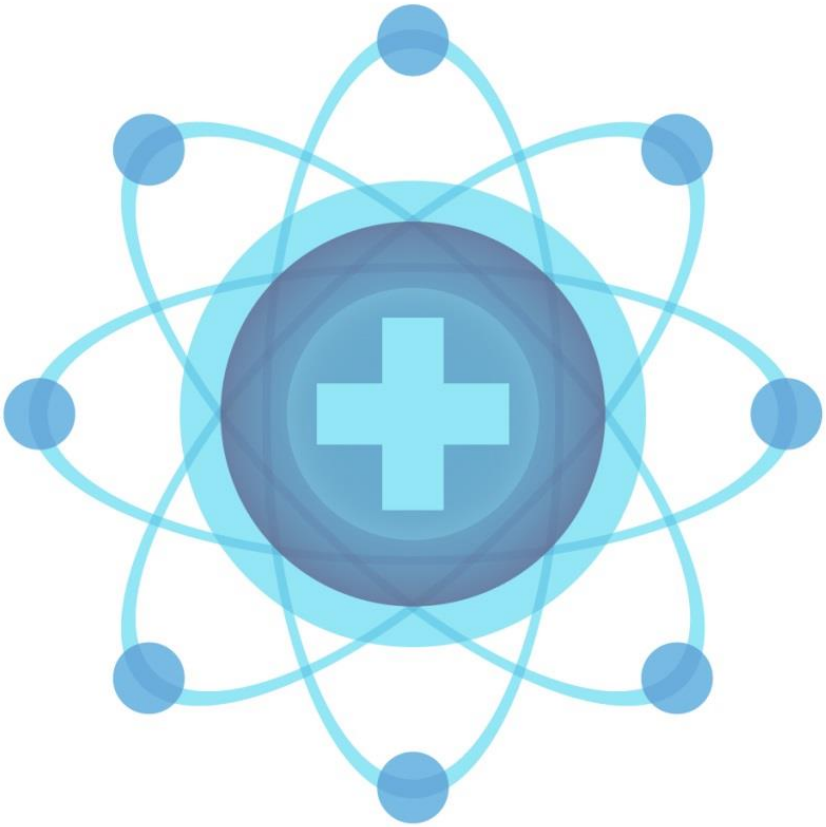

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# CLINICAL AND IMMUNOLOGICAL INDICATORS OF INFLAMMATORY DISEASES OF THE NERVOUS SYSTEM

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**Abstract:** Inflammatory diseases of the central nervous system are severe processes with a wide range of pathogenetic disorders and lead to a gross deficiency in the nervous system or, in the worst cases, to the death of the patient. Acute inflammatory diseases of the central nervous system represent an extremely heterogeneous group of diseases and conditions in terms of clinical manifestations and prognosis, traditionally combined according to one of the main pathomorphological signs - primary demyelination.

**Keywords:** primary, demyelination, diseases, clinical.

**Introduction**: Clinical manifestations of inflammatory diseases of the central nervous system in the acute period to a certain extent depend on the tropism of the pathogen, the predominant localization of lesions and the characteristics of pathogenesis, as well as on the age of the patients. Despite the expansion of the diagnostic capabilities - neuroimaging, immunological studies, the possibility of carrying out these methods in the shortest possible time, there remain a number of unspecified questions both in the diagnosis and in the treatment of these diseases.

In this regard, the goal was set for us: to study the clinical and immunological features of inflammatory diseases of the central nervous system and to optimize the diagnosis of these processes.

Material and research methods: In the period from 2015 to 2020. 124 patients with acute inflammatory diseases of the central nervous system at the age from 18 to 74 years were examined. The patients were observed in the neuro-intensive care units of the clinic of the Andijan Medical Institute. The comparison group consisted of 30 apparently healthy people. All patients were divided into 3 groups depending on the localization of organic lesions of the central nervous system and the clinical diagnosis. Group 1 consisted of 34 patients with myelitis, group 2 of 58 patients with encephalitis and group 3 of 32 patients with encephalomyelitis. In all patients, the nosological forms were verified both clinically and neuroimaging (according to MRI data).

