Sensory-Predominant Chronic Inflammatory Demyelinating Polyneuropathy in a Patient with Parainfectious Limbic Encephalitis (case report)

[1,2]Popova T.E., [1]Nikolaeva T.Y., [2]Schnayder N.A., [2]Petrova M.M., [1]Semenov A.A., [3]Pen O.V., [2]Panina U.S., [2]Muravyova A.V.

[1] – FGAOU VPO "North-Eastern Federal University named after M.K. Ammosov"

[2] – GBOU VPO "Krasnoyarsk State Medical University named after Professor V.F. Voino-Yasenetsky"

[3] – FGAOU VPO "Siberian Federal University"

ABSTRACT

We report a patient with chronic herpes infection, which manifested as parainfectious limbic encephalitis (PILE) and sensory-predominant chronic inflammatory demyelinating polyneuropathy (SP-CIDP). It is demonstrated that persisting herpes infection associated with immunodeficiency can facilitate two pathological processes: direct viral damage of limbic structures and autoimmune damage to myeline sheath of peripheral and cranial nerves. Description of the case includes clinical presentation and diagnosis of SP-CIDP and PILE. CIDP is an autoimmune disorder, characterized by damage of myelin sheath of peripheral and cranial nerves. It is thought that CIDP accounts for 20-50% cases of undiagnosed polyneuropathy. The contribution of Herpesviridae family to development of CIDP is a matter of debate. PILE associated with Herpesviridae infection is one of the most common forms of chronic herpetic encephalitis, characterized by abnormalities in function of limbic system (hippocampus and amygdala), with protracted course of disease and frequent exacerbations. Parainfectious limbic encephalitis is caused by direct viral damage to limbic structures.

We suggest a new diagnostic algorithm of SP-CIDP, which includes nerve conduction study, stabilometry with use of EU standard Rhomberg's test, computerized pallesthesiometry (CP) of distal parts of upper and lower extremities, computerized thermosensometry (CTS) for evaluation of thermoception and pain threshold for cold and hot stimuli. This algorithm can be used in the setting of outpatient clinic by neurologists and general practitioners. The diagnostic methods utilized in this algorithm, such as CP and CTS, are safe, simple, and non-invasive and may have broad application.

Keywords: chronic inflammatory demyelinating polyneuropathy (CIDP), parainfectious limbic encephalitis (PILE), vibroception, thermoception

Chronic inflammatory demyelinating polyneuropathy (CIDP) is an acquired autoimmune disease, characterized by loss of myelin sheath of peripheral nerves [4]. 20-50% of polyneuropathies of unknown cause are associated with CIDP [9]. CIDP is included in the group of dysimmuneneuropahies [6, 8, 14, 15]. A change in the immune status and the development of autoimmune process are the major contributing factors in the development of CIDP [10, 11, 17]. However, no specific antigens, which trigger the demyelination process, are identified. According to Kantimirova E.A. [1, 5], polymerase chain reaction (PCR) and enzyme-linked immunosorbent assay (ELISA), which were set to identify neurotrophicHerpesviridae family viruses in patients with CIDP, in 45% cases Hepres simplex virus 1 (HSV-1) was identified, 4,5% - cytomegalovirus (CMV) and Epstein-Barr virus (EBV), 13.6% cases were attributed to HSV-1 and EBV infection and in 9% CMV and EBV.

Clinical variants of CIDP include Lewis-Sumner syndrome (acquired multifocal demyelinating sensorimotor neuropathy), sensory-predominant CIDP (SP-CIDP), acquired distal demyelinating sensory neuropathy and CIDP with central nervous system involvement (CNS-CIDP) [15, 23, 26].

Acquired multifocal demyelinating sensorimotor neuropathy, also known as Lewis-Sumner syndrome, is characterized by multifocal lesions of sensory and motor nerve fibers, sometimes with asymmetrical presentation [22, 26] and slow progression of symptoms.

SP-CIDP is characterized by sensory symptoms: pain, imbalance (sensitive ataxia), paresthesia and dysesthesia. Neurophysiological evaluation reveals motor nerve fibers involvement, despite the absence of motor symptoms. Acquired distal demyelinating sensory neuropathy has slowly progressive course and is characterized by predominant involvement of sensory nerve fibers, which can be accompanied with moderate distal muscle weakness. The course of disease is slowly progressive. IgMparaprotein is often associated with the development of this kind of neuropathy [11, 12, 19].

