Inflammation and Injury

Ashlyn Ferguson, OD
Dr. Ferguson is a 2015 graduate of Indiana University School of Optometry. She completed a Primary Care Residency at the Indianapolis Eye Care Center in 2016 and currently practices as a medical optometrist at Price Vision Group in Indianapolis, Indiana.

Kimberly Warner, OD
Dr. Warner is a 2015 graduate of Indiana University School of Optometry. She completed a residency in Pediatric/Binocular Vision at IUSO in 2016 and currently practices at the Eye Care Group in Madison, IN.

Edited by Anna Bedwell, OD, and Katie Connolly, OD.
All photos are property of Indiana University School of Optometry.
© Copyright 2014 by the School of Optometry, Indiana University. All rights reserved.
Cases presented in this issue are from Cases from the Advanced Ocular Care Service.
Chronic Intermediate Granulomatous Uveitis

Ashlyn Ferguson, OD  
Primary Care Resident  
Indianapolis Eye Care Center  
IU School of Optometry

Case

A 50 year old Caucasian female presents to the clinic for a granulomatous uveitis follow up noticing a slight haziness OD. She had a previous episode of bilateral, granulomatous uveitis with posterior synechiae OU 13 months prior (Image 1). The patient had cataract surgery with intraoperative Kenalog injections 9 months prior due to incomplete resolution of this episode of uveitis (Image 2). The patient’s medical history included HTN, muscle and back pain, numbness and tingling of the extremities, and a granuloma of the left lower lung found on X-ray during work up for systemic etiology of uveitis after first episode. The patient was taking hydrochlorothiazide, lisinopril, topiragen, aspirin, furosemide, potassium chloride, hydrocodone, baclofen, pramipexole, and Lyrica.

BCVA was 20/20 OD and OS. Intraocular pressure was 38 mmHg OD and 24 mmHg OS with Goldmann tonometry. Anterior segment evaluation revealed mutton fat keratic precipitates, 3+ cell and 1+ flare in anterior chamber OD, 2+ cells without flare OS, 3+ vitreous cells OD, and 1-2+ vitreous cells OS. Anterior segment photos were obtained (Image 3). The patient was diagnosed with recurrent, intermediate, bilateral, granulomatous uveitis. She was started on Durezol ophthalmic emulsion q2h OU along with Alphagan P BID OU due to a previous history of being a steroid responder. The patient was eventually switched to Pred Forte ophthalmic solution and slowly tapered off steroid drops over a four month period.
Chronic Intermediate Granulomatous Uveitis

The patient was referred for extensive lab testing and imaging in effort to elucidate a possible underlying etiology of the uveitis (Table 1). The work up for uveitis in this patient was fruitless for a definitive diagnosis and cause of the patient’s granulomatous uveitis. The positive findings included an elevated ESR, monoclonal paraproteinemia, a granuloma of left lower lung, and an abnormal MRI. However, each of the positive findings were discounted as being the root cause of the patient’s uveitis.

Approximately 2 months after complete resolution of her second episode of granulomatous uveitis, the patient presented to the clinic with blurred vision OU, a dull pain around her eyes, and light sensitivity. She also exhibited a moderate anterior chamber reaction and vitritis. Since the patient presented with a relapse of the condition less than 3 months after discontinuing treatment she was subsequently diagnosed with chronic bilateral, intermediate, granulomatous uveitis (Image 4). Additional lab testing is currently underway. Further testing and coordination of care with specialists will be necessary to reach a definitive diagnosis of the systemic condition causing the patient to have recurrent episodes of granulomatous uveitis. Until the underlying etiology is revealed and treated, the patient will most certainly continue to experience bouts of granulomatous uveitis.

Image 3. Mutton fat KPs can be seen in this image on the inferior cornea. The image was captured when the patient presented with the second episode of granulomatous uveitis.

Image 4. Mutton fat KPs can be seen across the inferior cornea in this image. This image was taken when the patient was diagnosed with chronic bilateral granulomatous uveitis.
Chronic Intermediate Granulomatous Uveitis

Table 1. Systemic work up to determine possible underlying cause of uveitis.