Table No. 1

**Distribution of patients depending on age**

| **Patient age** | **1st group Myelitis** | | **2 group encephalitis** | | **Group 3 Encephalomyelitis** | | **Healthy** | |
|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | | % |
| 18-44 years | 20 | 58,8 | 45 | 77,6 | 22 | 68,8 | 2 | 40 |
| 44-59 years | 9 | 26,5 | 10 | 17,2 | 7 | 21,9 | | 33,3 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 0 | |
| 60-74 years | 5 | 14,7 | 3 | 5,2 | 3 | 9,3 | | 26,7 |
| Всего | 34 | 100 | 58 | 100 | 32 | 100 | 0 | 100 |

The distribution of patients depending on age indicates the predominance of patients from 18 to 44 years old in different age categories (patients with myelitis in this interval accounted for 58.8%, encephalitis 77.6%, encephalomyelitis 68.8%) (Table 1).

The average age of patients at the time of examination was determined. According to statistical data, the average age of patients with myelitis was 39.2 ± 2.6 years, the average age of patients with encephalitis was 37, 4 ± 1.7, and patients with encephalomyelitis, 37 ± 2.5. Studies have shown that most often inflammatory processes affect people of young and working age, which is consistent with the literature data.

All patients underwent clinical neurological, laboratory, neuroimaging, immunological studies in order to determine the main mechanisms of the development of the disease.

Of all the examined patients with encephalitis, 39 (67.2%) people had a severe and extremely difficult disease, 16 (27.6%) patients had a moderate form, a mild form of acute encephalitis in 3 (5.2%) patients ( table 2).

In patients with myelitis, 8 (23.5%) patients had a severe course of the process, 22 (64.7%) patients had a moderate course, and 4 (11.8%) patients had a mild course.

Encephalomyelitis, as a more common and severe process, proceeded in the following indicators: extremely severe course in 8 (25%) patients, severe in 12 (37.5%) patients and moderate in 12 (37.5%) people.

Table No. 2

**The course of the inflammatory process depending on the disease**

| | **Nosology** | **The severity of the flow** |
|---|---|---|

| | | **Lung** | **Average heavy** | **Heavy** | **Extremely heavy** |
|---|---|---|---|---|---|
| | Myelitis | 4 (11,8%) | 22 (64,7%) | 8 (23,5%) | - |
| | Encephalitis | 3 (5,2%) | 16 (27,6%) | 29 (50%) | 10 (17,2%) |
| | Encephalomyelitis | - | 12 (37,5%) | 12 (37,5%) | 8 (25%) |
| | Total | 7 (5,6%) | 50 (40,3%) | 49 (39,5)% | 18 (14,5%) |

Clinical and neurological research showed that in all study groups they had signs of organic lesions of the brain and spinal cord with a number of neurological symptoms in the form of bulbar disorders (in group 2 - 58.6%, in group 3 - 84.4%), pyramidal disorders ( in group 1 - 100%, in group 2 - 74.1%, in group 3 - 90.7%), pelvic disorders (in group 1 - 85.3%, in group 3 - 93.8%) (table No. 3).

Table No. 3

Comparative characteristics of the main neurological symptoms

| | Neurological symptoms | 1 group (encephalomyelitis) | 2 group (encephalomyelitis) | 3 group (encephalomyelitis) |
|---|---|---|---|---|
| | Bulbar disorders | - | 34 (58,6%) | 27 (84,4%) |
| | Convulsive syndrome | - | 23 (39,7%) | 10 (31,2%) |
| | Cranial nerve damage | - | 17 (39,3%) | 15 (46,8%) |
| | Pyramidal violations | 34 (100%) | 43 (74,1%) | 29 (90,7%) |
| | Sensory impairment | 34 (100%) | 38 (65,5%) | 30 (93,8%) |
| | Pelvic | 29 (85,3%) | - | 30 (93,8%) |

