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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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Содержание:

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OPTIC NEUROMYELITIS: CASE REPORT AND REVIEW

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Abstract. Neuromyelitis optica (Devic disease) is a demyelinating disease of the central nervous system. This disease is progressive and might be fatal.

Objective. To accentuate the importance of differential diagnosis of demyelinating diseases of central nervous system.

Materials and methods. The results of diagnostic search based on modern laboratory and instrumental methods were analyzed and summarized. As an illustration we used a clinical case confirmed by the results of neuroimaging. The practical orientation of the represented scientific report is proved.

Results and discussion. Our patient was diagnosed Optic Neuromyelitis (Devic disease), seropositive, exacerbation stage, with the presence of lower central paraparesis (deep in the right leg, moderate in the left), conductive sensory disorders from Th5, central pelvic dysfunction.

Conclusion. The prognosis for neuromyelitis optica spectrum disorders (NMOSD) can vary from complete recovery or rare exacerbations to progressive disability and death of the patient. The mortality rate for NMOSD is high and ranges from 25 to 50% according to various cohort studies.

Key words. Optic neuromyelitis, differential diagnosis, antibodies to aquaporin-4, demyelinating diseases.

Introduction. Optical neuromyelitis (neuromyelitis optica spectrum disorders, NMOSD), previously known as Devic disease or neuromyelitis optica [NMO]) are inflammatory disorders of the central nervous system characterized by severe, immune-mediated demyelination and axonal damage predominantly targeting optic nerves and the spinal cord [1].

The first clinical descriptions of NMOSD appeared more than a century ago, when E. Devic and his student F. Gault singled out a group of patients with monophasic bilateral (or rapidly sequential) optic neuritis and myelitis with severe residual symptoms and severe disability [2]. It was previously thought that NMO and multiple sclerosis are the same disease with different phenotypes and expression. However, the results of recent studies reveal differences between these diseases in terms of pathogenesis, clinical features, neuroimaging results, identified biomarkers, response to treatment [3].

The prevalence of NMOSD in various studies ranges from 0.5 to 10 per 100,000. Ethnic, geographical, and gender disparities are recognized. The incidence of NMOSD in women is up to 10 times higher than in men. In monophasic NMOSD (1 to 10 percent of patients), men and women suffer equally, but in typical recurrent NMOSD, women predominated over men by 5: 1 to 10: 1. The average age of onset is from 32 to 41 years, but cases have been reported among children and the elderly. In comparison, the average age of onset of multiple sclerosis is 24 years, and the incidence ratio between women and men is 2.3: 1[4].

Population-based studies over the past two decades report the prevalence and incidence of NMOSD in different populations worldwide. One relevant finding is the varying prevalence observed in different racial groups. Consistently, the prevalence of NMOSD among Whites is ~1/100,000 population, with an annual incidence of <1/million population. Among East Asians, the prevalence is higher, at ~3.5/100,000 population, while the prevalence in Blacks may be up to 10/100,000 population [5].

This study has been performed in compliance with the ethical principles of the Ukrainian national committee.

The aim of the work was to accentuate the importance of differential diagnosis of demyelinating diseases of central nervous system.

Case Presentation.

42-years old patient was complaining of muscle weakness in the lower limbs, more in the right, urinary retention, pain in the thoracic spine and a feeling of tightness in the chest.

5 days before she has noticed sudden pain in the interscapular area and a feeling of tightness in the chest. Next day she felt muscle weakness and numbness in the right leg. Then the weakness in the left leg and urinary retention appeared. That's why she was admitted to the hospital. The past medical history is remarkable for congenital cataract and amaurosis of the right eye.

The neurological exam at admission: visual acuity OD 0.01, congenital horizontal nystagmus while looking outside. Central lower paraparesis (deep - on the right, moderate - on the left). Hypesthesia of superficial and deep types of sensation according to the conductive type from Th5 level bilaterally. Pelvic dysfunction according to the central type: urinary retention.