CNS-CIDP is characterized by involvement of visual system, hyperreflexia and positive Babinski sign, with foci of demyelinization found on brain magnetic resonance imaging (MRI). Whether CNS-CIDP is a distinct nosological form or random combination of diseases is currently debatable.

Classic CIDP is defined by the predominance of motor symptoms over sensory, with motor weakness present in proximal or distal muscle groups, low or absent deep tendon reflexes. Motor variant of CIDP has more severe course [13, 19, 22]. Cranial neuropathy and bulbar symptoms develop in 10-20% cases [15, 20]. Sensory CIDP is more common variant and has following symptoms – loss of vibration and temperature sensitivity, as well as allodynia. This variant of CIDP is rarely diagnosed at the early stage in outpatient clinics, which burdens

following therapy and leads to relentless progression of the disease [12]. Modern diagnosis of CIDP includes nerve conduction study (NCS), nerve biopsy and cerebrospinal fluid test [8, 9, 20, 23, 28, 29]. Unfortunately, there is no consensus on pathological NCS results among authors [16, 18, 20]. There is a need for new electrophysiological method of SP-CIDP verification. We developed new algorithm for the diagnosis of SP-CIDP which includes computerized pallesthesiometry of distal parts of upper and lower extremities, stabilometry with utilization of EU standardized Rhomberg's test, nerve conduction studies and transcutaneous oximetry.

Parainfectious limbic encephalitis (PILE) associated with Herpesviridae infection is one of the most common variants of chronic herpetic encephalitis. It is defined by disturbances in limbic system (hippocampus and amygdala) functioning. The course of the disease is protracted with frequent exacerbations [6, 7, 21, 24, 25]. PILE is caused by direct damage of limbic system by infectious agent, usually HSV-1 [2, 3]. Clinical presentation includes cognitive impairment, seizures, sleep disturbances and mental disorders. PILE in patients with secondary immunodeficiency is characterized by covert course of disease which does not raise suspicion of this condition in doctors of outpatient clinic [25, 27, 30]. If diagnosed in timely manner, PILE has good prognosis. Otherwise, PILE can be complicated with mesial temporal sclerosis with the development of intractable parietotemporal epilepsy, emotional and cognitive impairment, as well as schizophrenia-like symptoms. All these complications severely hinder treatment and worsen prognosis.

Thus, chronic herpetic infection accompanied with immunodeficiency can lead to direct damage of the limbic system in form of PILE, while simultaneously activating autoimmune response and developing CIDP.

CASE REPORT

43-year-old patient came to Krasnoyarsk State Medical University's outpatient clinic with complaints of short-term memory disturbances, rare bouts of daytime sleepiness, speech problems, occasional tremor provoked by fatigue, unexplainable waking at 2 am and 5 am, overall fatigue and decreased performance.

Medical history: patient is regularly visiting immunologist for highly active chronic mixed herpevirus infection since 2009. Patient has frequent flare-ups of chronic herpetic infection manifesting with blisters on tongue, vermillion border and on the face with subsequent development of V1 and V2 trigeminal neuralgia, hyperesthesia in the right half of the face, muscle weakness in right arm, as well as paroxysmal tachycardia and dyspnea. Flare-ups were treated with T-cell stimulators, specific EBV immunoglobulin shots and other antiviral drugs, which usually resulted in remission up to 6 months. In January 2013 patient started to experience neurological symptoms, including tinnitus, blurred vision, emotional instability and irritability,

sudden daytime sleepiness with speech slurring and slowing, muscle weakness in right arm, and imbalance attacks. Patient's condition worsened in March 2013, when he noticed severe short-term memory problems, slurred speech in the morning; tremor triggered by fatigue, muscle jerks in the right half of the body, blood pressure instability with tendency to rise, irresistible paroxysms of daytime sleepiness during driving, myalgia and polyarthralgia, chronic tiredness and insomnia. This condition was accompanied with flare-ups of herpetic stomatitis every month. Patient underwent treatment prescribed by immunologist, but the duration of remission was short. On October 2013 patient went into spontaneous remission, with improvement in daytime sleepiness, hyperkinesia and memory loss. Relapsing orofacial herpes was still present.

