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May // 2020 // njretina.com

Physicians

Nneka O. Brooks, MD
Nicholas D. Chinskey, MD
Leonard Feiner, MD, PhD
Howard F. Fine, MD, MHSc
Eric S. Friedman, MD
Paul Hahn, MD, PhD
Vincent Y. Ho, MD
Bruce J. Keyser, MD
David Y. Kim, MD
Jennifer M. Krawitz, MD
Marisa K. Lau, MD
Steven A. Madreperla, MD, PhD
Lekha K. Mukkamala, MD
Stuart W. Noorily, MD
Jonathan L. Prenner, MD
Daniel B. Roth, MD
Christopher M. Seery, MD
Sumit P. Shah, MD
Elizabeth Tegins, MD
Vinod B. Voleti, MD
H. Matthew Wheatley, MD

Locations

North Jersey

Belleville
973-450-5100

Elizabeth
908-409-4900

Morristown
973-630-7700

Ridgewood
201-445-6622

Teaneck
201-837-7300

Union City
201-867-2999

Vauxhall
908-349-8155

Wayne
973-633-9898

Central Jersey

Bridgewater
908-218-4303

Eatontown
732-389-2333

Edison
732-906-1887

Lakewood
732-363-2396

Lawrenceville
609-896-3655

Monroe
609-655-8301

New Brunswick
732-220-1600

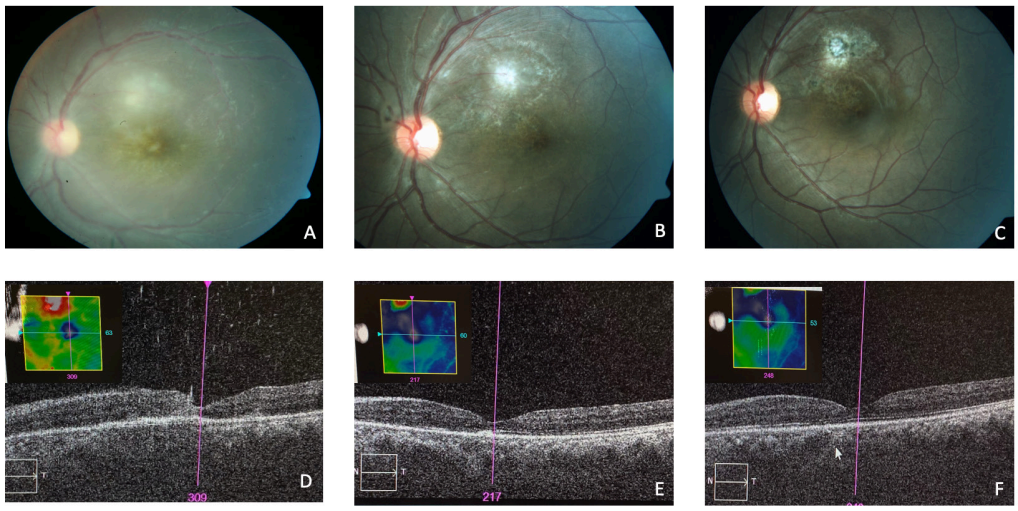
Toms River
732-797-3883

Toxoplasmosis

A healthy 11-year-old African boy presented with a two-week history of eye pain and horizontal diplopia, followed by vision loss in his left eye. He was initially seen as an inpatient where he had an MRI of the brain performed which was normal. He was started on clindamycin, ceftriaxone, and fluticasone nasal inhaler in the hospital for possible sinusitis while his blood work was pending.

On his initial presentation his vision was 20/20 OD and 20/800 OS, and an exotropia was noted. His right ocular exam was within normal limits; however, the left eye exam showed trace pigmented cells in the anterior chamber and 1-2+ cells in the anterior vitreous. The fundus exam of the left eye revealed multifocal vascular sheathing with confluent white retinal infiltrates in the superonasal macula with smaller white infiltrates in the nasal macula. (Figure 1A). OCT demonstrated deep outer retinal infiltrates (Figure 1D).

