A Mysterious Case of Pediatric Uveitis

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Abstract:
This case report involves a 10-year-old female who presented with acute onset of high fever, sore throat, rash, and new-onset blurry vision, later diagnosed as post-infectious uveitis, following an upper respiratory infection. Initial evaluation raised concern for Kawasaki disease, but it was ultimately ruled out. Further laboratory and imaging did not reveal signs of vasculitis, autoimmune disease, or systemic infection. Ophthalmologic examination revealed anterior chamber inflammation, vitritis, snowballing, and peripheral retinal phlebitis, confirming significant ocular inflammation. Despite using corticosteroid eye drops, the patient initially demonstrated persistent uveitis, requiring escalation to oral methotrexate. Over the following months, the uveitis gradually improved and then resolved completely, and the methotrexate and steroids were appropriately tapered off throughout that time. Long-term follow-up over several years has shown stable vision.

The case

A 10-year-old female with no past medical history presents to urgent care with a fever to 105°F, headache, and worsening sore throat for 3 days. Physical exam was notable for pharyngeal erythema without tonsillar exudates and a blotchy rash on her right forearm, without conjunctivitis or other remarkable ocular findings. With this presentation, the patient was transported to the emergency department (ED), where lab work was notable for mild hyponatremia and moderate transaminitis. In the ED, she was also noted to have 2+ erythema in both eyes and blurry vision. At this point, the patient's differential diagnosis remained wide, but given her constellation of findings, she was admitted for concern for Kawasaki's disease and erythema nodosum. This prompted further workup, so she was admitted to the hospital.

While admitted, the patient failed to meet clinical and laboratory diagnostic criteria for Kawasaki's disease, given her lack of oral changes, hyperemia of extremities, or lymphadenopathy. A CT angio of her head and neck was obtained, without evidence of large vessel vasculitis. She was started on amoxicillin-clavulanate, cephalexin, and Tylenol. Prednisone eye drops resulted in minimal improvement of the conjunctivitis. After one week in the hospital, the patient's fever and conjunctivitis began to improve, and her sodium levels and liver enzymes normalized. She was ultimately discharged with instructions to follow-up with an ophthalmologist. At this stage, the most likely diagnosis was post-infectious uveitis, and the differential included sarcoidosis, pars planitis, and tubulointerstitial nephritis and uveitis. However, the patient had a normal chest x-ray, kidney function was intact, and inflammatory and vasculitis labs were normal. Thus, it was concluded that the patient had experienced uveitis secondary to her upper respiratory infection just prior to her ED presentation.

The patient was followed up at the outpatient ophthalmology clinic immediately after discharge. On exam, the patient had visual acuity 20/50 OU which is worse than her baseline of 20/20 OU, intraocular pressures were normal, no visual field deficits, pupils equal, round, reactive to light without relative afferent pupil defect. On the slit lamp exam, there was evidence of cell and flare in the anterior chamber, vitritis, and snowballs in the peripheral retina, and Fluorescein Angiography (FA) confirmed phlebitis in the peripheral retina. Review of systems was positive for occasional abdominal pain, headache, and skin rash. At this time, the patient received continued recommendations for taking prednisolone eye drops every 2 hours in both eyes. However, on follow-up 4 and 6 weeks after discharge, the patient's exam did not show improvement in anterior or posterior inflammation, prompting the addition of oral methotrexate as a second-line medication. Two weeks after starting methotrexate, the patient presented for follow-up, and her eye exam was normal for the first time, so methotrexate was held. Over the next 6 months, her eye exam continued to be quiet, so prednisolone continued to be tapered at appropriate intervals until she was off prednisolone after 6 months of a quiet eye exam. Fortunately, she did not have any flare-ups during this time, and her vision and eye exam remained unremarkable. Years after hospitalization, the patient continues to undergo follow-up examinations every six months. These examinations indicate vision in both eyes as stable and clear without any irritants or pain.

Uveitis: Reviewed

Retinal vasculitis and uveitis are inflammatory conditions of the eye; both are distinct, yet they can be interconnected and share similar features[1,2,8]. Retinal vasculitis involves inflammation of the retinal blood vessels[8,9]. Symptoms include floaters and blurred vision, which may lead to significant retinal damage if left untreated[4,8]. In many cases, retinal vasculitis can occur as a complication of uveitis, a condition referring to the inflammation of the uvea, the middle layer of the eye[2,3,7,8]. The uvea includes the iris, ciliary body, and choroid[2]. Uveitis commonly presents with symptoms such as eye pain, redness, and light sensitivity[2,6]. These two conditions are typically separate; however, they may coexist, particularly in cases of posterior uveitis, where inflammation can extend to the retina, causing retinal vasculitis[3,8]. Both conditions may be triggered by a variety of factors, such as autoimmune disease or infections[3,4,10]. The differential diagnosis of uveitis typically includes conjunctivitis, keratitis, and glaucoma[2,6]. Similarly, the differential diagnosis for retinal vasculitis includes coagulopathies like antiphospholipid syndrome, thrombotic thrombocytopenic purpura, and several drug toxicities[8,9]. Comprehensive eye examinations and imaging techniques such as fluorescein angiography are essential for diagnosing and assessing the degree of retinal involvement[8,11]. Early recognition is critical to preventing future complications such as permanent vision loss, glaucoma, cataracts, macular edema, and epiretinal membrane[3].