It must be noticed, that the patient is the ENT doctor, thus frequently contacting with herpes patients. He is married, has 2 children. His wife has chronic HSV and EBV infection, as well as multiple sclerosis, controlled by glatiramer acetate. His children both have relapsing infectious mononucleosis and are infected by CMV.

At the time of observation patient's condition was stable. He was alert and mentally active. Skin was moderately moisturized with rare roseate nodular rash on the trunk and proximal part of upper extremities. No edema was present. There was a conjunctival redness with scant serous discharge. Patient had symmetrically swollen lymph nodes, which were tender in the right side. Enlarged tonsils were noticed upon oral cavity inspection with no adjacent redness of the pharynx. Patient was mentally alert and did not demonstrate any signs of mental disorder. Mood was slightly decreased. Interview revealed minor cognitive impairment due to short-term memory loss.

Neurological examination revealed diplopia during side gaze, convergence insufficiency in the left eye, tender points in trigeminal areas V1, V2 and V3. No muscle weakness was present, but mild spasticity in lower extremities was noted. Deep tendon reflexes elicited from upper extremities were normoactive and symmetrical. Knee and ankle reflexes were hyperactive and symmetrical. Mild sensitive ataxia was noted. Sensory symptoms in form of allodynia were present symmetrically at the elbow level and below in upper extremities, and in the knee level and below in lower extremities. Symptoms got progressively worse as they reached distal parts of extremities, presenting as hyperalgesia and dysesthesia. Bladder and bowel function were intact. No meningeal symptoms were observed.

Brain magnetic resonance imaging (MRI) with MR-spectrography confirmed chronic limbic encephalitis with lesions mainly located in the anterior and medial parts of right hippocampus with slight reduction of N-acetylacetate level. Other findings included chronic bilateral maxillary sinusitis, ethmoiditis, right nasal concha hypertrophy, and dysembryonic benign neoplasm in form of lipoma of medial parts of falx. Furthermore, chronic adenoiditis

without significant hypertrophy was found, with cystic inclusions in lymphoid tissue of the posterior wall of nasopharynx, sized 0.2-0.5 cm in diameter (Fig. 1-4).

Findings of visual evoked potentials (VEP) using reversal chess pattern were suggestive of moderate axonal/demyelinating lesion of optic nerves at pre- and postchiasmal level.

Brainstem auditory-evoked potentials (BAEP) revealed signs of bilateral initial decrease in I-III interpeak intervals, which is indicative of early signs of bilateral demyelinating lesions of auditory nerves, caused by chronic mixed type herpetic infection. Patient was referred to audiologist for tonal audiometry and further evaluation.

Polysomnography (PSG) revealed signs of secondary insomnia with significant deterioration of night sleep and shortening of its length, increased frequency of waking. 11 episodes of sleep apnea were registered, 10 of which were obstructive. Snoring was present only in supine position.

ELISA findings showed increased titer of anitbodies to Herpesviridae family viruses. Immune status test demonstrated decrease in T-helpers level, increased amount of T-cells, NK-cells and B-lymphocytes.

We developed new electrophysiological diagnostic algorithm for SP-CIDP, which includes computerized pallesthesiometry and thermosensometry of distal parts of upper and lower extremities, stabilometry (EU standard Rhomberg's test), upper and lower extremities nerve conduction study (NCS), and transcutaneous oxymetry. This algorithm was implemented in our patient, confirming the diagnosis of SP-CIDP with predominant involvement of lower extremities, peroneus profundus nerve being the most damaged.

NCS ("Neurosoft", Ivanovo, Russian Federation) showed markedly reduced nerve conduction in sensory fibers of bilateral median nerves, right peroneal nerves, which are indicative of axonal-demyelinating damage. Furthermore, mid axonal degeneration in motor fibers of both peroneal nerves were found.

Abnormalities in main posture of mixed cause with the involvement of proprioceptive and cerebellar system were found on stabilometry (EU standard Rhomberg's test) (MBN, Moscow, RF).