During his hospital stay, his blood work for inflammatory and infectious etiology was normal except for positive toxoplasma IgG antibodies (negative IgM antibodies). There was a high suspicion for outer retinal toxoplasma retinitis therefore on discharge he was started on daraprim, leucovorin, sulfadiazine, augmentin, and oral prednisone. During his first month on steroids and antibiotic treatment, his vision gradually improved in his left eye to 20/40, there was less inflammation, and his retinal lesions began consolidating (Figure 1, B & E). Around 9 months after starting treatment vision in his left eye improved to 20/25 and the patient had inactive chorioretinal scars (Figure 1, C & F).



(Figure 1: A & D)
Fundus photograph and OCT demonstrating active toxoplasmosis chorioretinitis in the macula with overlying vitritis seen at presentation. (B & E) Fundus photograph and OCT demonstrating regressing toxoplasma chorioretinitis with resolution of the vitritis debris seen 1 month after starting treatment. (C & F) Fundus photograph and OCT demonstrating inactive chorioretinal scar 9 months after presentation

Toxoplasmosis is caused by Toxoplasma gondii; an obligate, intracellular protozoan parasite. Toxoplasma gondii has a predilection for the central nervous system and the retina, and in the United States it is the most common cause of posterior uveitis in an otherwise healthy individual[1]. It can be acquired in utero, or it can be transmitted through undercooked meat (most commonly lamb, pork, and goat), through contaminated produce or water, through organ transplantation, or through blood transfusions (Figure 2). In humans, tachyzoites along with bradyzoites (tissue cysts) can be found within the retina. It is the encysted form which allows toxoplasmosis to remain dormant in the host for years and upon rupturing (for unknown reasons) causes inflammation.

The most common symptoms of an active toxoplasma infection include blurry vision and floaters. Active signs may include the classic "headlight in the fog" appearance which relates to retinochoroiditis with overlying vitreous inflammation (Figure 3). The retinitis tends to be full thickness however at times it can be confined to the inner or, less frequently, outer retina in which case it may lead to a serous retinal detachment. The retinitis may occur in a previously normal appearing retina or adjacent to an old chorioretinal scar. Other notable features may include anterior uveitis, keratic precipitates, posterior synechiae, retinal vasculitis with vascular sheathing and hemorrhages, and optic nerve edema. Additional complications that may develop include cystoid macular edema, retinal and choroidal neovascularization, vitreous hemorrhage, vascular occlusions, and epiretinal membranes.

The diagnosis of toxoplasma chorioretinitis is based on clinical exam as T. gondii is rarely found in intraocular fluids and invasive retinal biopsies are associated with serious risks therefore they are not routinely performed. Serum IgG and IgM antibodies can demonstrate prior exposure; however, it is not uncommon to have low IgG and absent IgM with active retinitis as it is usually related to a recurrent disease process.

The "classic" therapy of pyrimethamine, sulfadiazine, and folinic acid, and the newer combination of trimethoprim and sulfamethoxazole can be used during an acute infection; however, these medications have side effects and are unable to destroy tissue cysts. The role of treatment with antibiotics and steroids in immunocompetent patients is still uncertain. In a 2013 report by the American Academy of Ophthalmology there was lack of level I evidence to support the efficacy of routine antibiotic or corticosteroids for acute toxoplasma chorioretinitis[4]. However, in practice most clinicians still tend to treat with antibiotics and steroids in all patients with vision threatening lesions. Steroids will decrease the inflammation and likely improve visual function however they should not be used without antitoxoplasmic drugs. In high-risk patients, trimethoprim-sulfamethoxazole may be used long-term to lower the recurrence rate; however, this benefit is lost upon cessation of the medication.

