Chorioretinitis Secondary to Methicillin-resistant Staphylococcus aureus Bacteremia

Nicholas Holden, OD, Daniel Grangaard, OD
The Chillicothe VAMC and Columbus VA Ambulatory Care Clinic
The Ohio State University School of Optometry

Abstract
A 50-year old male presents with acute red eye and recent history of back surgery. Dilated fundus exam reveals bilateral chorioretinitis secondary to MRSA bacteremia from surgical complications. Systemic treatment slowly resolves ocular manifestations.

I. Case History (Initial Presentation)
   A. 50-year old white male
   B. Chief Complaint: red eye OD with mild pain
   C. Ocular History
      1. Physiological cupping vs. Glaucoma suspect OU
         a. Family History (Mother)
      2. Congenital Hypertrophy of RPE OD
      3. Blepharitis OU
      4. Myopia with Presbyopia OU
   D. Medical History
      1. Laminectomy to remove epidural abscess near lumbar spine 4 weeks ago; receiving in-patient care at VA.
      2. MRSA bacteremia
      3. Type 2 Diabetes: dx in 2010
      4. Hyperlipidemia
      5. Elevated liver function
      6. Pulmonary nodule
      7. Hemochromatosis
      8. Hypokalemia
      9. Gastroesophageal reflux disorder
     10. Panic/depressive disorder
     11. Eczema
     12. Intraparenchymal hemorrhage of brain
     13. Alcoholic cirrhosis of liver with ascites (chronic)
     14. Thrombocytopenia (Chronic)
   E. Medications
      1. Indomethacin 50mg PO TID
      2. Prednisone Acetate 1% oph sol QID OD
      3. Cyclopentolate 1% oph sol BID OD
      4. IV Daptomycin 410mg in sodium chloride 0.9% 50mL IVPB
      5. Oxycodone 5mg tab PO q6 hours
6. Senna-docusate 8.6-50mg tab PO BID for 15 days
7. Gabapentin 300mg capsule PO TID
8. Atorvastatin 10mg
9. Cetirizine 10mg
10. Cholecalciferol 2,000 unit Cap
11. Cyclobenzaprine 10mg tablet
12. Glipizide 5mg tablet
13. Gualfenesin 200mg tablet
14. Magnesium hydroxide 400mg/5mL susp
15. Metformin 500mg tablet
16. Lactobacillus 1 cap PO QD
17. Sildenafil citrate 100 mg
18. Tramadol HCl 50mg PO TID

II. Pertinent Findings
   A. Clinical
      1. VA sc: OD: 20/30+2 PHNI OS: 20/40 PH 20/30-
      2. Pupils, EOM, Confrontation Visual Fields: Unremarkable
      3. Anterior Segment
         a. Normal OS
         b. Nasal sectoral grade 3 conjunctival and scleral injection 2-5 o’clock with an elevated ~3mm x 3mm nodule OD
         c. Grade 1 cells with no flare OD
      4. IOP: 8/12 mmHg @ 1:37pm
   B. Patient unable to stay for dilation due to extreme back pain from recent surgery
   C. Assessment/Plan
      1. Nodular non-necrotizing anterior scleritis OD
      2. Anterior uveitis OD
      3. Patient denies history of autoimmune disease; minimal eye pain likely due to oral pain medication after back surgery; patient agreed to return for dilated fundus exam in four days
      4. Current post-surgical inflammation likely to complicate lab work results.
      5. Patient to begin Indomethacin PO TID, Prednisone Acetate 1% QID OD, Cyclopentolate 1% BID OD, Omeprazole for prevention of gastrointestinal complications

III. Follow-Up #1 (11 days after initial visit)
   A. Pertinent Findings
      1. CC: Patient reports new black spots in vision out of right eye for last week; patient here for DFE/scleritis follow-up; no eye pain with mild light sensitivity; questionable compliance with medications
2. VA sc: OD: 20/30- OS: 20/25-

3. Anterior Segment
   a. Grade 2 conjunctival and scleral injection from 2-3 o’clock OD
   b. Cornea: 1+ inferior SPK OD
   c. Deep and quiet; no cells or flare OD
   d. Nerves: OD: 0.55 round; OS 0.60/0.65, subretinal hemorrhage nasal to rim margin
   e. Posterior Pole:
      a. OD: white, well circumscribed lesion ~3DD x 2DD superior temporal with mild overlying superficial vitritis, peripheral hemorrhages and surrounding exudates, ~1/3DD CHRPE superior nasal
      b. OS: small white well circumscribed lesion ~1DD superior temporal, peripheral hemorrhages in surrounding area