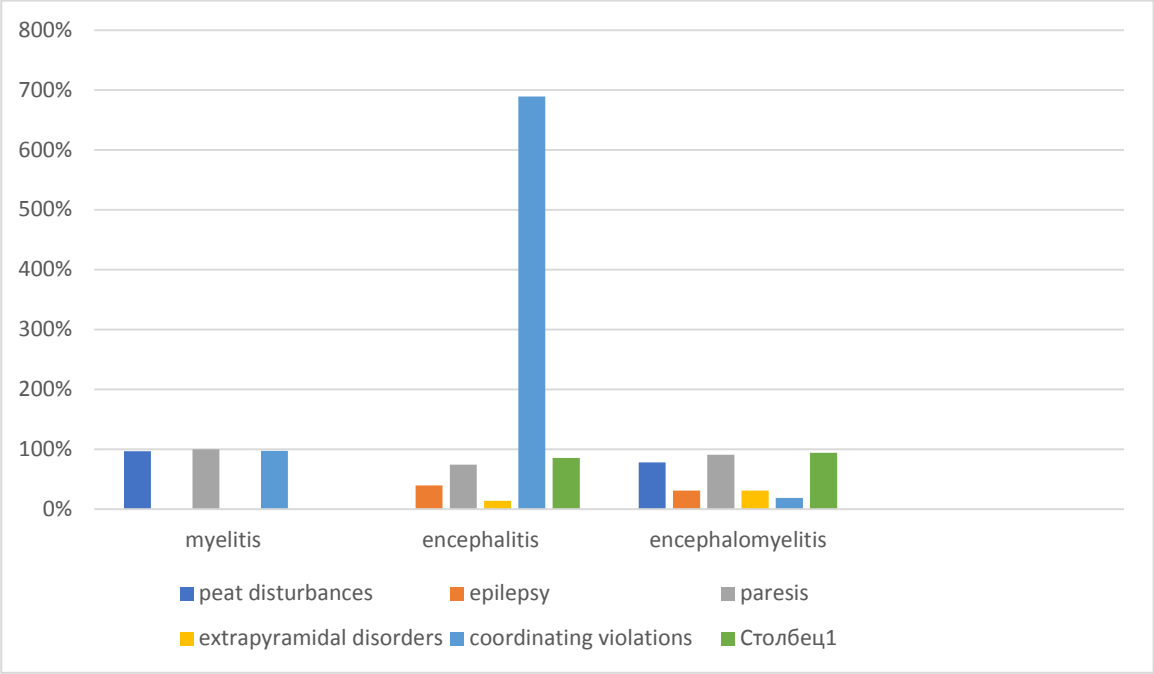
| | | | | |
|---|---|---|---|---|
| | disorders | | | |
| | Intellectual impairment | - | 2 (3,4%) | - |

**Complications after a previous illness**

| | **Nosology** | **Vegetative (trophical) violations** | **Epilepthis** | **Paresis and paralysis** | **Extrapyramine disorders** | **Coordinating violations** | **Pelvic dysfunction** |
|---|---|---|---|---|---|---|---|
| | **Myelitis** | 33(97%) | - | 34(100%) | - | 33(97,1%) | 29(85,3%) |
| | **Encephalitis** | - | 23(39,7%) | 43(74,1%) | 8(13,7%) | 4(6,89%) | - |
| | **Encephalomyelitis** | 25(78,1%) | 10(31,2%) | 29(90,7%0 | 10(31,2%) | 6(18,7%) | 30(93,8%) |
| | **Total** | 58(46,7%) | 33(26,6%) | 106(85,4%) | 18(14,5%) | 43(34,7%) | 59(47,5%) |

Complications after the previous illness among patients of all groups were observed more in the pyramidal, coordinating systems and pelvic disorders (diagram No. 1). Also, among patients with encephalitis and encephalomyelitis, the disease was complicated by epilepsy and amounted to 39.7% and 31.2%, respectively.

Diagram No. 1




Among patients with myelitis and encephalomyelitis, a large number (97% and 78.1%, respectively) were trophic disorders, which, according to literature data, is associated with damage to the lateral horns of the spinal cord in inflammatory processes of the central nervous system.