Computerized thermosensometry(CSM) (thermodynamic test with assessment of pain threshold to cold and hot) (MBN, Moscow, RF) of upper extremities found slightly reduced warmth sensation in both forearms, cold sensation was intact bilaterally. Moderate decrease in cold pain threshold was registered in both upper extremities, with warmth pain threshold being intact. CSM of lower extremities revealed mild decrease in warmth sensation bilaterally, more pronounced in feet, as well as mild reduction in cold sensation in distal parts of lower extremities. Cold pain threshold was moderately reduced bilaterally, warmth pain threshold was

intact. Cold dysesthesia was revealed. These findings are indicative of mild-to-moderate impairment of unmyelinated and thinly myelinated fibers of distal parts of extremities.

Computerized pallesthesiometry (CPM) (MBN, Moscow, RF) of styloid processes of ulna revealed reduced vibroceptionof high frequency vibration (250, 500 Hz) on the right, and 8, 16, 32 and 250 Hz on the left. These findings are compatible with mild damage to thickly myelinated fibers of Aβ type in distal parts of lower extremities (Fig. 5).

CPM of lateral malleoli revealed mild reduction of vibroception on frequencies 32-64 Hz and marked reduction with tendency to complete loss at frequencies 250 and 500 Hz. This is indicative of mild to moderate damage to thickly myelinated fibers of Aβ type in distal parts of extremities (Fig. 6).

Transcutaneous oxymetry ("Radiometer TCM4", Copenhagen, Denmark) revealed mild reduction of transcutaneous oxygen tension in soft tissues of dorsal part of right foot and lower one-third of right calf.

Homozygous carriage of high-productive polymorphic allelic variants of interleukin-1β gene in 3954 locus (C/C) and "wild" polymorphic allelic variant of interleukin-1β in 511 locus (G/G) were found on genetic testing. Risk factor stratification based on these findings positioned our patient in the moderate risk group for recurrent herpetic neuroinfection.

Final diagnosis considering aforementioned findings was as follows: Highly active chronic viral infection (EBV, HSV-1). Recurrent orofacial herpes, currently in frail remission. Slowly progressive type of chronic parainfectious limbic encephalitis with lesions mainly localized in mediobasal parts of right temporal lobe, moderate cognitive impairment (mainly anxiety-depressive syndrome), transient motor dysphasia, left side hyperkinetic syndrome. Multiple cranial neuropathy: newly revealed mild chronic inflammatory bilateral axonal-demyelinating optic neuropathy, mild chronic left trigeminal neuropathy, chronic oculomotor neuropathy (mild medial rectus muscle weakness of left eye resulting mild diplopia). Chronic inflammatory demyelinating polyneuropathy, sensorimotor variant with predominant mild to moderate impairment of distal parts of peroneal nerves, slowly progressive type with loss of proprio- and exteroception and mild sensitive ataxia.

Aforementioned condition was associated with secondary immunodeficiency with imbalance at the level of T-cell immunity and increase in levels of cytotoxic T-cells and natural killers with reduced function of humoral immunity. Chronic bilateral hyperplastic maxillary sinusitis with formation of cyst in right maxillary sinus. Chronic adenoiditis with formation of small cysts in pharyngeal tonsil. Chronic tonsillitis in remission. Nasal septum deviation, op-ed. Hypertrophy of right nasal concha. Rhonchopathy. Mild obstructive sleep dyspnea. Moderate secondary insomnia with the disturbances in sleep architecture and duration of night sleep.

Falxcerebrilipoma is unrelated to main disease.

After proper establishment of the diagnosis, intravenous immunoglobulin infusion and antiviral therapy with famcyclovir was carried out. Adjuvant therapy included antihistamines, alpha-lipoic acid, B vitamins and antioxidants.

CONCLUSION

Chronic herpetic infection is an actual health problem as demonstrated in presented case. Primary involvement of central nervous system in form of PILE was accompanied with secondary dysimmune neuropathy manifesting as SP-CIDP in the presence of genetically determined susceptibility to chronicity and relapse of herpes infection. Patients with chronic herpetic infection must be evaluated more thoroughly at the setting of outpatient clinic for possible primary and secondary neurological deficit. New algorithm for the diagnosis of SP-CIDP is simple and includes total evaluation of sensory system.

