Ax FLAIR	5:08
VENBold	1:40
Cor	3:22
T1 DWI	0:55

Morphometric protocol for anatomic and lesion quantification

Pulse sequences	Time (minutes)
T1 3D	7:41
T2 VISTA	7:32
FLAIR VISTA	8:16
pause	5:00
T1 3D GAD	7:41

Used postprocessing software: FreeSurfer, FSL, AutoSeg and ABC.

Intermediate results: In order to investigate changes in the volume of brain regional structures in early-staged HIV patients, 21 HIV subjects and 20 controls were investigated using our complex developed algorithm. Voxel morphometry of basal ganglia was performed, in particular: accumbens, amygdala, caudate, hippocampus, globus pallidus, thalamus and putamen. Fig. 1 and 2 show most important results. The volumes of the structures are shown as a percentage of the intracranial volume (ICV) calculated using ROBEX software.

We found a statistically significant increase in amygdala volume. From the literature it is known that an in-depth study of the functions of the amygdala has established an active role this structure plays in determining social behavior. In particular, the increase in amygdala volume was observed in children with autism spectrum disorder (ASD) and is considered as a factor in determining the deficit of communication and social relations characteristic of this population [1]. Cremers et al. [2] found that the volume of the right amygdala is directly correlated with extraversion levels in healthy volunteers. Another study of healthy individuals showed a positive correlation between the volume of the amygdala and neuropsychiatric features that were determined by measuring the size of social relations (which include friends, family members, neighbors, colleagues) [3]. People with higher volumes of amygdala have observed greater number and higher complexity of social relations. Kanai et al. [4] found that the density of the gray matter of the amygdala is positively correlated with the size of both «real» social relations, and social relations on the Internet.

Jasper [5] studied the link between the amount and functional activity of the amygdala and the size of the social network for persons living with HIV. It is noted that in HIV-infected patients are characterized by an increase in the volume of the amygdala. Unlike amygdala volume increase in healthy volunteers, which is due to the high social activity, in HIV this can be attributed to social stimuli associated with the strengthening of social interaction. A deeper understanding of the relationship between the amygdala volume and the size of social interactions can aid in the development of new rehabilitation programs for people living with HIV.

In addition to the volume increase in amygdala, we have found statistically significant unilateral reduction in the right globus pallidus volume. In the literature, many researchers have noted a pronounced decrease in the volume of a bilateral globus pallidus in HIV-infected patients, but we did not find references to the unilateral reduction of the volume of the basal ganglia, including the globus pallidus, in patients in the early stages of HIV.

Conclusion: There is a strong need of further investigation of regional brain volume changes in patients with HIV in the early stages of disease in order to understand the underlying mechanisms of HIV-associated neurocognitive disorders as this could help preventing development of neurocognitive disorders in HIV patients.

HPV-associated cervical lesions among russian HIV-infected women in St.-Petersburg

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Background: Since the beginning of the HIV epidemic in Russia and St. Petersburg the population of HIV-infected persons increases, among whom the proportion of women with the progression of HIV infection and the development of opportunistic diseases, which include cervical cancer, increases. The persistence of high-risk human papillomaviruses (HR-HPV) has been recognized as the major risk factor associated with the development of the cervical dysplasia and cancer. Immunodeficiency, including HIV-infection, is a cofactor of human papillomavirus (HPV) in the development of the cervical dysplasia and cancer.

There are data on the regional differences in structure of the high-risk human papillomavirus types; type-specific distributions of HPV among HIV-positive women differ from those among HIV-negative women. Type-specific prevalence of high-risk human papillomavirus, risk factors for cervical precancer and cancer among Russian HIV-infected women previously was not estimated. The impact of highly active antiretroviral therapy (HAART) on papillomavirus infection and cervical diseases associated with HPV remains uncertain. Clinical research has produced conflicting evidence with regards to both the effect of HAART on HPV infection and its impact on the development, progression, regression of the HPV-related cervical disease.

The lack of data about the features of the HPV infection and HPV-associated cervical disease, depending on the severity of the HIV infection and using HAART in

HIV-infected women of St. Petersburg determine the aim of this study.

Methods: This was a prospective cohort study of HIV-infected women receiving care at the Center for Infectious Diseases and Prophylaxis, Saint Petersburg. The patients were enrolled from 2009 to 2013. Physical and gynecologic examination, CD4 cell count, plasma HIV RNA, human pappillomavirus PCR test (subtypes 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59) from cervical canal and surface of the cervix, cervical cytology, colposcopic examinations, biopsy and histopathologic examination were obtained.