Here is an example: Patient K., born in 1984, was admitted to the neurology department of the AGMI clinic with a diagnosis of Acute meningoencephalitis.

Complaints at admission: severe headaches, nausea, vomiting, fever up to 39 ° C, chills, pain throughout the body, weakness in the arms and legs on the left, drowsiness, general weakness.

Anamnesis morbi: the patient considers himself ill for 10 days, the left extremities began to weaken on the sly, then he turned to a specialist, where he was urgently hospitalized.

Status praesens: the general condition is more serious, is in an unconscious state. Visible skin and mucous membranes were unchanged. Peripheral lymph nodes are not enlarged. Breathing is even through the nose. Weak vesicular breathing is heard in the lungs. Heartbeats are rhythmic. HELL 140/90 mm Hg pulse 80 beats per

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minute. The tongue is clean, uncoated. The liver and spleen are not enlarged. Urination is carried out through a urinary catheter.

Neurostatus: (given the serious condition of the patient) the pupils are uniformly narrow, photo reaction and corneal, conjunctival reflexes are weak. The face is symmetrical. There is no deviation. Motor sphere: there is a limitation of movement in the left limbs. Decreased muscle tone on the left. Tendon reflexes are triggered. Pathological reflexes: upper, lower Rossolimo, Babinsky on the left are positive. Sensitivity: the reaction is weak to external stimuli (needle prick). The coordination samples could not be verified. Meningeal signs: stiff neck, Kernig positive. There are no trophic changes. VND soporous state.

**Test results:**

1. General analysis: Hb - 108 g / l, erythrocytes-3.74, Tsv.pok-0.8, leukocytes-25 g / l, ESR-25 mm / h,
2. Analysis of cerebrospinal fluid: quantity-2.0, color-colorless, protein-6.6, cytosis-82, Pandey reaction - ++++, lymphocytic pleocytosis ,.
3. ECG: sinus tachycardia, horizontal position of the electric axis of the heart.
4. Biochemistry blood test: sugar -6.2 mmol, PTI-105%, INR-0.94, total bilirubin -36.54, bound-8.7, unbound-27.84, total protein -64.7, AST-1.2, ALT-1.5,
5. Urine analysis: straw yellow color, protein - abs, leukocytes - 3-0-2.
6. MRI of the brain: external dropsy of the brain, ventriculmegaly, hypotrophy of the cerebral cortex. Infiltration of the right hemisphere.

Мрт расм

Based on the history, clinical, MRI and laboratory findings, the following diagnosis was made:

Acute encephalitis, viral etiology.

Complication: left-sided hemiparesis. Edema of the brain. Sopor. Jacksonian seizures.

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Treatment: was carried out according to the standard of treatment of the Ministry of Health of the Republic of Uzbekistan.

1. Antiviral drugs
2. Decongestants
3. Drugs that improve microcirculation
4. Neuroprotective agents
5. Hormone therapy
6. Antibiotic therapy
7. Plasmapheresis

In order to confirm the participation of the autoimmune component in the development of demyelination in patients with inflammatory diseases of the central nervous system, we examined the indicators of the following main cytokines: IL-1β, IL6, TNF-alpha (Table 4).

Table No. 4

Indicators of immunological research for encephalitis (pg / ml)

| | **Nosological forms** | The number of patients examined | | IL-1β | IL-6 | TNF-alpha | CEC large | C EC small |
|---|---|---|---|---|---|---|---|---|
| | | Abs number | | | | | | |
| | **Encephalitis** | 20 | 4,4 | 13,5±0,5*** | 8,4±0,6** ^ | 7,4±0,3 | 124,1±1,8** | 127,7±1,8**^^ |
| | **Myelitis** | 20 | 8,8 | 11,8±06 | 6,9±0,3^ | 7,4±0,4** | 102,5±1,7** | 101,8±1,3^^ |
| | **Encephalomyelitis** | 20 | 2,5 | 22,9±1,0*** | 11,0±0,4** ^ | 6,6±0,4** | 132,7±2,3** | 130,6±3,0**^^ |
| | **control** | 20 | 6,7 | 9,94 ± 1,78*** | 3,42 ± 0,28^ | 4,58 ± 0,81** | 101±1,5** | 100±1,7** |