Primary diagnosis. transverse myelitis at the thoracic level with lower central paraparesis (deep - on the right, moderate - on the left), conductive sensory disorders from Th5 level, pelvic dysfunction according to the central type (acute urinary retention).

Further examinations.

1. CBC, biochemistry, urinalysis – without changes.
2. Wasserman test - negative.
3. Blood rheumatoid tests - ASL-O-200, CRP-5.2, RF-12, seromucoid 0.18.
4. Blood test for borreliosis by immunoblotting (western-blot) - IgM and IgG antibodies were not detected.
5. Antiaquaporin–4 IgA, G, M) - antiaquaporin–4 IgG detected.
6. ECG - unremarkable.
7. CT scan of the lungs - no pathological changes were detected.
8. MRI of the thoracic spine and spinal cord – lesions occupy the lateral cords of Th1-Th9 segments on T2, T2 STIR images.

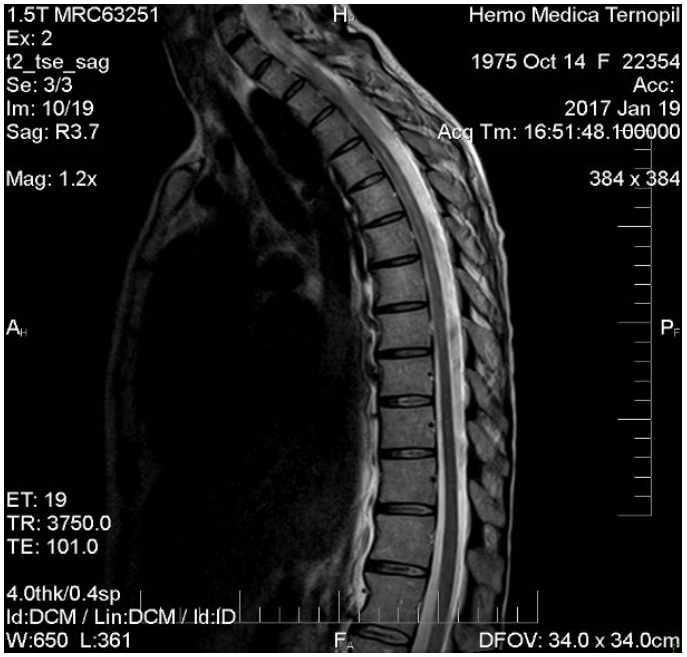

Figure.1. MRI of the thoracic spine and spinal cord – lesions occupy the lateral cords of Th1-Th9 segments on T2, T2 STIR images.

Conclusion: MR findings should be differentiated with optic neuromyelitis (Fig.1).

MRI of the brain - unremarkable.

10. Ophthalmologist - congenital cataract OD.

11. Urologist - neurogenic bladder according to hypotonic type.

The differential diagnosis with multiple sclerosis, neurosyphilis, Lyme borreliosis (neurological stage), systemic autoimmune diseases, spinal cord tumors was performed.

Based on clinical and anamnestic data, MR findings, the results of immunological examination (detected anti-aquaporin-4 IgG) and after differential diagnosis, the patient was diagnosed with the next clinical diagnosis: optic neuromyelitis (Devic disease), seropositive, exacerbation stage, with lower central paraparesis (deep - on the right, moderate - on the left), conductive sensory disorders from Th5 level, pelvic dysfunction according to the central type.

Treatment: Methylprednisolone (1000 mg intravenously for 5 days), 3 sessions of plasmapheresis, L-lysine aescinat, deproteinized calf blood haemoderivative, phospholipides, pentoxifylline, ipidacrine, ATP, Cytidine-5-disodium monophosphate (CMP disodium salt), uridine-5-trisodium triphosphate (UTP trisodium salt), uridine-5-disodium diphosphate (UDP disodium salt), uridine-5- disodium monophosphate (UMP disodium salt), Acidum pipemedicum, omeprazole, algeldrate, magnesium hydroxide, Spironolactone, asparaginat K-Mg. Physical therapy, massage, electrophoresis with proserine on the bladder, electrical stimulation of the lower extremities. After treatment, the patient's state has improved: muscle strength increased, pelvic disorders regressed.

