The *pol* and *env* genes evolution demonstrates the presence of a temporary structure with a characteristic increase of divergence between viruses and their last common ancestor, which grew by 1,7 (for the *pol* gene, p<0,001) and 2,4 times (for the *env* gene, p<0,001) during the observation period. The unequal rate of spread of HIV in these high-risk groups, and as a result, differences in the degree of selective pressure of the immune system onto the virus population, possibly causes two effects. On the one hand, it may cause a higher rate of evolution of viruses that spread among the heterosexuals, which is 1,5 times higher than in IDUs for *pol* gene (p<0,001) and 2,1 times for the *env* gene (p<0,001), on the other hand — the differences in positive selection effect on the individual sites, with the frequency of amino acids in these positions among different risk groups being the same (as a whole).

Malignant neoplasms in HIV patients

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Background: HIV patients are at high cancer risk; therefore, oncological care provision to them is becoming a priority. Objective: To study the clinicoepidemiologic characteristics of cancer in HIV patients, to assess their total survival rate (TSR), and to determine what factors influence TSR and interfere with anticancer therapy.

Patients and methods: The study involved 192 HIV patients with cancer who were treated at Saint-Petersburg AIDS Center in 2006–2014. Their case histories were examined in conjunction with Population Cancer Register data. The median follow-up time of the survived patients (n=73) was 2 years and 8 months (range: 1 month to 13 years). In 36% of the patients, their follow up period was more than 5 years. Results: The median age of male patients (n=142) was 34 years (range: 17–78 years). HIV was detected before cancer in 93%, and concomitantly with cancer, in 7% of the cases The median duration of HIV infection before cancer diagnosis was 5 years (range: 3 months to 19 years). Cancer was found at stages 4b or 5 according to (Pokrovsky, 2001) in 95% of cases. At the time of cancer diagnosis, ART was administered in 9,4% of cases, viral load was suppressed (HIV RNA <50 mL^{-1}) in 7,8%, and the median CD4 cell count was 100 μL^{-1} (1–1184). The most prevalent among cancers were lymphomas (n=111, 58%). At the time of diagnosis, Stage 4 cancer (TNM, Ann Arbor) was found in 80%, complications in 15,1%, and more than three complications, in 6,8% of cases. In total, 57,3% of the patients had conditions that limited anticancer therapy: CD4-cell counts below 50 μL^{-1} (28,6%), severe opportunistic infections involving CNS (28,5%) and lungs (23%), active tuberculosis (12%), WBC below 1000 μL^{-1} (3%), and Stage 4 thrombocytopenia (platelet counts below 20 000 μL^{-1}; 2,6%). Opiate-addicted patients in the non-abstinence state or alcoholic patients made 14%. TSR in HIV patients was 55% during 1 years and 39% during 5 years after cancer diagnosis. The factors that reduce TSR during 5 years include severe opportunistic infections involving the CNS (20% vs 47%, p<0,001) and the lungs (17% vs 46%, p<0,001), the long duration of HIV infection before cancer diagnosis, CD4-cell count (less than 50 vs 250 mL^{-1}), HIV RNA (above 400 vs. below 50 copies per 1 μL). Being coinfected with EBV, CMV, HCV, or HBV did not influence TSR during 5 years. ART prescribed upon cancer diagnosis improved TSR during 5 years (49% vs 20%, p<0,001), fig. 2. Conclusions: Lymphomas are the most prevalent cancer in HIV patients (58%). Most cancer are diagnosed at advanced stages (80%). In 93% of cases, HIV infection is diagnosed before cancer, ART being provided to only 9,4 of the patients. Conditions that limit anticancer therapy were found in 57,3% of HIV cases. The total 5-year survival rate in HIV patients after cancer diagnosis is 39%. ART prescribed upon cancer diagnosis significantly increases this parameter.

Structural brain changes in the early stages of HIV

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Motivation: HIV causes neurological complications with the title «HIV-associated neurocognitive disorder (HAND)». HAND occur in 50% of patients which presents a strong social problem. After the introduction of HAART (1996) the number of cases of HIV-associated dementia significally reduced, but the total number of neurocognitive disorders was not decreased.

Study aim: improve early diagnosis and monitoring of atrophic brain changes in HIV patients using quantitative evaluation methods of MRI images.

Study tasks: Further investigate changes in global and regional brain structures in HIV-infected patients in the early stages of the disease; to study the relationship between atrophic and functional changes of brain structures in HIV-infected patients in the early stages of the disease.

Patients: 24 to 48 y.o in early stage of HIV without opportunistic infections and brain lesions according to conventional MRI, no drug addicts, no hepatitis, no psychological disorders. CD4 level: 445±230 cells/ml. Disease duration: 6 to 18 months.

MBaRsIe apcrqotuoicsoitli on protocol:

Pulse sequences	Time (minutes)
Localizers	1:37
Ax T2	1:48
Sag T2	2:12