*** - P<0,001 between 1 and 3, 1 and 4 comparison group for IL -1β
** - P<0,01 between 1 and 3 comparison group according to IL-6

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^ - P<0,001 between 2 and 3, 1 and 4, 2 and 4, 3 and 4 comparison group according to IL-6

** - P<0,01 between 2 and 4, 3 and 4 comparison group for TNF-alpha

*** - P<0,01 between 1 and 3, 2 and 3 by the CEC comparison group, large

^^ - P<0,001 between 1 and 2, 2 and 3 comparison group by CEC small

** - P<0,01 between 1 and 3 comparison group according to the CEC small

In all three observation groups, the above cytokines were also examined to determine the level of the autoimmune response. As can be seen from the data presented in the first group (encephalitis), the level of IL-1β was 2.5 times higher than the reference value and amounted to 13.5 ± 0.5.

An increase in IL-1β was also observed in the groups examined with myelitis (11.8 ± 06 pg / ml) and encephalomyelitis (22.9 ± 1.0 pg / ml), and these indicators have a significant increase both between groups 1 and 3, and with the control group.

In the study of the level of cytokines in the acute period of the disease, an increase in the production of IL-1β was observed in all studied groups, but it was significant in relation to the control group with encephalitis and encephalomyelitis (13.5 ± 0.5 pg / ml and 22.9 ± 1, 0 pg / ml, respectively). Moreover, with encephalitis and encephalomyelitis, this indicator was significantly higher than with myelitis, which once again proves the severity of these processes. It also correlates with both the course and clinical manifestations of the disease.

When determining the level of IL-6, it was found that this indicator was significantly higher in all three groups compared with the control (8.4 ± 0.6 pg / ml with encephalitis, 6.9 ± 0.3 pg / ml with myelitis and 11 , 0 ± 0.4 pg / ml with encephalomyelitis). When comparing IL-6 between groups with diseases, it turned out that a significant increase was also observed between patients with encephalitis and encephalomyelitis. With encephalomyelitis, this indicator exceeded those with encephalitis (8.4 ± 0.6 pg / ml and 11.0 ± 0.4 pg / ml). This ratio corresponds to the severity and prevalence of the inflammatory process.

The same tendency is characteristic of the tumor necrosis factor TNF-alpha - a cytokine, which usually increases during viral processes in the central nervous system, and also determines the immune response of the organism to pathogenic

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processes. This indicator was significantly higher in all three groups with diseases compared to the control group (7.4 ± 0.3 with encephalitis, 7.4 ± 0.4 with myelitis, 6.6 ± 0.4 with encephalomyelitis). However, this indicator in the comparison groups did not have a significant difference in increase, although it exceeded the indicators of the control group, but at the same time did not go beyond the limits of the reference value.

**Conclusions:**

1. Studies have shown that all inflammatory processes of the central nervous system are characterized by a predominance of severe (39.5%) and moderate (40.3%) forms of diseases, a high incidence of residual consequences (75%): in them, a chronic vegetative state was detected in 10% patients, symptomatic epilepsy - 26.6%, psychoorganic syndrome - 12.5%, coordination disorders - 34.7%, paresis and paralysis - 85.4% and others.

2. The level of IL1-β, IL6, TNFa, CEC large and CEC small in acute inflammatory diseases of the central nervous system directly correlates with the severity of the course of the disease and the development of demyelination in the central nervous system (according to computed and magnetic resonance imaging), although according to TNFa indicators were in the study group were not reliable and did not exceed the reference values.

3. Investigation of the level of circulating immunological complexes allows to determine the severity of the course of the disease and to predict the outcome in inflammatory diseases of the central nervous system.

**References:**

1. Antsilevich LM, Yagudina LA Practical application of enzyme immunoassay in the diagnosis of diseases [Electronic resource] // Practical medicine. - 2014.