After discharge from the hospital, the patient receives a systemic immunotherapy drug as a participant of a clinical trial. During the next 3 years her neurological status remained stable, no exacerbations of the disease were observed.

Discussion.

Pathogenesis. Views on the pathogenesis of NMOSD have changed dramatically since 2004, following the isolation of a disease-specific marker, serum antibodies to NMO immunoglobulin G (IgG), which selectively binds aquaporin-4 (AQP4) [6]. A subgroup of patients with the NMOSD phenotype in whose serum antibodies to myelin oligodendrocyte glycoprotein (MOG-IgG) is detected has been identified [7].

AQP4, the target NMO-IgG antigen, is an aqueous canal protein that is concentrated in the gray matter of the spinal cord, periaqueductal, periventricular areas, and astrocytic legs that form the blood-brain barrier. Due to immuno-mediated inflammation that develops due to the expression of AQP4-IgG antibodies through the aqueous channels of AQP4 astrocytes, astrocyte dysfunction occurs with the development of clinical syndrome of the disease [8].

In NMOSD, the pathological process involves a large number of segments of the spinal cord and optic nerves, developing demyelinating necrotic process in white and gray matter in combination with axonal loss, perivascular lymphocytic infiltration, and vascular proliferation [9]. Autoimmune inflammation is according to the vasculitis type, with vascular hyalinoses in spinal lesions. Necrosis and cavitation usually involve both gray and white matter, pathomorphological detect massive necrotic lesion in the spinal cord [10].

The pathophysiology of NMOSD is mediated by the humoral part of the immune system [11]. There is some evidence to support the autoimmune pathogenesis of the disease. The most important of these was the detection of NMOSD-specific autoantibodies to aquaporin-4 (AQP4) [12]. Several studies have shown that serum anti-AQP4 titers during exacerbation correlate with the length of longitudinal spinal cord injury, clinical disease activity, decrease after immunotherapy, and remain low during remissions [13]

Additional data confirming the autoimmune pathogenesis of NMOSD include the following observations:

- NMOSD is often associated with systemic autoimmune disorders such as Sjogren's syndrome, autoimmune thyroiditis, rheumatoid arthritis, systemic lupus erythematosus, pernicious anemia, non-specific ulcerative colitis, primary sclerosing cholangitis, thrombocytopenia.
- Clinical experience shows that repeated plasmapheresis sessions and immunosuppressive therapy are the leading methods in the treatment of NMOSD exacerbations [14].

Clinical features. The disease manifests itself in a number of specific neurological syndromes. In particular [15]:

- syndrome of bilateral optic neuritis. Optic neuritis is manifested by severe loss of visual acuity to amaurosis, impaired color perception, positive visual phenomena, pain in the orbital area.

- transverse myelitis syndrome, characterized by symmetrical paraparesis or tetraparesis, pelvic disorders and conductive sensory disorders below the level of lesion, often with recurrent course. Neurological symptoms develop within hours or days, while partial recovery of lost functions occurs within weeks or months. MRI examination of the spinal cord reveals a lesion for at least three spinal segments - the so-called longitudinally

extensive transverse myelitis (LETM). In addition, the described neurological disorders may be accompanied by paroxysmal tonic spasms of the muscles of the torso or extremities, radicular pain or Lermitt's syndrome.

- area postrema syndrome - the third most common NMOSD syndrome after optic neuritis and transverse myelitis, occurs in 16-43% of cases. This clinically difficult to treat nausea, vomiting, or hiccups (area postrema syndrome) is associated with area postrema lesions (the chemoreceptor zone of a specialized ependyma located in the brainstem, caudal triginum n. Vagi, and receiving an abundant blood supply. It is responsible for regulation of cerebrospinal fluid electrolytes, vomiting and coughing reactions, heart rate). MRI examination reveals signs of dorsal lesion of the medulla oblongata - area postrema.

