inSight

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Viral Anterior Uveitis: Laboratory Diagnostic Testing & Management

Anterior uveitis (AU), which refers to inflammation within the anterior segment of the eye, is the most common form of uveitis. The etiology of anterior uveitis is usually infectious or autoimmune. Infectious anterior uveitis may be caused by viral pathogens such as herpes simplex virus (HSV) type 1, varicella zoster virus (VZV) and cytomegalovirus (CMV), or associated with systemic autoimmune conditions, such as sarcoidosis. Distinguishing infectious from autoimmune anterior uveitis is often difficult. The diagnosis of HSV/VZV/CMV anterior uveitis is usually based on clinical findings, including the nature of the keratic precipitates (e.g. large, mutton-fat KPs with HSV), iris changes (e.g. iris sectoral atrophy with VZV), ocular hypertension (e.g. CMV) or corroborative corneal and cutaneous manifestations (e.g. HSV keratitis or shingles).

Anterior chamber paracentesis is a safe procedure to obtain aqueous humor that may aid in the diagnosis of viral anterior uveitis. Both quantitative and qualitative viral nucleic acid tests use molecular techniques to detect viral DNA or RNA in the patient's sample. Polymerase chain reaction (PCR) is the most common test used. Qualitative PCR uses probes complementary to an internal nucleic acid sequence to target primers. The results are expressed as negative or positive for viral DNA or RNA, depending on the primers used. Quantitative PCR, also called real-time PCR, measures the amount of amplified product. It is used to determine not only whether a nucleic acid sequence is present in a sample, but also the number of copies of the virus. Quantitative PCR is most useful in establishing the viral etiology of an infection. For fastidious infectious agents that are difficult to grow in the laboratory, PCR is more effective and less time-consuming than conventional microbiology.

Theoretically, any hospital lab equipped with PCR capability should be able to do viral PCR testing of aqueous fluid. But due to the small volume of the sample, most local hospital and commercial labs will not do the testing. There are only a few certified CLIA (Clinical Laboratory Improvement Amendments) laboratories in the U.S. that do PCR testing of ocular specimens. We have established an "in-house" ocular PCR lab at the University of Louisville to assist us in diagnosis and management of our patients, but since it is not certified, we can't charge for the service or process outside specimens.

We usually take 50 µl of aqueous fluid for PCR testing, although testing can be done on a smaller volume. An anterior chamber tap is performed in the clinic examination room. The results are available within 36 hours after receiving the sample. Another useful diagnostic laboratory test is analysis of intraocular production of immunoglobulin, also known as the Goldmann-Witmer quotient or antibody coefficient test. It requires obtaining both intraocular and serum samples, and comparison of immunoglobulin levels to a putative pathogen in both samples. It has proven useful in confirming intraocular infection from herpesviruses, as well as toxoplasmosis. The combination of antigen detection by PCR with detection of a rise in Goldmann-Witmer coefficient results in a higher sensitivity for diagnostic testing.

Our first-line therapy for anterior uveitis secondary to herpesvirus infection is topical corticosteroids combined with systemic antivirals. Treatment is maintained for 4–6 weeks. Maintenance systemic anti-viral therapy would be continued for patients with recurrent disease. The typical corticosteroid regimen for viral anterior uveitis is prednisolone acetate, with initial frequency determined by the severity of inflammation, but with tapering on clinical response. Topical cyclopentolate is started and continued until 1+ to 2+ cell in the anterior chamber is achieved at which time it would be discontinued. Systemic antivirals, such as valacyclovir or valganciclovir, are started with the topical medication. If recurrent inflammation is observed the initial topical regimen would be started again and the patient placed on maintenance systemic antiviral therapy. Topical antivirals alone are useful for the treatment of pseudodendritic keratitis, but they do not show benefit in viral anterior uveitis.

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