THE STATE OF THE IMMUNE SYSTEM AND LABORATORY DIAGNOSIS OF TOXOPLASMOSIS

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Abstract. Toxoplasmosis is a parasitic disease characterized by a predominantly latent or chronic course, which affects the nervous system, reticuloendothelial organs, muscles, myocardium and eyes. About 30% of the world's population is infected with toxoplasmosis.

This infestation is usually asymptomatic, but congenital toxoplasmosis can lead to abortion, stillbirth or severe neurological damage. Even in cases where the child has no obvious clinical signs at birth, chorioretinitis and visual impairment may develop a few years later. Asymptomatic forms of toxoplasmosis and pneumocystosis can eventually develop into a severely fatal disease if the patient becomes immunosuppressed. Cellular and humoral immunity provides reliable and lifelong protection against reinfection and activation of bradyzoites in the cyst. Immunogenesis, in particular the continuous production of antibodies, is induced by contact of the immune system cells with the cystic antigens of the parasite; this immunity is called non-sterile immunity. The prolonged production of antibodies, the variability of their quantitative values in different classes of immunoglobulins are also explained by the presence of long functioning memory lymphocytes, the phenomena of non-specific stimulation of immunocompetent cells, conjugate specificity and idiotypantidiotypic interactions. The state of the cellular immune system is considered only in manifest forms of the disease.

The laboratory diagnosis of toxoplasmosis is mainly based on serological methods - determination of antibody titre against toxoplasmosis by CFR (complement fixation reaction), IIFR (indirect immunofluorescence reaction), ELISA (enzyme immunoassay).

It is known that serological values in diseases caused by opportunistic pathogens, including toxoplasma, are interpreted as indicative; the so-called diagnostic titres have no strict limits.

IIFR becomes positive from the first week of illness and may persist for up to 15 years or more in low to medium titres. RBC becomes positive from 2-3 weeks of illness, but may become negative or persist in low titers after 1-3 years. Interpretation of ELISA results is more objective, as it is guided by the WHO International Standard. A positive reaction can be indicated by values expressed in optical density units (OD) > 1.5; immunoassay units (EIU) >60, international units (ME) >125 and antibody titres (TA) > 1:1600. Serological follow-up tests include 2 tests at 2-week intervals; 4-fold elevated

titres or positive antibodies of the IgM and IgA classes indicate a fresh infection. IgM antibodies persist until 6 months after the onset of the disease; IgG antibodies appear from 6-8 weeks and are often indicative of non-sterile immunity or a chronic variant of toxoplasmosis. Rare cases of process activation (more often chorioretinitis) are accompanied by an increase in IgG antibodies. Of particular importance in tests for toxoplasmosis is the RZO membrane protein, the main antigen of the parasite. The antibodies that are formed against this protein are highly specific. Recently, polymerase chain reaction (PCR) has been used in the diagnosis of toxoplasmosis. When assessing serological tests, consideration should be given to: - clinical data and other laboratory findings; - the fact that continuous antibody production in healthy children and adults indicates normal non-sterile immunity; - possible discrepancies between antibody titres and clinical variants of the disease (very high titres in healthy children, no antibodies in newborns, premature infants, children in the first months of life). Every woman preparing to conceive should have her serological status determined in order to identify those who are infected and to provide them with the necessary information on the results of the tests during pregnancy. In the absence of a routine screening programme in which reactions for toxoplasmosis are repeatedly performed during pregnancy, IgM-NRFA, DS-IgM-ELISA or IgM-ISA tests should be performed if other serological tests have been positive during any period of pregnancy. If no IgM- IIFR, DS-IgM-ELISA or IgMISA test is available, serological testing should be repeated after 3 weeks to determine titer stability or upward trend. If the IgM- IIFR, DS-IgM-ELISA or IgM-ISA tests are negative and the NRFA or dye test is stable and less than 1:1000 (300 ME) and stable (not including titres in the IgM- IIFR test), the infusion should be considered acquired at least within the last 4 weeks and probably more than 8 weeks before the serum samples were taken.

From a practical point of view, the risk to the foetus is very low if the titer of the dye test or IIFR is greater than or equal to 1:1000 and stable in the first 2 months of pregnancy. While titers in the dye test or IIFR peak and stabilize by week 8 after infection, titers in CRC or IIFR continue to increase for 4-6 months or longer. Therefore, elevated titres in the latter two tests may not be as informative in establishing the timing of infection in relation to gestational age and should not be used as the sole criterion for this purpose. A problem often arises when a woman without clinical signs of infection is tested for antibodies against toxoplasmas in the late first or second trimester of pregnancy and shows IIFR or dye test titres within 1:2000, but IgM- IIFR, DS-IgM-ELISA or IgM-ISA titres are negative. In this situation, it cannot be determined whether the infection occurred before or after conception. The detection of toxoplasma antigen in the amniotic fluid may be a useful additional method to decide whether a woman who has contracted toxoplasmosis in an ongoing pregnancy has become infected in the foetus. However, this method is currently experimental.

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