- Acute stem syndrome in patients with NMOSD manifests as signs of vestibular disorders, deafness, prosoparesis, trigeminal neuralgia, oculomotor disorders (diplopia, ptosis). Brain damage can lead to acute neurogenic respiratory failure and death of the patient.

- Radicular pain is a frequent symptom of NMOSD. In retrospective studies, more than 80% of patients report pain localized in the torso and lower extremities.

Typical for NMOSD brain damage is the localization of lesion in the hypothalamus, corpus callosum or periventricular. Symptoms associated with bilateral hypothalamic lesions may include symptomatic narcolepsy or excessive daytime sleepiness, neuroendocrine disorders, and autonomic visceral disorders. Cases of NMOSD-associated encephalopathy, fulminant cerebral demyelination, and posterior reverse leukoencephalopathy have been reported.

Together with CNS damage in NMOSD in rare cases, muscles are affected according to the type of recurrent myalgia with signs of autoimmune myopathy.

In 90% of cases, NMOSD has a recurrent course. In some patients, optic neuritis and transverse myelitis occur simultaneously; in others - after some time. Recurrence occurs within a year after the first attack in 60% of patients and within three years - in 90%. Deep disabling neurological deficits in the form of bilateral amaurosis and lower paraplegia develop within five years.

Diagnosis of NMOSD is based on data of neurological examination, neuroimaging, laboratory (serological) tests to determine serum antibodies to AQP4-IgG and antibody levels to MOG, as well as the results of cerebrospinal fluid analysis.

To assess the degree of neurological disorders in NMOSD, as in MS, the extended scale of disability EDSS (Expanded Disability Status Scale) is used.

Characteristic for NMOSD MRI signs of spinal cord injury are the presence of longitudinally spread foci for at least three spinal segments on T2-weighted images (LETM). Usually, the entire diameter of the spinal cord is affected, signs of edema and accumulation of contrast are diagnosed, which indicates the activity of the process. In severe cases, cavitation is detected. Pathognomonic for NMOSD MRI-sign is a symptom of "owl's eye" - hyperintensity of cells of the anterior horns of the spinal cord due to ischemia of the latter. In 60% of cases, cervical spinal cord injuries are diagnosed, and the process can spread to the medulla oblongata. In some cases, inflammation and edema of the spinal cord reach a level where the pathological focus mimics a tumor. Under the influence of treatment, the accumulation of contrast in pathological foci decreases as their size decreases.

Characteristic for NMOSD MRI signs of brain damage are the appearance of foci subcortically, perpendicularly, in the thalamus, hypothalamus, corpus callosum and diencephalon, which correspond to areas with high expression of AQP4.

MRI - signs of optic neuritis in NMOSD are unilateral or bilateral signal enhancement on T2-weighted images with the accumulation of contrast on T1-weighted images in the optic nerve, chiasm or visual tract.

A specific biomarker for NMOSD is the autoantibody to AQP4 found in patients' serum, AQP4-IgG, also known as NMO-IgG. The aquaporin-4 receptor is a target antigen for NMO-IgG, which plays a direct role in the pathogenesis of NMOSD. Therefore, patients with suspected NMOSD should be tested for serum AQP4-IgG antibodies. Ideally, testing for antibody status to AQP4 should be performed during exacerbations prior to immunotherapy, as seronegative status may occur during treatment.

Establishing a reliable diagnosis of NMOSD is based on diagnostic criteria for the disease, developed in 2015 by an international group led by DM Wingerchuk.

Diagnostic criteria for NMOSD according to D. M. Wingerchuk, 2015.

Diagnostic criteria for NMOSD with the presence of AQP4-IgG antibodies

1. The presence of at least one obligate clinical syndrome.
2. Positive test for AQP4-IgG using the best detection method (method of cellular presentation of antigen).
3. Exclusion of alternative diagnoses.