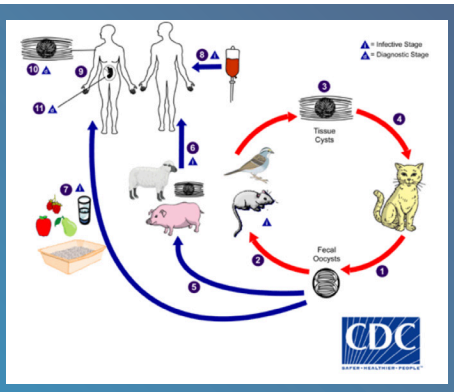


Figure 2:
The life cycle of T. gondii involves felines as the definitive hosts which release oocysts in their feces. Oocysts are ingested by small birds or rodents (red arrow) which when consumed by other felines generate new hosts. Feline fecal oocysts can also contaminate produce and water supplies, and can be ingested by other small animals including goats, lambs, pigs, etc. (blue arrow). If undercooked meat is consumed or contaminated produce or water ingested by humans they may become infected. Humans then pass it along to others in utero, through organ transplantation, or through blood transfusions[2].

Figure 3:
(Acute toxoplasmosis retinitis B) Large atrophic macular scar, 9 years after initial infection[3].

The management of posterior uveitis can be challenging given the broad number of inflammatory, infectious, and metastatic etiologies. At NJRetina, we offer a comprehensive approach beginning with thorough history, careful examination, and advance imaging techniques in order to best diagnose and treat these patients. As these patients are at risk for recurrences and significant vision loss, our empathy, experience, and thorough evaluation are crucial in providing optimal care.

References:

1. *Schachat, Andrew P. Ryan's Retina, 6th Edition. Philadelphia. Elsevier, 2017. Print*
2. *"Parasites – Toxoplasmosis (Toxoplasma infection): Biology". Centers for Disease Control and Prevention. 5 Sept 2018, https://www.cdc.gov/parasites/toxoplasmosis/biology.html*
3. *Agarwal, Anita. Gass' Atlas of Macular Diseases. Elsevier Health Sciences, 5th edition. Elsevier, 2012. Print.*
4. *Kim, Stephen J., et al. "Interventions for toxoplasma retinochoroiditis: a report by the American Academy of Ophthalmology." Ophthalmology 120.2 (2013): 371-378*

COVID-19 Protocol in NJRetina Offices

It is hard to believe how life has changed for us both personally and professionally over the past few weeks. The COVID-19 pandemic has been a challenging time for all of us in the eyecare community, in the broader healthcare community and throughout our country.

NJRetina has taken several steps to implement safety measures to keep the patients you have entrusted to our care, and our staff, safe. We have resumed seeing all patients in our offices and continue to follow recommended guidance from public health authorities, including best practices for hygiene, infection control and medical professional team health.

Adopted protocols include thorough surface cleaning, sanitizing exam rooms between each patient, instrument disinfection, rearrangement of waiting areas according to social distancing standards, and plexiglass barriers that allow for protected communication. Prior to arrival, our staff will go through an infection risk assessment questionnaire (based on CDC guidelines) with patients and measure their temperature as they enter the office. If a patient does not have a mask or acceptable face covering, we will provide them with one. Additionally, NJRetina staff and doctors will have their own masks and their own temperatures monitored throughout the day.

We have established a modified patient flow pattern to ensure safety during patient visits. We ask that patients 'check in' for their appointment from the parking lot and wait until our staff notifies them that it is safe to enter the office. Patients are asked to come into the office alone or with only one person if they require mobility or communication assistance. Patients are escorted (from a six foot distance) throughout their visit to ensure they avoid contact with others.

To learn more about our safety measures, visit **njretina.com** and view our patient safety video.

At the **Forefront** of **Clinical Research**

NJRetina currently conducts clinical trials at key locations. Our clinical research coordinators, who conduct the trials, will be happy to discuss the inclusion/exclusion criteria or any other aspect of these studies with you or your patients. If you have any questions, please feel free to contact:

Véronique Ruppe, PhD, Clinical Trials Manager - 908-258-8323

Olga Faldamis, Joe Martinez & Jonathan Rodriguez - Teaneck: 201-837-7300; 4

Dina Christodoro - Toms River: 732-797-3984

Amy Leviton - Edison: 732-906-1887

NOTE: ENROLLMENT IS ON HOLD FOR ALL STUDIES UNTIL FURTHER NOTICE.

