

Neuropsychological Status of Patients with Hiv Infection

¹ **Kuranbaeva SatimaRazzaqovna**

Tashkent Medical Academy,

² **QalandarovaSevaraXo'janazarovna**

Tashkent Medical Academy,

³ **DaminovaXilolaMaratovna**

Tashkent Medical Academy

Annotation: The study is based on the survey data of 103 patients with HIV infection who are registered at the dispensary, aged 20 to 45 years. Neuropsychological studies of patients with HIV infection were carried out using special tests. As a result of interpretation of the data revealed that for a early preclinical stages of HIV memory disorders were observed in 64% of patients and affected mainly visual and auditory short-term memory types, attention disorders expressed in the form of exhaustion (at 51.2%). At the stage of HIV progression to the development of opportunistic infections, memory impairments were observed in 78% of patients and affected the logical, visual and associative types of memory. Disorders of attention were expressed in a decrease in work efficiency (in 22.6%), the degree of working capacity (in 43.3%) and exhaustion (in 66%).

Key words: HIV, neurological syndromes, cognitive impairments, neuropsychological impairments.

Today it is quite obvious that HIV infection has moved from the asymptomatic carriage stage to the stage of clinical manifestations and has entered our polyclinics and hospitals [2, 11, 17]. Experience has shown that this category of patients is currently concentrated not only in centers and offices for the prevention of AIDS, but increasingly turns to neurologists of polyclinics and, if the therapy is ineffective, is hospitalized in hospitals with diagnoses of discirculatory encephalopathy, polyneuropathy of unspecified genesis, disseminated encephalomyelitis syndrome, progressive myelopathy, focal brain damage, leukoencephalopathy, etc. [3, 5, 9]. Neuro AIDS is the general name for various clinical forms of lesions of the nervous system that develop in patients with HIV / AIDS [5].

Although pathological studies show that damage to the nervous system is detected in 90% of AIDS patients, clinically neurological complications are detected in 50-70% of patients, and in 10% of cases they are the first clinical manifestation of the disease. It is neurological complications that are one of the main causes of disability and death in HIV infection [6, 13, 16].

A variety of clinical variants of neurological disorders in HIV infection, which can be detected in the early stages of the disease, determine the relevance of the problem under consideration, and neurologists' knowledge of the main forms of clinical manifestations will contribute to early diagnosis of the disease and timely therapy [4, 7, 10]. The available literature contains a small number of works describing the lesions of the NA in HIV-infected individuals. In the International Classification of the 10th revision, the nervous system lesions in HIV are assigned to the class "Some infectious and parasitic diseases", where only general damage to the nervous system is provided (a disease caused by HIV with manifestations of encephalopathy and AIDS dementia) [12, 15].

In connection with the above, the **purpose of the study** was the study of the characteristics of disorders in the psycho- neurological status in patients with HIV infection.

Materials and methods of research: the study is based on the survey data of 103 patients with HIV infection (54.4% of women and 45.6% of men), who are registered at the dispensary, aged 20 to 45 years.

All patients were divided into 3 groups: group 1 (n = 25) early preclinical stages of the disease with no indications for initiation of HAART; group 2 (n = 53) clinical signs of HIV infection before the development of opportunistic infections at the stage of initiation of HAART. Group 3 (n = 25) opportunistic and other brain lesions in the analysis took into account gender and age (Table 1).

Table 1
Characteristics of patients by groups

Indicator	1st group (n = 25)	2nd group (n = 53)	Group 3 (n = 25)
Men	8 (32%)	25 (47.2%)	14 (56%)
Women	17 (68%)	28 (52.8%)	11 (44%)
Average age, years	32.1 ± 2.5	33.0 ± 1.8	38.4 ± 2.7 **
Average duration of infection, mss.	28.3 ± 6.4	38.7 ± 7.3 *	114.7 ± 7.6 **

Note: * - reliability of data for indicators of group 1 (P <0.05); ** - reliability of data for indicators of group 2 (P <0.05).