Diagnostic criteria for NMOSD without AQP4-IgG or NMOSD

with unknown AQP4-IgG status

1. The presence of at least two obligate clinical syndromes arising from one or more clinical attacks and meeting all of the following requirements:

a) at least one of the obligate clinical syndromes should be: either optic neuritis, or acute myelitis with longitudinally extensive transverse myelitis (LETM), or area postrema syndrome

b) spread in space (the presence of two or more different obligate clinical syndromes)

c) if necessary - neuroimaging.

2. Negative tests for AQP4-IgG using the best method of diagnosis / inability to test.
3. Exclusion of alternative diagnoses.

Obligatory clinical syndromes

1. Optical neuritis.
2. Acute myelitis.
3. Area postrema syndrome: an episode of unexplained hiccups or nausea and vomiting.
4. Acute stem syndrome.

5. Symptomatic narcolepsy or acute diencephalic clinical syndrome with typical NMOSD MPT-lesion of the diencephalic area.

6. Symptomatic cerebral syndrome with typical NMOSD brain lesions.

Detection of other clinical, laboratory, and neuroimaging syndromes should be considered as "red flags" indicating the likelihood of alternative diagnoses.

"Red flags" are signs that are not typical for NMOSD

1. Clinical features and laboratory data:

- progressive course of the disease (deepening of the neurological deficit without clearly defined exacerbations) - suspicion of PS

- rapid development of symptoms (less than four hours) - suspected ischemia / spinal cord infarction

- prolonged deepening of the neurological deficit (more than four weeks after the first signs) - suspicion of sarcoidosis or tumors

- partial transverse myelitis, especially if it does not meet the MRI characteristics of NMOSD and the presence of oligoclonal bands in the cerebrospinal fluid - PC should be excluded.

2. The presence of comorbid diseases that may be accompanied by symptoms that mimic NMOSD:

- sarcoidosis

- onychopathology

- chronic infection (e.g., HIV, syphilis)

3. Features of neuroimaging:

1. The brain:

a) the presence of T2-weighted MRI images typical of PC:

- foci located perpendicular to the lateral ventricles (Dawson's fingers)

- juxta cortical and cortical foci.

2. Spinal cord:

- lesions of less than three adjacent spinal cord segments in sagittal projections on T2-weighted images.

- lesions located mainly (70%) in the peripheral parts of the spinal cord on axial T2-weighted images.

Differential diagnosis. First of all, NMOSD should be differentiated from multiple sclerosis - the most common disorder that causes demyelination of the central nervous system.

Similar clinical and neuroimaging syndromes are found in systemic autoimmune diseases, infectious and parainfectious disorders (acute disseminated encephalomyelitis, HIV, syphilis), metabolic disorders (vitamin B12 deficiency), after radiation therapy. Also, it is necessary to exclude the presence of an intrathecal tumor or vascular abnormality.

Treatment. During the exacerbation of the disease (regardless of the serological status of the patient) prescribe pulse therapy with corticosteroids and / or metabolic plasmapheresis (5-7 sessions a day). The effectiveness of intravenous immunoglobulin in the treatment of exacerbations of NMOSD has not been proven.

To prevent exacerbations of NMOSD, systemic immunotherapy is recommended. Prescribe first-line drugs: azathioprine, mycophenolate mofetil, rituximab, tocilizumab in combination with low doses of corticosteroids.

Some observational data suggest that treatment with NMOSD by interferon-beta, natalizumab or fingolimod is not effective, and there is no data on the treatment of NMOSD with interferon-beta [13].

Systemic immunosuppression should usually last for at least five years after an NMOSD attack. However, given the destructive nature of the disease, some experts consider it appropriate to prescribe lifelong immunotherapy; others suggest that its duration should be adapted to the severity of the attacks and the degree of disability of the patient.

Recent clinical trials have recently approved new drugs for the treatment of patients with NMOSD: eculizumab, nebilizumab and satralizumab.

Conclusions.

The prognosis for NMOSD can vary from complete recovery or rare exacerbations to progressive disability and death of the patient. The mortality rate for NMOSD is high and ranges from 25 to 50% according to various cohort studies.

Conflict of interest.

I undersign, certificate that I do not have any financial or personal relationships that might bias the content of this work.

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