Results: A total of 395 women, aged 18–43 years, were enrolled: 305 HIV-infected women and 90 HIV-uninfected women with high-risk HPV. The prevalence of high-risk human papillomavirus among HIV-infected women was 72,5% (221/305). Frequency of each of the 12 oncogenic HPV types was determined among HIV/HPV co-infected women and among HIV-uninfected women with HPV. 16, 56, 52, 33, 31 HPV types were the most prevalent among HIV/HPV co-infected women, 16, 33, 51, 18 types were the most prevalent among HIV-uninfected women with HPV. Statistically significant differences were detected with respect to 5 types (HPV 31, 35, 52, 56, 59). Among HIV-positive women (n=305), the prevalence of high oncogenic risk HPV types was 77,1% (81/105) among those receiving HAART at enrollment as compared to 70,0% (140/200) among those not receiving HAART (p>0,05). The duration of HAART use 1 year or more was also not associated with the frequency change in detection of HPV: HR-HPV was detected in 79,2% (57/72) of case subjects with HAART use 1 year or more and in 70,4% (164/233) of case subjects with HAART use less than 1 year or without HAART (p>0,05).

Repeated testing for HR-HPV in 12–17 (median follow-up 14,9) months after detection of an initial HPV infection performed by 81 women co-infected with HIV and HPV: in 29 cases (35,8%) types of high-risk HPV were not identified, in 52 cases (64,2%) the virus was detected again. 51,9% (42/81) of those surveyed in the dynamics of women found again one or more same initially identified HPV types, sometimes in combination with new types of the virus. The frequency of re-identification of the same HPV type was different depending on the type of virus.

Most often, we noticed the re-identification of HPV types 16, 35, 45 — in more than half of all initial infections.

Abnormal results of cervical cytology were present in 21,3% (47/221) of all enrolled HIV/HPV co-infected women. Cervical biopsy was performed 52 HIV/HPV co-infected women with abnormal results of cervical cytology and/or colposcopic examinations; during the histological examination of the cervix tissues CIN I and koilocytosis were confirmed in 13 cases, CIN II and CIN III — in 30 women, invasive cervical cancer — in 2 women.

Among HIV/HPV co-infected women the incidence of CIN II, CIN III and invasive cervical cancer is inversely correlated with CD4 cell count (Rg=-0,60, p<0,001) and reaches 42,9% in patients with severe immunodeficiency. High HIV RNA level (OR=2,8), the prolongation of HIV infection (OR=2,4), the progression of HIV infection (OR=2,6) are associated with increased risk of presenting CIN II, CIN III and invasive cervical cancer in women coinfected with HIV and HPV more than two times (p<0,05).

Among HIV/HPV co-infected women (n=221) HAART use was not associated with the change in frequency of detection of CIN and invasive cervical cancer: among those who received HAART, the proportion of patients with HPV-associated cervical pathology was 18,5% (15/81), among women without treatment of HIV infection — 21,4% (30 140) (p>0,05). We evaluated the frequency of HPV-associated cervical disease, taking into account the duration of the treatment of HIV infection. In women receiving treatment less than one year, or without HAART, the frequency of HPV-associated cervical disease rate was higher than those, who recieved HAART for one year or more,— 23,8% (39/164) and 10,5% (6/57), respectively (p<0,05). In assessing the structure of cervical disease, no data was received on the effect of HAART on the detection frequency of CIN I and koilocytosis, whereas CIN II, CIN III, and invasive cervical cancer in women receiving HIV treatment for one year or more, we discovered 3 times less, than in women with a shorter duration of treatment with or without HAART.

Conclusions: The prevalence of high-risk human papillomavirus among HIV-infected women in St. Petersburg was 72,5% (95% confidence interval 67,3–77,3%), the most prevalent genotypes were 16, 31, 33, 52, 56, infection with multiple HR-HPV types was detected in 68,8% (152/221) of case subjects with HIV/HPV co-infection. In HIV-infected women with HPV in 64,2% cases the types of HR-HPV are detected again during the observation period of 12–17 (on average — 14,9) months. Low CD4+ T-cell counts, increased HIV loads, HIV disease progression, and duration of the disease more than 5 years are significant risk factors associated with the development of the CIN II, CIN III and invasive cervical cancer among Russian HIV/HPV co-infected women.

The frequency of infection by HR-HPV types in HIV-positive women does not depend on the use of HAART and the duration of treatment. Whereas the identification of CIN II, CIN III and invasive cervical cancer in HIV-infected women with HPV depends on the duration of HAART — the incidence of these diseases is 3 times lower