The study did not include: active users of psychoactive substances and alcohol; patients with acute somatic, psychiatric and neurological diseases; the need for concomitant therapy with drugs that have a significant effect on the functional parameters of the central nervous system, pregnant women.

Neuropsychological studies of patients with HIV infection were carried out using special tests: Wechsler Memory Scale, (WMS). 7 subtests are assessed: - working memory - logical memory - short-term auditory memory - visual memory - associative memory. An Equivalent Memory Index (EPI) is obtained that is comparable to the IQ. The test of stability of attention and dynamics of working capacity "Schulte table" assesses: - efficiency of work - degree of training - mental stability "Incomplete contours of objects" AR Luria) evaluates visual object gnosis .

The statistical analysis of the results obtained was carried out using the methods of variation statistics. The significance of the differences in the means was assessed on the basis of the Student's test with a 95% confidence interval (p < 0.05).

Research results: Clinical observations show that in the early stages of HIV infection, the most frequent are reactive neurotic states and manifestations of asthenovegetative syndrome.

Patients in group 1 have a variety of neurotic disorders, as well as increased fatigue in 8 (32.0%), absent-mindedness - in 5 (20.0%), forgetfulness - in 7 (28.0%), mood deterioration - 13 (52.0%), narrowing of the range of interests - 6 (24.0%), sleep disorders - 11 (44.0%), various phobias - 4 (16.0%), vegetative lability - 15 (60.0%) (Table 2).

Depending on the clinical development of the disease, the severity of neurological symptoms is noted. Particularly high percentages were found among patients in group 3, i.e. in cases where the clinical manifestations of HIV infection were associated with opportunistic and other brain lesions.

Table 2
Symptoms observed at an early stage of the disease in the examined patients (n = 103)

Symptoms	1st group (n = 25)		2nd group (n = 53)		Group 3 (n = 25)	
	Abs .	%	Abs .	%	Abs .	%
Increased tired e Bridges	eight	32.0	nineteen	35.8	12	48.0
Absent-mindedness	five	20.0	fifteen	28.3	nine	36.0
Forgetfulness	7	28.0	twenty	37.7	eleven	44.0
Deteriorating mood	13	52.0	32	60.4	eighteen	72.0
Narrowing the range interval e cos	6	24.0	24	45.3	17	68.0
Sleep disorders	eleven	44.0	31	58.5	nineteen	76.0
Raznoo used various phobias,	four	16.0	fourteen	26.4	10	40.0
Vegetative labile v Nosta	fifteen	60.0	37	69.8	21	84.0

An objective examination of patients revealed disorientation in place, time and personality from 26.2% (27 patients) to 43.7% (45 patients), disorders of higher integrative functions were noted in the form of a decrease in memory and attention - in 21.4% (22 patients) cases. Neuropathy - a common complication of HIV infection, which can fuss to pull the at any stage, while those in the early stages (Figure 1.).

As can be seen from the diagram, neuropathy is observed in all studied groups, its frequency increases depending on the stage of the disease.

At a further stage, the neuropsychological characteristics of patients with HIV infection were analyzed using special tests.

