CLINICAL AND LABORATORY PREDICTORS OF ANTITOXIC IMMUNITY AGAINST TETANUS IN HIV-INFECTED ADULTS

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Introduction. Modern antiretroviral therapy (ART) has significantly increased survival rate among HIV-infected individuals, which concurrently raised the question of primary care surveillance of adult HIV-infected people [1, 2, 3]. The immunosuppressed status due to HIV infection is a risk factor for morbidity and mortality caused by a number of infectious diseases, including those preventable by vaccination. Tetanus is the clearest example of the constant threat to health around the world. In this disease there is no long-term protection [4, 5].

Studies of antitoxic immunity against tetanus in HIV-infected adults in the world are very limited, and in Ukraine are conducted for the first time, which determines the relevance of the chosen topic.

The aim of the study was to assess the intensity of immunity against tetanus in HIV-infected adults and to investigate its relationship with key clinical and laboratory indicators to determine the predictors of the integrated use of these factors.

Materials and methods. The study included 90 patients with HIV aged 22 to 60 years, the average age was 40.1±0.9 years, of which women were 51 (56.7%), men – 39 (43.3%) persons. The control group included 49 healthy immunocompetent volunteers of the appropriate age group and gender composition. Diagnostic test systems RIDASCREEN Tetanus IgG (R-Biopharm AG, Germany) were used to estimate the immunity strengths to tetanus by means of immunoassay (ELISA). The examination was carried out in compliance with the manufacturer's instructions. The immunity status against tetanus was estimated by determining the concentration of antibodies in IU/ml. Assessment of anti-tetanus immunity strengths was carried out as follows: up to 0.1 IU/ml — protection absent; 0.1-0.5 IU/ml — minimum level of protection; 0.6-1.0 IU/ml – moderate level of protection; 1.1 IU/ml and above — high level of protection.

Results of the research. We found that the median anti-tetanus antibody was 0.59 (0.28 - 1.09) IU/ml in HIV-positive individuals, which is 2.3 times lower than in the control group - 1.33 (1.13 - 1.45) IU/ml (p<0.001 by U-test). For in-depth analysis, all patients with HIV infection were divided into 2 groups taking into account the intensity of antitoxic anti-tetanus immunity. Thus, the median of tetanus IgG in the group with no and minimal levels of protection (group I) was 0.28 (0.10-0.39) IU/ml, which is 5.3 times less than in the group with medium and high levels of tetanus IgG (group II) - 1.48 (1.00-2.50) IU/ml (p<0.001 by U-test).

In more in-depth analysis of immunological and clinical and laboratory parameters that can affect the intensity of antitoxic immunity, the following data were obtained. The high risk of low levels of tetanus antibodies is significantly (from p<0.05 to p<0.001) associated with female sex (OR=2.69), the presence of anemia (OR=4.67), thrombocytopenia (OR=25.38), 2 or more opportunistic diseases.
including shingles (OR=4.88), hairy leukoplakia of the tongue (OR=7.72), frequent recurrences of VZV infection (OR=104.0) and simple herpes infection (OR=59.2), body weight deficit (OR=30.38), smoking (OR=7.13), low level of post-exposure prophylaxis of tetanus with TT (tetanus toxoid) due to trauma to violation of the integrity of the skin (OR=58.1) and living in urban areas (OR=4.05).

The greatest protective opportunities to increase the level of tetanus immunity in HIV-infected adults, respectively, are associated with the parenteral route of HIV infection ($r_s=0.20$; $p=0.06$) and obtaining IDU (injecting drug users) replacement therapy (using methadone or buprenorphine) ($r_s=0.34$; $p=0.081$), the presence of no more than one opportunistic disease ($r_s=0.31$; $p=0.003$), the absence of diseases of hairy leukoplakia of the tongue ($r_s=0.46$; $p<0.001$) and shingles ($r_s=0.38$; $p<0.001$), rare cases of recurrence of herpes labialis ($r_s=0.71$; $p<0.001$) and shingles ($r_s=0.81$; $p<0.001$), high coverage of post-exposure prophylaxis of tetanus with TT (tetanus toxoid) ($r_s=0.60$; $p<0.001$), living in rural areas ($r_s=0.33$; $p<0.001$), as well as smoking cessation ($r_s=0.44$; $p<0.001$), normal laboratory blood counts (hemoglobin level - $r_s=0.41$; $p<0.001$, platelets - $r_s=0.70$; $p<0.001$) and body weight ($r_s=0.64$; $p<0.001$).

It was found that the clinical stage of HIV infection ($r_s=-0.03$; $p=0.805$), the level of CD4+ T-lymphocytes ($r_s=-0.08$; $p=0.458$), B-lymphocytes ($r_s=-0.09$; $p=0.392$), viral load ($r_s=-0.07$; $p=0.489$), receiving ART ($r_s=+0.10$; $p=0.336$) and adherence to ART ($r_s=+0.03$; $p=0.779$) had no significant relationship with the intensity of antitetanus immunity.

**Conclusions.** The seroprevalence level of HIV-infected persons against tetanus is significantly lower than that of immunocompetent ones — a significant number of HIV-positive adults do not have sufficient antibody titers. A comprehensive assessment of these factors will allow, without conducting special studies, to identify risk groups that require vaccination against tetanus.

**References:**