2. Belova A.N., Shalenkov I.V. Differential diagnosis of focal non-compression lesions of the spinal cord of the cervicothoracic localization. Practical medicine. 2013 No. 66, 31 pages

3. Galaktionov. V.G. Immunology. - M .. Academy, 2004. - S. 122-123.

4. Lobzin Yu.V. Meningitis and encephalitis / Yu.V. Lobzin, V.V. Pilipenko, Yu.N. Gromyko. SPb.YOOO "FOLIANT Publishing House", 2003. - 128 p.

5. Odinak M.M. Private neurology / M.M. Same. SPb .: Lan, 2002. "- 446 p.

6. Protas I.I. Herpetic encephalitis / I.I. Protas. Minsk: LLC "Met". - 2000 .-- 176 p.

7. Chuchalin A.G., T.V. Sologub. Influenza in adults: guidelines for diagnosis, treatment, specific and non-specific prevention. SPb .: Publishing and printing complex "NP-Print". 2014: 192.

8. Yatsyshina S.B., Tvorogova M.G., Shipulin G.A., Maleev V.V. Laboratory diagnostics of influenza and other acute respiratory viral infections by the method of polymerase chain reaction. Laboratory service. 2017; 6 (3): 238-267. https: // doi: 10.17116 / labs201763238-267.

9. Borchers A.T., Gershwin M.E. Transverse myelitis // Autoimmun. Rev. 2012. V. 11. P. 231-248.

10. Dinarello, C., Simon, A., van der Meer, J. Treating inflammation by blocking interleukin-1 in a broad spectrum of diseases. Nat Rev Drug Discov., 2012. — Vol. 11(8). — P. 633-652.

11. Giovannini, S., Onder, G., Liperoti, R. et al. Interleukin-6, C-reactive protein, and tumor necrosis factor-alpha as predictors of mortality in frail, community-living elderly individuals. J Am Geriatr Soc., 2011. — Vol. 59(9). — P. 1679-1685.

12. Goh C., Desmond P.M., Phal P.M. MRI in transverse myelitis // J. Magn. Reson. Imaging. 2014. V. 40. P. 1267-1279.

13. Kamei S, Sekizawa T, Shiota H, et al. Evaluation of combination therapy using aciclovir and corticosteroid in adult patients with herpes simplex virus encephalitis. J Neurol Neurosurg Psychiatry 2005;76:1544-1549.

14. Malmgaard L. Induction and regulation of IFNs during viral infections. J Interferon Cytokine Res 2004;24:439-454.

15. Misra UK, Tan CT, Kalita J. Viral encephalitis and epilepsy. Epilepsia 2008;49(Suppl. 6):13-18.

16. Misra UK, Kalita J, Phadke RV, et al. Usefulness of various MRI sequences in the diagnosis of viral encephalitis. Acta Trop 2010;116:206-211.

17. Renard D, Nerrant E, Lechiche C. DWI and FLAIR imaging in herpes simplex encephalitis: a comparative and topographical analysis. J Neurol 2015;262:2101-2105.

10.5281/zenodo.5639620
18. Solomon T, Michael BD, Smith PE, et al. Management of suspected viral encephalitis in adults—Association of British Neurologists and British Infection Association National Guidelines. J Infect 2012;64:347-373.

19. Sutter R, Kaplan PW, Cervenka MC, et al. Electroencephalography for diagnosis and prognosis of acute encephalitis. Clin Neurophysiol 2015;126:1524-1531.

20. Thakur KT, Motta M, Asemota AO, et al. Predictors of outcome in acute encephalitis. Neurology 2013;81:793-800

21. Venkatesan A, Geocadin RG. Diagnosis and management of acute encephalitis: A practical approach. Neurol Clin Pract 2014;4:206-215.

22. Venkatesan A, Tunkel AR, Bloch KC. Case definitions, diagnostic algorithms, and priorities in encephalitis: consensus statement of the international encephalitis consortium. Clin Infect Dis 2013;57:1114-1128.