Post-infectious Uveitis

Post-infectious uveitis occurs after an infection, when inflammation of the eye continues after the infection has subsided[3,5]. There are four possible biological mechanisms that may cause post-infectious activation in the eye: molecular mimicry, persistent antigens, epitope spreading, and bystander activation[3,12]. Molecular mimicry occurs when a microbial antigen shares a structural similarity with the ocular proteins[3,12]. The immune system generates T cells to fight the infection; however, due to that similarity, the T-cells attack healthy proteins such as S-antigen or interphotoreceptor retinoid-binding protein (IRBP)[3]. Another such cause is antigen persistence, when leftover fragments of the pathogen stimulate the immune cells[3]. Epitope spreading occurs when inflammation exposes new self-antigens that the immune system has not normally encountered[3]. The immune system starts to attack these self-antigens and broadens the immune response[3]. Bystander activation occurs when inflammatory molecules such as IL-6 or IFN-γ activate nearby immune cells, amplifying the inflammation[12].

A variety of infections can trigger post-infectious uveitis[3,4]. Bacterial infections such as Streptococcus Pyogenes can cause post-streptococcal anterior uveitis[4]. Other bacteria, such as tuberculosis and syphilis, are also known to cause uveitis[3,4]. Viruses, including herpes simplex, varicella-zoster, cytomegalovirus, and West Nile virus, have been known to cause post-infectious uveitis[3,12]. The onset of post-infectious uveitis can range from days to months after the initial infection passes[3].

Post-infectious uveitis typically presents with similar symptoms as any other form of uveitis, with symptoms such as eye pain, redness, blurred or decreased vision, floaters, and photophobia[5,6]. Symptoms may come on suddenly or worsen quickly[5]. Severe cases lead to retinal damage and potential vision loss[3,12].

Diagnosis relies on recent infection history, ocular examination, and laboratory testing to exclude any active infection[3,5]. Imaging techniques such as optical coherence tomography (OCT) or fluorescein angiography can be used to detect any structural changes inside the eye[5,12]. Treatment is directed to controlling the inflammation, which may vary depending on the location within the eye[3,5]. Corticosteroid eye drops are prescribed in addition to corticosteroid injections or tablets if necessary[5]. Patients who do not respond to the steroids may require further systemic medications, including methotrexate or azathioprine[12]. If left untreated, post-infectious uveitis may cause cataracts, glaucoma, macular edema, or permanent vision loss[5,12].

Conclusion

Ten years post-hospitalization, the patient's uveitis continues to be effectively managed, with her vision remaining stable and without evidence for any episodes of uveitis. The patient's health

journey inspired them to pursue a career in ophthalmology, with the goal of helping others who may face similar health challenges.

Works Cited

1. American Academy of Ophthalmology. (n.d.). *Retinal vasculitis*. EyeWiki. https://eyewiki.aao.org/Retinal_Vasculitis
2. American Academy of Ophthalmology. (n.d.). *Uveitis*. EyeWiki. https://eyewiki.org/Acute_Anterior_Uveitis
3. Asghar, M. A., Tang, S., Wong, L. P., Zhao, Q., & Yang, P. (2024). *Infectious uveitis: A comprehensive systematic review of emerging trends and molecular pathogenesis using network analysis*. *Journal of Ophthalmic Inflammation and Infection, 14*, 60. https://pubmed.ncbi.nlm.nih.gov/39565496/
4. Filloy, A., Comas, C., & Català-Mora, J. (2016). *Anterior and intermediate uveitis with retinal vasculitis: An unusual manifestation of post-streptococcal uveitis syndrome*. *Ocular Immunology and Inflammation, 24*(6), 607–609. https://pubmed.ncbi.nlm.nih.gov/26713592/
5. Mayo Clinic. (n.d.). *Uveitis: Diagnosis and treatment*. https://www.mayoclinic.org/diseases-conditions/uveitis/diagnosis-treatment/drc-20378739
6. Mayo Clinic. (n.d.). *Uveitis: Symptoms and causes*. https://www.mayoclinic.org/diseases-conditions/uveitis/symptoms-causes/syc-20378734
7. National Eye Institute. (n.d.). *Uveitis*. National Institutes of Health. https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/uveitis
8. O'Keefe, G. A. D. (2021). *Retinal vasculitis: A framework and proposal for a classification system*. *Journal Name*. https://pubmed.ncbi.nlm.nih.gov/32450158/

9. Sève, P., Cacoub, P., Bodaghi, B., et al. (2022). *Retinal vasculitis: A comprehensive review*. *Journal of Clinical Medicine, 11*(9), 9101900. https://pmc.ncbi.nlm.nih.gov/articles/PMC9101900/
10. StatPearls Publishing. (2024). *Retinal vasculitis*. In *StatPearls*. https://www.ncbi.nlm.nih.gov/books/NBK540993/
11. Song, W., Au, A., Sarraf, D., Prasad, P., & Tsui, E. (2025). *Bilateral acute multifocal retinitis and retinal vasculitis secondary to Rickettsia typhi infection*. *Journal of Ophthalmic Inflammation and Infection, 15*, 38. https://pubmed.ncbi.nlm.nih.gov/40259155/
12. Testi, I., Fabozzi, L., & De Benito-Llopis, L. (2023). *Cytomegalovirus anterior uveitis and occlusive retinal vasculitis without retinitis in a patient on immunomodulatory therapy*. *Journal of Ophthalmic Inflammation and Infection, 13*, 34. https://pmc.ncbi.nlm.nih.gov/articles/PMC10403449/