Enrolling Studies:

Dry AMD

Teaneck & Edison

A Genetic Screening and Registry Study to Evaluate Long-term Clinical Outcomes and Disease Progression in Subjects with Non-Central Geographic Atrophy (GA) Who Are Carriers of High-Risk Genetic Complement Variants Associated with Dry Age-related Macular Degeneration (AMD)
A Prospective Natural History Study to Evaluate Clinical Characteristics and Disease Progression in Subjects with Non-Central Geographic Atrophy (GA) Who Are Carriers of High-Risk Genetic Variants of Complement Factor H (CFH)•

Teaneck

Phase II, Randomized, Double-Masked, Placebo-Controlled Clinical Study to Evaluate the Safety, Efficacy, and Pharmacokinetics of Subcutaneous Investigational Medicinal Product Solution with Age-Related Macular Degeneration with Geographic Atrophy

Teaneck & Toms River

A Phase II, Multi-Center, Randomized, Single-Masked, Sham Injection Controlled Study of the Safety, Tolerability, and Evidence of Activity of Intravitreal Injection of R7171009 in Patients with Geographic Atrophy Secondary to Age-Related Macular Degeneration

Severe NPDR

Teaneck

A Randomized, double-masked, placebo-controlled exploratory study to evaluate safety, tolerability, pharmacodynamics and pharmacokinetics of orally administered BI 1467335 for 12 weeks with a 12 week follow up period in patients with Nonproliferative diabetic retinopathy without center-involved diabetic macular edema

Wet AMD

Teaneck

A Phase III, Multicenter, Randomized, Double-Masked, Active Com- parator Controlled Study to Evaluate the Efficacy and Safety of Farici-mab (a humanized bispecific IgG1 monoclonal antibody that selectively binds to VEGF-A and Ang-2) in Patients with Neovascular Age-Related Macular Degeneration

Teaneck

Conbercept A Phase III, Multicenter, Double Masked, Randomized, Dose- Ranging Trial to Evaluate the Efficacy and Safety of Conbercept (biologic, VEGF-antagonist) Intravitreal Injection in Subjects with Neovascular Age-Related Macular Degeneration

Edison

A Randomized, Single-Masked, Active-Controlled Phase 2 Study of the Safety, Tolerability, and Efficacy of Repeated Doses of Hight-Dose Aflibercept in Patients with Neovascular Age-Related Macular Degeneration

Teaneck

A Phase II, Prospective, Randomized, Double-Masked, Active-Comparator Controlled, Multi-Center Study to Investigate the Efficacy and Safety of Repeated Intravitreal Administration of KSI-301 in Subjects with Wet AMD

Diabetes

Teaneck

Sequoia prospective retinal image collection study, to support training of Sequoia software for the detection of Diabetic Retinopathy (DR) and Diabetic Macular Edema (DME))

Soon to Enroll Studies:

- A Phase III, Multicenter, Randomized, Visual Assessor Masked, Active Comparator Study of the Efficacy, Safety, and Pharmacokinetics of the Port Delivery System with Ranibizumab in Patients with Diabetic Macular Edema (PAGODA)
- Feasibility of Adaptive Optics Imaging for Assessment of Progression of Atrophy Secondary to Dry Age-Related Macular Degeneration (Astellas)
- A Study of Disease Progression in Genetically Defined Patients with Geographic Atrophy Secondary to Age-Related Macular Degeneration
- A 64-week, Phase 3b, Multicenter Study Assessing the Efficacy and Safety of Brolucizumab 6mg Compared to Aflibercept 2mg in a Treat to Control Regimen in Patients with Neovascular Age-Related Macular Degeneration
- A 12-Month, 2-Arm, Randomized, Double-Masked, Multicenter Phase IIIa Study Assessing the Efficacy and Safety of Monthly Brolucizumab versus Monthly Aflibercept in Adult Patients with Visual Impairment due to Diabetic Macular Edema
- Efficacy and Safety of Brimonidine Drug Delivery System (Brimo DDS®) in Patients with Geographic Atrophy Secondary to Age-Related Macular Degeneration: A Phase 3, Randomized, Double-masked, Sham Procedure-controlled Trial