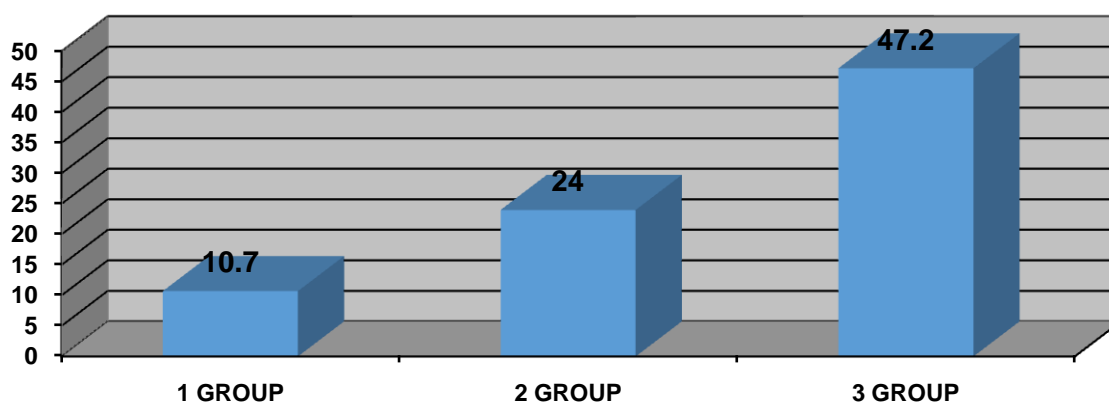


Fig. 1. The incidence of neuropathy in HIV infection

We used the Wechsler Memory Scale, WMS methods . 7 subtests are assessed: - working memory - logical memory - short-term auditory memory - visual memory - associative memory. An Equivalent Memory Index (EPI) is obtained that is comparable to the IQ. The test of stability of attention and dynamics of working capacity " Schulte table " assesses: - efficiency of work - degree of training - mental stability "Incomplete contours of objects" (AR Luria) evaluates visual object gnosis .

During psychological examination, patients already at the subclinical stage of the course of HIV infection (group 1) showed disturbances in the process of memorizing and reproducing information. The average value for the equivalent memory index (EPI), determined on the basis of subtests of the Wechsler method, in this group was noted below the norm by 1 standard deviation and was 105 ± 5.4 (100-110), which corresponds to the range from mild memory loss to the lower limit norms. Normal values for the EPG (above 110) had only 36% of patients studied in Group 1 (Table . 3).

As the disease progressed, there was a significantly significant decrease in EPI in groups 2 and 3 ($p < 0.05$), the mean values for which were 96 ± 3.4 (91-101) in group 2 and 90.1 ± 2.9 (84-101), in the 3rd group, respectively.

Table 3
Indicators of the WMS scale in patients with HIV infection

	Average EPI	Proportion of patients with normal values on the memory scale
1st group	105 ± 5.4 (100-110)	9 (36%)
2nd group	95.4 ± 3.4 (91-101)	13 (24.5%)
Group 3	90.1 ± 2.9 * (84-101)	5 (20%)

Note: * - reliability of data in relation to group 1; $P < 0.05$

The proportion of patients with normal values on the memory scale in the 2nd and 3rd groups was 24.5 % and 20.0 %, respectively.

Thus, as the disease progresses, the frequency of memory impairments in patients with HIV infection increases. So, in 52.0% of patients of the 1st group, a slight decrease in memory was noted, in 12.0% - a moderate decrease, and not a single case of a pronounced decrease in memory. (Fig. 2) .

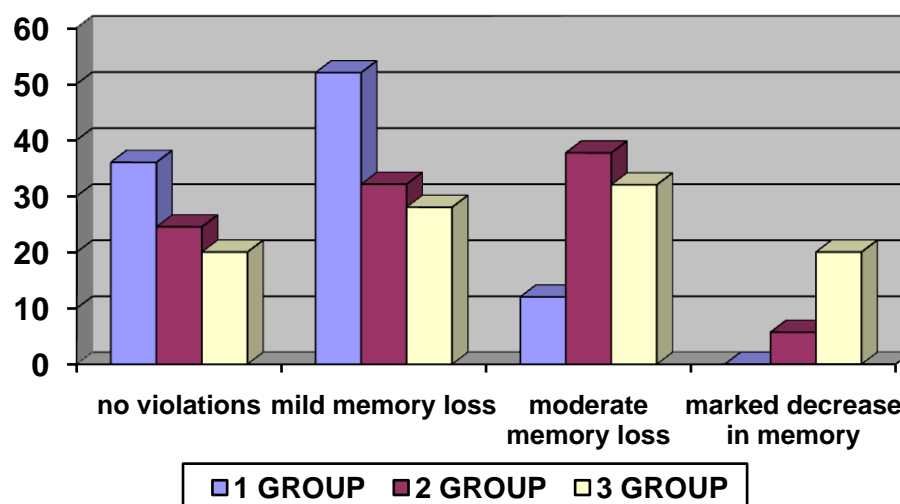


Fig. 2. Frequency of memory impairment in patients with HIV infection

At the same time, in patients of the 2nd group, in 32.1% of cases, there was a slight decrease in memory, in 37.7% - moderate and in 5.7% - a pronounced decrease in memory. In the 3rd group, a continuation of the increase in changes was noted, a pronounced decrease in mnestic functions was detected already in 20% of the examined patients, moderate - in 32.0% and mild - in 28.0%.