References:

1. Kantimirova E.A. Shnajder N.A. Hronicheskaja vospalitel'naja demielinizirujushhaja polinejropatija: definicija, jepidemiologija, klassifikacija, diagnostika [Chronic inflammatory demyelinizing polyneuropathy: definition, epidemiology, classification, diagnosis] Vestn. Klinicheskoj bol'nicy [Bulletin of the hospital № 51]. 2009, № 7, P. 22 - 25.
2. Shnayder N. A., Panina Yu. S., Dmitrenko D. V. [i dr.]. Klinicheskij sluchaj pozdnej diagnostiki parainfekcionnogo limbicheskogo jencefalita, associirovannogo s virusami semejstva Herpes viridae [Clinical case of late diagnosis parainfectious limbic encephalitis associated with viruses of the Herpes viridae family] Spravochnik vracha obshhej praktiki [Handbook of General practitioner]. 2012, № 6, P. 28 - 37.
3. Kryizhanovskaya S.V., Shnayder N.A. Jetiopatogenez hronizacii porazhenija central'noj nervnoj sistemy pri gerpeticheskoj infekcii [The etiopathogenesis of chronic lesions of the Central nervous system with herpes infection] Vestn. Klinich. bol'nicy № 51 [Bulletin of the hospital № 51]. 2010, V. III, № 10, P. 38 - 48.
4. Podchuvarova E.V. Dostizhenija v diagnostike i lechenii hronicheskoj vospalitel'noj demielinizirujushhej polinevropatii i drugih immunologicheski oposredovannyh nevropatij [Advances in the diagnosis and treatment of chronic inflammatory demyelinative polyneuropathy and other immunologically mediated neuropathies] Nevrol. zhurn [Neurological journal]. 2003, № 4, P. 59 - 64.
5. Shnayder N.A., Kantimirova E.A. Jepidemiologicheskaja i klinicheskaja harakteristika otdel'nyh form polinevropatij (na primere ZATO Zheleznogorsk Krasnojarskogo kraja) [Epidemiological and clinical characteristics of the individual forms of polyneuropathy (for example, Zheleznogorsk, Krasnoyarsk region)] Nervno-myshechnye bolezni [Neuromuscular disease]. 2011, № 1, P. 34 - 40.
6. Allan S.M., Tyrrell P.J., Rothwell N.J. Interleukin-1 andneuronalinjury/ S.M.Allan, P.J.Tyrrell, N.J. Rothwell // Nat. Rev. Immunol. – 2005. – Vol. 5. – P. 629-640.
7. Bien C.G., Elger C.E. Limbic encephalitis: a cause of temporal lobe epilepsy with onset in adult life / C.G.Bien, C.E. Elger // Epilepsy Behav. – 2007. – Vol. 10. – P. 529-538.
8. Bromberg M. B. Review of the evolution of electrodiagnostic criteria for chronic inflammatory demyelinating polyradiculoneuropathy/M. B. Bromberg// Muscle Nerve. – 2011. – Vol. 43. – P. 780 - 794.

