implementation and the need for the block to be performed at hospital. The authors report good and satisfactory results in 70% of patients, with unsatisfactory results noted in 30%.

A positive result from epidural injections with sustained remission was obtained in 20-100% of patients, which averaged 67% [43-45]. After reviewing data from 12 randomized clinical trials of the efficacy of epidural injections with corticosteroids for low back pain and radiculopathy, the authors found that 6 publications proved high efficacy, while others showed no therapeutic effect. Other authors conducted a meta-analysis of data from 11 publications of randomized trials of placebo-controlled epidural injections and concluded that this method is more effective. Epidural steroid injections are considered more effective up to 6 months after completion of treatment. Epidural steroid administration is widely used to treat intervertebral disc pathology and spinal stenosis [46]. Regardless of the pathology, epidural steroid administration is highly efficient at the initial stage of the disease. The greatest effect was observed in patients with acute development of the disease, the presence of radicular syndrome and a short period of pain.

Based on the analysis of the literature and their own experience in the use of therapeutic and diagnostic epidural injections, A. I. Prodan et al. [47] concluded that epidural and perineural administration of a therapeutic mixture of anesthetics and corticosteroids in the acute and chronic phases of radiculopathy caused by disc herniation and protrusion, provide rapid elimination of radicular pain, a decrease in the activity of perineural and intraneural autoimmune inflammation. It should be pointed out not only the therapeutic effect of epidural blocks, but also their diagnostic nature, since the evaluation of the efficacy of the block makes it possible to identify the source of the pain syndrome and the ways of its formation.

The obtained results of the study by N. V. Kvasnitskyi, D. D. Dyachuk in 2017, based on a large clinical material, indicate the high efficacy of epidural steroid injection monotherapy in patients with radicular and chronic lower lumbar pain syndrome caused by degenerative spine damage. One or two epidural steroid injections in such patients provides reduced duration of treatment; increases the efficacy of treatment; stable and long-term remission is achieved; the number of complications and relapses is reduced. Epidural steroid injections are indicated for herniated discs, stenosis of the spinal canal, spondylolisthesis, spondyloarthrosis, which cause radicular and lower lumbar pain syndrome. Epidural steroid injections are indicated for herniated intervertebral discs up to 9 mm in size, and for larger hernias (mainly sequestered), as a symptomatic treatment, in preparation for surgery and categorical refusal of it. The obtained results of the study allow to recommend the widespread introduction of epidural steroid injections for the treatment of radicular and chronic lower lumbar pain syndrome in degenerative lumbar spine damage in the practice of neurologists, neurosurgeons, orthopedists, and anesthesiologists [48].

Most authors identify five factors that are most important in determining the efficacy of epidural steroid administration: the accuracy of the diagnosis and presence of radicular symptoms, duration of the disease, previous surgeries, age of the patient, and correctly performed puncture of the epidural space [49].

Contraindications to epidural injections are inflammatory or pustular skin lesions in the area of the block, blood clotting disorders in patients. There are absolute and relative contraindications to the use of epidural injections [50]. Absolute include local or systemic infections; blood coagulation system disorders; allergic reaction to drugs; serious condition of the patient; mental illness; spinal tumors; demyelinating diseases; herniated intervertebral discs of large sizes with the formation of a sequester, which entails a significant neurological deficit, and is an indication for surgical intervention; patient's refusal. Relative contraindications: high intracranial pressure; cardiovascular insufficiency; diabetes mellitus in the stage of decompensation; peptic ulcer of the stomach or duodenum in the acute stage; significant curvature of the spine.

Possible complications.

Epidural blocks should be performed only in an operating room or procedure room equipped with everything necessary to provide emergency care in case of complications. The most dangerous complications during epidural injections are associated with incorrect intravascular, subarachnoid, and intramedullary injection of a needle and medications.

Single cases of arachnoiditis, meningitis, impaired diuresis, development of cauda equina syndrome have been described [51]. According to large cohort studies, the frequency of neurological disorders (mostly minimal) in cases of epidural injections is 2.4-9.6% [52]. Although, Kondrashov OA has not observed any complications for 186 epidural injections [53]. Accidental puncture of the dura mater occurs in 1% of patients [54]. On the other hand, with blind interlaminar access, the tip of the needle does not enter the epidural space in 30% of cases. Headaches after puncture of the dura mater during epidural injection occur with the same frequency as in patients with general surgical pathology. If the needle enters the subarachnoidal area, the block must be postponed for the next day. Complications associated with the general resorptive action of anesthetics and steroid drugs are mild and short-lived in the form of nausea, vomiting, itching, and mild hypotension, or hypertension [55].

Conclusion.

Epidural injection is an intermediate procedure between surgery and drug therapy. It is a recent medical technique in targeted therapy concerning both pharmacotherapy and location of the pathological process. According to the analysis of the literature and our own researches, epidural steroid injections are the most effective method. However, study of their effectiveness has not been completed. The outcomes of epidural steroid injections depend on reasonable indications taking into account specific clinical manifestations and structural changes. As for the ways of introducing steroids into the epidural space, first of all, a technique, which the doctor is proficient in, should be used, since the results of the treatment largely depend on the accuracy of introduction of a steroid drug into the epidural

space. Considering the current outcomes of epidural steroid injections for degenerative-dystrophic damage of the spine as well as the fact that these interventions do not require complex and expensive equipment and their performing at outpatient clinic with a rapid result, this is the method of choice in cases of ineffectiveness of therapeutic treatment and the last option to avoid surgical intervention.