A detailed analysis of the average scores for subtests assessing different types of memory showed a significant decrease in logical and associative memory during the transition from the 1st to the 3rd group ($p < 0.05$) (Table 4).

Table 4
The state of various types of memory according to the Wechsler scale (n = 103)

Subtest	The maximum score on the subtests	Average score for the sub-tests		
		Group 1 (n = 25)	Group 1 (n = 53)	Group 1 (n = 25)
Mental control	nine	6.1 ± 0.19 (5-7 points.)	5.9 ± 0.12 (5-7 points.)	$5.2 \pm 0.17^*$ (4-6 points.)
Repetition of numbers	fifteen	11.0 ± 0.19 (10-12 points.)	11.8 ± 0.06 (11-12 points.)	10.7 ± 0.09 (10-11 points.)
Logical memory	23	11.4 ± 0.28 (10-13 points.)	9.4 ± 0.19 (8-11 points.)	$8.1 \pm 0.34^*$ (6-10 points)
Visual reproduction	fourteen	10.1 ± 0.18 (9-11 points.)	9.1 ± 0.12 (8-10 points.)	$8.2 \pm 0.24^*$ (6-9 points.)
Associative memory	21	14.0 ± 0.19 (13-15 points)	$12.0 \pm 0.12^*$ (11-13 points)	$11.0 \pm 0.24^*$ (9-12 points)

Note: * - reliability of data in relation to group 1; $P < 0.05$

Using an in-depth statistical analysis, we obtained data on the presence of a reliable relationship between the level of CD4-lymphocytes and HIV RNA in the blood with the severity of a decrease in mnestic processes ($p < 0.05$). Thus, with preserved immunity, normal EPP

values were more often recorded, or slightly reduced, while with a decrease in the number of CD4 lymphocytes, the degree of mnestic disorders increased, which was also confirmed by correlation analysis ($r = -0.589$; $p < 0.05$). Significant differences were also revealed when comparing EPP indices with the level of HIV RNA in the blood ($r = 0.601$; $p < 0.05$).

Thus, the revealed correlations between disorders of mnestic functions with the main characteristics of HIV infection - the level of CD4 lymphocytes and HIV RNA in the blood, may indicate a direct damaging effect of HIV on the central nervous system.

Memory disorders are common symptoms in brain disease. A number of mental disorders, such as impaired performance, impaired motivation, sometimes appear as manifestations of memory impairment. The structure of the process of memorization and reproduction is complex, therefore the disintegration of mnestic activity takes various forms. At the heart of memory impairment are factors, the results, the study of which may be useful for the diagnosis, in the differentiation of syndromes and in the practice of restorative work with patients [8, 14].

In the study of the process of voluntary attention according to the "Schulte tables" such indicators as work efficiency (ER), the degree of working capacity (VR), mental stability (PU) were compared (Table 5). The study of the tempo of sensorimotor reactions and attention, which was carried out according to the Schulte tables, revealed that the average time spent in the 1st group was 35.0 ± 0.4 s.

Table 5
Comparative analysis of the Schulte scale indicators in HIV infection

Indicator	1st group (n = 25)	2nd group (n = 53)	3rd group (n = 25)
Schulte tables	35.0 ± 0.4	$41.2 \pm 0.3^*$	$49.4 \pm 0.3^*$

Note: * - reliability of data in relation to group 1; $P < 0.05-0.001$

Patients 2-th group elapsed time was 41.2 ± 0.3 with ($P < 0.001$), whereas in 3-th group - 49.4 ± 0.3 c ($P < 0.001$).

The rate of sensorimotor reactions and attention according to the Schulte tables in patients of the 2nd and 3rd groups was slowed down in comparison with the indicator of the 1st group. Patients from the 2- and 3rd group required a longer time to complete the task, they often made mistakes due to absent-mindedness and the deterioration of the ability to remember the information.