9. Chronic inflammatory demyelinating polyradiculoneuropathy. Clinical characteristics, course, and recommendations for diagnostic criteria. / R.J. Barohn, J.T. Kissel, J.R. Warmolts, J.R. Mendell// Arch. Neurol. – 1989. – Vol. 46. – P. 878.
10. CD8+ T-cell immunity in chronic inflammatory demyelinating polyradiculoneuropathy / T. Schneider-Hohendorf, N. Schwab, N. Uçeyler [et al.] // Neurology. – 2012. – Vol. 78. – P. 402.
11. Chronic steadily progressive central and peripheral predominantly motor demyelination, involving the cranial nerves, responsive to immunoglobulins / C.Bentes, M. de Carvalho, J.de Sa [et al.] // Electromyogr. Clin. Neurophysiol. – 1999. – Vol. 39, №l. – P. 33 - 37.
12. Chronic immune sensory polyradiculopathy: a possibly treatable sensory ataxia / M. Sinnreich, C.J. Klein, J.R. Daube [et al.] // Neurology. – 2004. – Vol. 63. – P.1662.
13. Clinical spectrum of chronic acquired demyelinating polyneuropathies / D.S. Saperstein, J.S. Katz, A.A. Amato, R.J.C. Barohn // Muscle Nerve. – 2001. – V. 24. – P. 311.
14. Dalakas M.C. Medscape. Advances in the diagnosis, pathogenesis and treatment of CIDP / M.C. Dalakas// Nat. Rev. Neurol. – 2011. – Vol. 7. – P. 507.
15. Dalakas M. C. Clinical trials in CIDP and chronic autoimmune inflammatory demielinatingpolyradiculoneuropathy/ M.C. Dalakas// J. PeripherNerv. Syst. –2012. – Vol. 7 (Suppl). – P. 34 - 39.
16. Dyck P.J., Lais A.C., OhtaM. At small heat-shock protein 27 causes axonal Charcot-Marie-Tooth disease and distal hereditary motor neuropathy / P.J. Dyck, A.C.Lais, M. Ohta// Nat. Genet. –2004. – Vol. 36, № 6. – P. 602-606.
17. Fatigue as the main presenting symptom of chronic inflammatory demyelinating polyradiculoneuropathy: a study of 11 cases / S.Boukhris, L.Magy, G.Gallouedec [et al.] // J. Peripher. Nerv. Syst. – 2005. – Vol. 10, № 3. – P. 329 - 337.
18. Harbo T., Andersen H., Jakobsen J. Length-dependent weakness and electrophysiological signs of secondary axonal loss in chronic inflammatory demyelinating polyradiculoneuropathy /T. Harbo, H. Andersen, J. Jakobsen// Muscle Nerve. – 2008. – Vol. 38. –P.1036.
19. Harding A.E., Thomas P.K. The clinical features of hereditary motor and sensory neuropathy types I and II/ A.E.Harding, P.K Thomas// Brain. – 1980. – Vol. 103, № 2. – P. 259-280.
20. Hartung H.P., Lehmann H.C., Willson H.G. Peripheral neuropaties: establishing common clinical research standarts for CIDP / H.P.Hartung,H.C.Lehmann, H.G.Willson// Nat. Rev. Neurol. – 2011. – Vol. 16 (Suppl). – P. 63-67.

21. Hippocampal damage in newly diagnosed focal epilepsy: a prospective MRI study / T. Salmenperä, M. Könönen, N.Roberts [et al.] // Neurology. – 2005. – Vol. 64. – P. 62-68.
22. Leger J.M., Behin A. Multifocal motor neuropathy / J.M. Leger, A.Behin// Curr. Opin. Neurol. – 2005. – Vol. 18, № 5. – P. 567 - 573.
23. Lewis R., Jeremy M.S. Chronic inflammatory demyelinating polyneuropathy: Etiology, clinical features, and diagnosis /R. Lewis, M.S.Jeremy// Neurophysiol. Clin. –2004. – Apr. V. 34(2). –P. 71-79.
24. Misra U. K., Tan C.T., Kalita J. Viral encephalitis and epilepsy / U.K.Misra, C.T. Tan, J.Kalita // Epilepsia. – 2008. – Vol. 49 (6). – P. 13 - 18.
25. Potentially reversible autoimmune limbic encephalitis with neuronal potassium channel antibody / M.J.Thieben,V.A. Lennon, B.F. Boeve[et al.]// Neurology. – 2004. – Vol. 62. – P. 1177-1182.
26. RajaballyY.A., ChavadaG.Lewis-sumner syndrome of pure upper-limb onset: diagnostic, prognostic, and therapeutic features /Y.A .Rajabally, G. Chavada// Muscle Nerve. – 2009. – Vol. 39. – P. 206.
27. Tüzün E., Dalmau J. Limbic encephalitis and variants: classification, diagnosis and treatment / E.Tüzün, J.Dalmau // Neurologist. – 2007. – Vol. 13. – P. 261-271.
28. Validity of diagnostic criteria for chronic inflammatory demyelinating polyneuropathy: a multicentre European study / Y.A. Rajabally, G. Nicolas, F. Piéret [et al.] // J. Neurol. Neurosurg. Psychiatry. – 2009. – Vol. 80. –P. 1364.
29. Vallat J.M., Tabaraud F., Magy L. [et al.]Diagnostic value of nerve biopsy for atypical chronic inflammatory demyelinating polyneuropathy: evaluation of eight cases/ J.M. Vallat, F. Tabaraud, L. Magy[et al.]// Muscle Nerve. – 2003. – Vol. 27. – P. 478.
30. Vezzani A., French J., Bartfai T., Baram T. Z. The role of inflammation in epilepsy / A.Vezzani, J.French, T.Bartfai, T.Z.Baram // Nat. Rev. Neurol. – 2011. – Vol. 7 (1). – P. 31-40.