<table>
<thead>
<tr>
<th>ETIOLOGY</th>
<th>LAB TEST/IMAGING</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBC</td>
<td></td>
<td>Normal</td>
</tr>
<tr>
<td>ESR</td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Lyme disease</td>
<td>Lyme disease antibody</td>
<td>Negative</td>
</tr>
<tr>
<td>Syphilis</td>
<td>RPR</td>
<td>Non-reactive</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>PPD</td>
<td>Negative</td>
</tr>
<tr>
<td>HLA-B27-associated (ankylosing spondylitis, inflammatory bowel disease, reactive arthritis, psoriatic arthritis)</td>
<td>HLA-B27 antigen</td>
<td>Negative</td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
<td>Rheumatoid factor</td>
<td>Normal range</td>
</tr>
<tr>
<td>Systemic lupus erythematosus</td>
<td>ANA panel</td>
<td>Negative</td>
</tr>
<tr>
<td>Wegener's granulomatosis</td>
<td>ANCA vasculitides</td>
<td>Negative</td>
</tr>
<tr>
<td>Sarcoidosis</td>
<td>Serum ACE</td>
<td>Normal range</td>
</tr>
<tr>
<td>Chest X-ray</td>
<td></td>
<td>Granuloma of left lower lung, no bilateral hilar lymphadenopathy</td>
</tr>
<tr>
<td>Monoclonal paraproteinemia</td>
<td>Immunofixation serum</td>
<td>Kappa monoclonal band</td>
</tr>
<tr>
<td>Immunoglobulin G</td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Multiple sclerosis</td>
<td>MRI</td>
<td>Multiple T2 lesion in the right cerebellum consistent with old areas of ischemia, mild-moderate number of T2 lesions in the periventricular white matter seen with ischemia demyelination, vasculitis, or migraines</td>
</tr>
</tbody>
</table>

Discussion

In any case of uveitis, it is important to take a detailed patient history that includes both ocular and systemic history. Other factors to consider when a patient presents with uveitis include: age, gender, race, and socio-economic status\(^1\). The primary location of the uveitis, onset – acute versus insidious, whether it is granulomatous or nongranulomatous, duration of the condition, and the course of the uveitis – acute versus chronic, also need to be recognized. Consideration of each of the previously mentioned elements helps to narrow down the differential diagnoses list\(^2\).
Chronic Intermediate Granulomatous Uveitis

Discussion Continued

All cases of granulomatous uveitis necessitate a thorough workup to determine the underlying systemic etiology. Since lab testing and imaging can be very expensive, clinicians should tailor testing to the most likely causes of the uveitis for a particular patient. Common causes of granulomatous uveitis include sarcoid, tuberculosis and syphilis. This case presents interesting findings in that the patient has a lung granuloma, but no other positive lab testing to support the most common causes of granulomatous lung disease such as sarcoidosis, Wegner’s granulomatosis or tuberculosis.\(^4,5\)

Although determining the cause of uveitis frequently requires lab testing, it is important to remember the majority of uveitis cases are idiopathic.\(^6\)

Treatment of anterior and intermediate uveitis typically begins with use of potent topical steroids, such as Durezol or 1% prednisolone acetate. Periocular or intravitreal steroids may also be necessary especially in cases of intermediate uveitis that do not resolve with topical steroids as well as posterior uveitis and panuveitis. In cases where the use of steroids is ineffective or not tolerated by the patient, immunosuppressive agents have shown to be effective. A combination of steroids and immunosuppressive drugs may also be considered.\(^2\) In cases where an underlying cause of the uveitis can be elucidated, not only does the uveitis need to be treated, but the associated systemic condition must also be treated and managed.

For any patient experiencing a uveitis, frequent follow up is required to ensure treatment is adequate enough to control inflammation. It is also necessary to monitor IOP to ensure the patient does not become a steroid responder. In the acute phase, patients should be seen anywhere from daily to weekly. Once the inflammation is under control, steroids should be tapered slowly and the patient can follow up less frequently. However, it is important to watch for rebound inflammation as the steroids are tapered.\(^4\) After complete resolution of an episode of uveitis, patients should be monitored for flare-ups at least every 6 months.