This confirms the fact that HIV infection insidiously damages subcortical structures and impairs intellectual- mnestic processes, which in turn leads to a slowdown in the rate of sensorimotor reactions and a decrease in the speed of switching attention.

In the analysis of the scale of "Incomplete contours of objects" (Luria) conducted assessment ka optic th Specialization th gnosis and . It was found that as the disease progressed, a decrease in these indicators was revealed ($p < 0.05$) (Table 6).

Table 6
Efficiency of object identification by their incomplete contours

Groups	Average number of correctly named items (9-12 items)
--------	--

	Average score, $M \pm m$	Variational series
Group 1 (n = 25)	9.5 ± 0.2	6-12 items
Group 2 (n = 53)	8.9 ± 0.2	7-11 items
Group 3 (n = 25)	6.5 ± 0.1	3-9 items

Note: * - reliability of data in relation to group 1; $P < 0.05-0.001$

A robust regression analysis of the results of the study of visual perception in patients of the 3rd group showed a significant decrease in the efficiency of recognizing objects by their incomplete contours in comparison with the results of patients of the 1st and 2nd groups ($p < 0.001$).

According to modern concepts, perception is an active process, and is carried out as a complex systemic act, which includes various structures of the brain - from subcortical centers to projection and associative areas of the cortex.

Using an in-depth statistical analysis, we obtained data on the presence of a reliable relationship between the level of CD4 lymphocytes and HIV RNA in the blood with the severity of a decrease in mnestic processes ($p < 0.05$). So, with preserved immunity, normal EPP values were more often recorded, or slightly reduced, while with a decrease in the number of CD4 lymphocytes, it increased with the intensity of mnestic disorders, which was also confirmed by correlation analysis ($r = -0,589$; $p < 0.05$). Significant differences were also revealed when comparing EPP values with the level of HIV RNA in the blood ($r = 0,601$; $p < 0.05$).

Thus, the revealed correlations between disorders of mnestic functions with the main characteristics of HIV infection - the level of CD4 lymphocytes and HIV RNA in the blood, may indicate a direct damaging effect of HIV on the central nervous system.

conclusions

1. At the early preclinical stages of HIV, memory impairments were observed in 64% of the surveyed and mainly affected short-term auditory and visual types of memory, attention impairments were expressed in the form of exhaustion (in 51.2%).
2. At the stage of HIV progression to the development of opportunistic infections, memory impairments were observed in 78% of patients and affected the logical, visual and associative types of memory. Disorders of attention were expressed in a decrease in work efficiency (22.6%), the degree of working capacity (43.3%) and exhaustion (66%)
3. At the stage of opportunistic and other lesions of the central nervous system, memory impairment is observed in 76% of the surveyed, affects the logical, visual, associative types of memory, impaired attention is expressed in a decrease in work efficiency (33.3%), working capacity (79.2%), mental fatigue activity (91.7%), there is a decrease in visual object gnosis.
4. There is a connection between indicators of disease progression - the amount of CD4 and HIV PCR in the blood - with memory impairment.
5. It is advisable to inform patients about the possible formation of disorders of the central nervous system in the cognitive sphere under the influence of the HIV virus (problems of perception, memory, concentration of attention, thinking) and the ways of their correlation using antiretroviral therapy - to make informed, optimal decisions about treatment.
6. Early preclinical diagnosis can be based on regular interviews of patients about the presence of symptoms, especially at an important clinical stage - before the start of antiretroviral therapy,

during the period of immunological and virological well-being, and short screening testing by psychologists may be able to correctly determine the severity of neurocognitive disorders.