Authors:

Popova Tatyana Egorovna – Ph.D., docent at Branch of Medical Genetics and Clinical Neurophysiology, Post-diploma Education Institute, Krasnoyarsk State Medical University

Address: 660021, Krasnoyarsk city, ulitsa Karla Marksa, 124, 8(391)2212449

e-mail: tata2504@yandex.ru

Nikolaeva Tatyana Yakovlevna – M.D., professor, head of Branch of Neurology and Psychiatry, Medical Institute, North-Eastern Federal University named after M.K. Ammosov

Address: 677000, Yakutsk city, ulitsa Oyunskogo, 27, 8(4112)363046

e-mail: tyanic@mail.ru

Schnayder Natalya Alexeevna – M.D., professor, head of Branch of Medical Genetics and Clinical Neurophysiology, Post-diploma Education Institute, Krasnoyarsk State Medical University

Address: 660021, Krasnoyarsk city, ulitsa Karla Marksa, 124, 8(391)2212449

e-mail: naschnaider@yandex.ru

Petrova Marina Mikhailovna – M.D., professor, head of Branch of Outpatient Inner Diseases and Family Medicine, Post-diploma Education Institute, Krasnoyarsk State Medical University

Address: 660022, Krasnoyarsk city, ulitsa P. Zheleznyaka, 1, 8(391)2280860

e-mail: stk99@yandex.ru

Semenov Artem Arkadievich – post-graduate student at Branch of Neurology and Psychiatry, Medical institute, North-Eastern Federal University named after M.K. Ammosov

Address: 677000, Yakutsk city, ulitsa Oyunskogo, 27, 8(4112)363046

e-mail: semartark@s-vfu.ru

Pen Olga Vladimirovna – student of Branch of Informational Systems, Siberian Federal University

Address: 660049, Krasnoyarsk city, ulitsa Kirenskogo, 26, korpus "ULK", 8(913)1968408

e-mail: olgapen1991@gmail.com

Panina Yulia Sergeevna – researcher at Interbranch Laboratory of Medical Genetics, Krasnoyarsk State Medical University

Address: 660021, Krasnoyarsk city, ulitsa Karla Marksa, 124, 8(391)2212449

e-mail: nerusss@mail.ru

Muravyova Anastasia Vladimirovna – assistant at Interbranch Laboratory of Medical Genetics, Krasnoyarsk State Medical University

Address: 660021, Krasnoyarsk city, ulitsa Karla Marksa, 124, 8(391)2212449

e-mail: exzen86@yandex.ru

Fig. 1. High-field brain magnetic resonance imaging of patient A., 43 years old (March 2014): hyperintensity in T1, T2-weighted images is found parasagitally in the medial parts of interhemispheric space, which is intimately confined to falxcerebri, the signal is suppressed in FLAIR images, with sharp and smooth edges, no perifocal reaction, sized The (?), which is structurally consistent with lipomaof falxcerebri.

Fig. 2. High-field brain MRI of the same patient: no significant changes in these images.

Fig. 3. Brain MRI of the same patient: insignificant local thickening and intense signal in T2 images in the cells of mucous membrane of ethmoid bone and both maxillary sinuses. Rhinosinusopathy. Cystic inclusions in the lymphoid tissue of nasopharynx, sized 0.2-0.5 in diameter.

Fig. 4. MR-spectrography of mediabasal parts of brain of the same patient: multivoxel spectroscopy (CSI_2D_TE30) revealed slight reduction of N-acetylaspartate level (neuronal marker) in anterior and medial parts of right hippocampus (compared to same parts of left hippocampus), which is also found in mediolateral part of left hippocampus. These findings are suggestive of neuronal dysfunction in these areas.

Fig. 5. Computerized pallesthesiometry of styloid processes of ulna of the same patient (Schneider N.A. et al. method): reduction of vibroception at 250 and 500 Hz in the right side and 8, 16, 32 Hz in the left side.

Fig. 6. Computerized pallesthesiometry of lateral malleoli of the same patient (Schneider N.A. et al. method): slight reduction of vibroception at 32-64 Hz and marked reduction with tendency to complete loss at 250 and 500 Hz.