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РЕЗЮМЕ

ЭПИДУРАЛЬНЫЕ ИНЬЕКЦИИ В ЛЕЧЕНИИ КОРЕШКОВОГО СИНДРОМА И ХРОНИЧЕСКОЙ БОЛИ В НИЖНЕЙ ЧАСТИ СПИНЫ ПРИ ДЕГЕНЕРАТИВНО-ДИСТРОФИЧЕСКОМ ПОРАЖЕНИИ ПОЗВОНОЧНИКА

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Цель исследования. Исследовать методологию проведения и эффективность эпидуральной стероидной инъекции при корешковом синдроме и боли в нижней части спины, обусловленной дегенеративно-дистрофическим поражением позвоночника.

Методы исследования: библиосемантический, сравнительный, системного подхода. Проведен анализ ранних и отдаленных результатов лечения больных с дегенеративно-дистрофическим поражением позвоночника с использованием эпидуральных стероидных инъекций различными авторами и собственного опыта автора.

Результаты. Обзор литературных данных и проведенное собственное исследование показало высокую эффективность, как монотерапии, так и при комплексном использовании, эпидуральных стероидных инъекций в лечении хронической нижнепоясничной боли и корешкового синдрома, вызванного дегенеративно-дистрофическим поражением позвоночника. Эпидуральные стероидные инъекции показаны при грыжах межпозвонковых дисков, спондилоартрозах, стенозах спинномозгового канала, спондилолистезах, которые вызывают хроническую нижнепоясничную боль, корешковый синдром. Позитивный результат от применения эпидуральных стероидных инъекций со стойкой ремиссией получен от 20 до 100% случаев, составивши в среднем более 80%. В эпидуральное пространство вводятся анестетики, кортикостероиды, ферментативные препараты и витамины для ликвидации болевого синдрома и воспаления, но большинство авторов отдают предпочтение стероидным препаратам. Кортикостероиды уменьшают воспалительную реакцию и отек, ингибируя синтез и освобождение многочисленных противовоспалительных медиаторов и приводят к обратному местноанестезирующему эффекту. Для введения препаратов в эпидуральное пространство используют разные доступы: интерламинарный, каудальный и трансфораминальный, применяется методика длительной локальной фармакотерапии. Межламинарная эпидуральная стероидная инъекция такая же эффективна, как и трансфораминальная эпидуральная инъекция. Серединный интерламинарный доступ менее травматичен. Выбор пути введения зависит от опыта и от того, чему отдает предпочтение специалист. Эпидуральные инъекции проводят как «слепым методом» (без визуализации), так и под контролем (флюороскопии, ультразвукового- и КТ-контроля) с целью повышения безопасности и точности введения фармакологического препарата. Доказана равноценность методов флюороскопического, ультразвукового и КТ-контроля эпидуральной инъекции с точки зрения эффективности лечения.

Выводы. Учитывая высокую эффективность эпидуральных стероидных инъекций, возможность амбулаторного лечения, практически отсутствие осложнений, делает этот метод – методом выбора в лечении корешкового синдрома и нижнепоясничного болевого синдрома, обусловленного дегенеративным поражением поясничного отдела позвоночника, после проведенного неэффективного консервативного лечения.

Ключевые слова: дегенеративно-дистрофическое поражение позвоночника, эпидуральные стероидные инъекции.

SUMMARY

EPIDURAL INJECTIONS IN THE TREATMENT OF RADICULAR SYNDROME AND CHRONIC LOWER BACK PAIN IN DEGENERATIVE-DYSTROPHIC SPINE DAMAGE (REVIEW)

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Purpose of the study: To investigate the methodology and effectiveness of epidural steroid injection for radicular syndrome and lower back pain caused by degenerative-dystrophic spine damage.

Research methods: bibliosemantic, comparative, systemic approach. The analysis of early and long-term results of treatment of patients with degenerative-dystrophic spine damage using epidural steroid injections by various authors and the author's own experience was carried out.

Results: Literature review and our study proved a high efficacy of both monotherapy and combined epidural steroid injections in the treatment of chronic lower back pain and radicular syndrome caused by degenerative-dystrophic spine damage. Epidural steroid injections are indicated for intervertebral disc herniation, spondyloarthritis, spinal canal stenosis, spondylolisthesis, which cause chronic lower back pain, radicular syndrome. Epidural steroid blockades with stable remission were proved to have positive result in 20 to 100% of cases, averaging more than 80%. Anesthetics, corticosteroids, enzymes, and vitamins are administered into the epidural cavity to relieve pain and inflammation, but most authors still prefer steroids. Corticosteroids reduce the inflammatory response and oedema by inhibiting the synthesis and release of numerous anti-inflammatory mediators and cause the reverse local anaesthetic effect. Different approaches are used to administer drugs into the epidural cavity: interlaminar, caudal and transforaminal; the method of long-term local pharmacotherapy is used. Interlaminar epidural steroid injection is as effective as transforaminal epidural injection. The middle interlaminar access is less traumatic. The choice of the administration technique depends on experience and preferences of the specialist. Epidural injections are performed both by a “blind method” (without imaging) and under control (fluoroscopy, ultrasound and CT) in order to improve the safety and carefulness of pharmacological drug administration. The equivalence of fluoroscopic, ultrasound and CT control of epidural injection in terms of treatment efficacy has been proved.

Conclusions: Taking into account the high efficacy of epidural steroid injections, the possibility of outpatient treatment in the absence of complications, makes it the method of choice in the treatment of radicular and lower back pain caused by degenerative damage of the lower back spine, after ineffective treatment.