Bibliography

1. Астаева А.В. Особенности развития высших психических функций детей старшего дошкольного возраста с ВИЧ-инфекцией. Вестник ЮУрГУ, Сер. «Психология», 2009, Выпуск 7, № 42 (175): 80-85.
2. Бартлетт Д. Клинические аспекты ВИЧ-инфекции / Д. Бартлетт, Д. Галант, П. Фам. - М.: Р. Валент, 2012. - 528 с.
3. Безрукова Е.Г. Диагностические подходы при нетипичном (неврологическом) дебюте ВИЧ-инфекции/Е.Г. Безрукова, О.Г. Гамов, Е.Б. Лаукарт, А.В. Девяткин и др. // Кремлевская медицина. Клинический вестник. - 2014. - 4. - 11-17.
4. Беляков Н.А. Коморбидные и тяжелые формы ВИЧ-инфекции в России / Н.А. Беляков, В.В. Рассохин, Т.Н. Трофимова, Е.В. Степанова и др. // ВИЧ-инфекция и иммуносупрессии. - 2016. - 3(8). - 9-25.
5. Беляков Н.А. Механизмы поражения головного мозга при ВИЧ-инфекции /Н.А. Беляков, С.В. Медведев, Т.Н. Трофимова и др. // Вестник РАМН. - 2012. - 9. - 4-12.
6. Густов А.Н. Клинические варианты поражения нервной системы при ВИЧ-инфекции/А.В. Густов, Е.А. Руина, Д.В. Шилов, М.Н. Ерохина//Клин. медицина. - 2010. - 3. - 61-65.
7. Завалишин И.А., Спирин Н.Н., Бойко А.Н., Никитина С.С. Хронические нейроинфекции.-М.:ГЭОТАР-Медиа, 2011.-560с.
8. Захарова Н.Г. Причины неблагоприятных исходов у больных с ВИЧ-инфекцией, принимавших ВААРТ. Часть II/Н.Г. Захарова, С.И. Дворак, З.В. Губа, С.Л. Плавинский и др. // ВИЧ-инфекция и иммуносупрессии. - 2015. - 4. - 52-63.
9. Иванова М.Ф., Евтушенко С.К. с соавт. Ранняя диагностика ВИЧ-ассоциированных неврологических нарушений как актуальная проблема в практике невролога / М.Ф. Иванова, С.К. Евтушенко, А.В. Семенова и др. // Междун. неврол. журн. - 2016. - 8(86). - 53-62.
10. Корсунская Л.А. Особенности клинического течения цереброваскулярных заболеваний у ВИЧ-позитивных пациентов /Л.А. Корсунская, С.В. Шиян // Междун. неврол. журн. - 2011. - 4(24).
11. Allie S., Stanley A., Bryer A., Meiring M., Combrinck M.I. High levels of von Willebrand factor and low levels of its cleaving protease, ADAMTS13, are associated with stroke in young HIV-infected patients // J. Stroke. - 2015. - 10(8). - 1294-6.
12. Benjamin L.A. HIV, antiretroviral treatment, hypertension, and stroke in Malawian adults: A case-control study / Benjamin L.A., Corbett E.L., Connor M.D. et al. // Neurology. - 2016, Jan 26. - 86(4). - 324-33.
13. Cognitive Performance in Men and Women Infected with HIV-1 Jose Maria FaildeGarrido, Maria Lameiras Fernandez, Marika Foltz, Yolanda Rodriguez Castro, and Maria Victoria Carrera Fernandez Hindawi Publishing Corporation Psychiatry Journal Volume 2013, Article ID 382126, 6 pages
14. HIV-1 infection and cognitive impairment in the cART-era: a review Judith Schoutena, c, Paola Cinquee, Magnus Gisslenf, Peter Reissb, c and Peter Portegiesa, AIDS 2011

15. Stefaniak J. HIV/AIDS presenting with stroke-like features caused by cerebral Nocardia abscesses: a case report // BMC Neurol. - 2015, Oct 7. - 15. - 183.
16. Woods SP, Moore DJ, Weber E, Grant I. Cognitive neuropsychology of HIV-associated neurocognitive disorders. Neuropsychol Rev, 2009; 19: 152-168.
17. Yen Y.F., Jen I., Chen M., Chuang P.H., Liu Y.L., Sharp G.B., Chen Y.M. Association of Cytomegalovirus End-Organ Disease with Stroke in People Living with HIV/AIDS: A Nationwide Population-Based Cohort Study// J. PLoS One. - 2016. - 11(3). - 0151684.