References

2. Dunn J. Uveitis. Primary Care: Clinics in Office Practice 2015; 42(3): 305-23
When a Concussion Causes More than Just a Headache

Kimberly Warner, O.D.
Pediatrics/Binocular Vision Resident
Atwater Eye Care Center
IU School of Optometry

Case

A 17 year old white female presented with the complaint of headache without relief, blurry near vision, and horizontal diplopia that worsened as the day proceeded. The patient suffered a TBI caused by a knee to the back of the head during a soccer game. Two weeks later the patient experienced a seizure, causing her to fall and hit her head on the bathroom counter. Ocular history was negative for eye related diseases or conditions, medical history was positive for concussion post TBI. The patient was taking 100 mg Topamax, and was under care for vestibular therapy and convergence training.

Unaided distance visual acuities were 20/25+ OD, 20/20 OS, 20/20 OU, and unaided near visual acuities were 20/30 OD, 20/25 OS, 20/30 OU. Pupils were equal, round, and reactive to light. Extraocular muscle movements were full, with (+) pain, (-) diplopia. Cover test revealed orthophoria at distance and near with no vertical movement. Maddox rod at near revealed 1 PD right hyperphoria. Accommodative testing revealed reduced and unequal values: MEM at +0.75 D OD, +1.25 D OS, near point of accommodation was found to be 20 cm OD, 13 cm OS, and 23 cm OU, and accommodative facility testing found 4.5 cpm OD, 7 cpm OS. Stereopsis was found to be 100 seconds of arc. Near point of convergence was found to have a 26 cm break. Step vergence ranges were performed and found to have the following values:

Distance: BI- X/16/15, BO- X/20/14
Near: BI- X/30/25, BO- X/20/14

Pursuits were jerky with undershoots, and saccades were slow, but WNL. The patient presented with the following physical presentation:

(+ ) head tilt to the right, which was not present prior to the injury
The patient was diagnosed with vertical heterophoria, accommodative paresis, and post-concussive syndrome. The patient was treated with 1 PD BU Fresnel prism OS and accommodative vision therapy. With the addition of the Fresnel prism, the patient reported a drastic difference in comfort and vision, and was able to sit upright and was free of diplopia.

The accommodative therapy plan was divided into three phases:

**Phase I**
- **In Office**
  - Accommodative push ups
  - Distance/Near Hart Chart
  - Hopping cards with +/- flipper bars
  - Lens sorting
- **At Home**
  - Accommodative push ups
  - Hopping cards with +/- flipper bars

**Phase II**
- Lens Rock- incorporate speed
- Bi-Ocular Accommodative therapy with +/- lenses and prism
- Brock String
- Barrel Cards
- Life Saver Cards

**Phase III**
- Binocular Accommodative therapy
  (ex: D/N Hart Chart, Lens Rock)- incorporate speed
- Tranaglyphs (variable and non-variable)
- Aperture Rule
- Vectograms

About halfway through the therapy program the patient reported that between the addition of the prism and accommodative therapy activities, she had noticed a tremendous difference in her symptoms. She was able to complete an extensive summer reading project that she has previously given up on completely.
Discussion

In a patient who suffers a TBI that results in a concussion, it is important to not only do an examination on the health of the eyes, but also perform a comprehensive exam on the binocular and accommodative systems. A vertical misalignment can often be found in patients who suffer from a concussion, with several of these patients being symptomatic. In a retrospective study by Doble, et al, 77 of 83 total patients (92.77%) had a vertical heterophoria after suffering from a TBI. By correcting this vertical misalignment, a drastic change can be noticed in patient symptoms making them more comfortable to complete everyday tasks—such as reading—without experiencing diplopia. Research has shown with the addition of prism to those who suffer from a vertical heterophoria, the burden of symptoms can be reduced by 71.8%.

It is imperative to also closely examine the accommodative system, as this system can be greatly affected in a post-concussive patient. In a prospective, cross-sectional study by Masters, et al, accommodative disorders were found to be the most common vision problem (51%) in children 11-17 years old who suffered from a concussion. This same study suggested that children of this age cohort could be more susceptible to the deficits due to their full-time academic work at school. By enrolling patients in a vigorous therapy program, the accommodative system can be quickly built up to be within the normal range, allowing the patient to become free of symptoms—such as blur, eye strain, and headaches.

In conclusion, it is imperative that practitioners check for vertical misalignment and fully assess the accommodative and vergence systems in post-concussive patients to ensure that proper treatment can be prescribed and provided. Correcting any vertical misalignment and completing an accommodative therapy program can have an enormous impact on resolving a patient’s symptoms, as well as improving their overall quality of life.

References