B. Special Testing
1. Optos retinal photos OU
2. OCT RNFL: OU: WNL, no apparent disc edema
3. OCT Macula: OU: normal foveal contour, no subretinal/intraretinal fluid

C. Assessment/Plan
1. Suspected Chorioretinitis OD > OS
2. Nodular non-necrotizing anterior scleritis OD – improving
3. No candlewax vascular findings; patient denies fatigue, joint pain, muscle problems.
4. Consult entered for referral to retinal specialist
5. Consider the following blood work panel: RF, ANA, HLA-B27, Lyme, PPD, FTA-ABS, ACE, C-ANCA, P-ANCA, ESR, CRP
6. Return 1 week for dilated fundus exam

IV. Follow-up #2 (29 days after initial visit)

A. Pertinent findings
1. CC: Patient unable to schedule appointment with retinal specialist. Since previous exam, patient was admitted to hospital with a fever and started on IV Daptomycin for treatment of MRSA bacteremia. Positive cultures obtained post laminectomy; patient also admits to never taking Indomethacin or any eye drops
2. VA sc: OD: 20/30 OS: 20/20-

3. Anterior Segment
   a. OD: nasal sectoral 1+ conjunctival/scleral injection with 5mm x 5mm nodule

4. Nerve: OS: subretinal heme resolving

5. Posterior Segment
a. OD: white, well circumscribed lesion ~3DD x 2DD superior temporal with resolving overlying superficial vitritis, peripheral hemorrhages and surrounding exudates resolving, ~1/3DD CHRPE superior nasal
b. OS: small white well circumscribed lesion ~1DD superior temporal, peripheral hemorrhages in surrounding area resolving

B. Special Testing
   a. Optos retinal photos
   b. Anterior segment photos

C. Assessment/Plan
   a. Nodular Non-necrotizing anterior scleritis OD – etiology unknown
   b. Chorioretinitis OD > OS likely from MRSA bacteremia; improvement seen on exam likely due to IV antibiotic treatment initiation
   c. Following blood work ordered: ANA, cyclic citrullinate, IGG/IGA, HLA-B27, Lyme, ACE, C-ANCA, P-ANCA, IgM, IgG, QuantiFERON Gold, TP-PA, RPR.
   d. Consider referral to retinal specialist with worsening symptoms. Otherwise, monitor in 1 week with dilated fundus exam.

V. Follow-Up #3 (35 days after initial visit)
   A. Pertinent Findings
      1. All laboratory testing returned normal, patient scheduled to end IV antibiotics in one week
      2. CC: patient reports no visual or ocular complaints OU
      3. VA cc: OD: 20/20 OS: 20/20
      4. Scleral thinning with uveal show evident nasal OD; otherwise stable
      5. Nerve: OS: hemorrhage resolved
      6. Posterior Segment:
         a. OD: peripheral hemes/exudates further improved; white lesion with visible choroidal vessels, no overlying vitritis, size consistent to last visit
         b. OS: peripheral hemes further improved; white lesion size consistent to last visit
   B. Special Testing
      a. Optos retinal photos
      b. Anterior segment photos
   C. Assessment/Plan
      1. Re-entered consult for further evaluation with retinal specialist. Return to clinic 2 weeks for dilated fundus exam.
VI. Differential Diagnosis
A. Primary: Chorioretinitis OU secondary to MRSA bacteremia
B. Secondary:
   1. Chorioretinal Scar
   2. Posterior Staphyloma
   3. Ocular Histoplasmosis
   4. Choroidal Osteoma
   5. Peripheral Exudative Chorioretinopathy
   6. Toxoplasmosis

VII. Diagnosis and Discussion
A. At initial presentation the patient had classic signs of nodular non-necrotizing anterior scleritis. The patient also had a history of recent lower back surgery to remove an epidural abscess and was prescribed oral pain medication, likely reducing symptoms of ocular pain and discomfort that are classic in scleritis cases. Treatment was initiated due to ocular signs. Primary care recommended we hold off on blood work because the results would likely be complicated from normal inflammation post surgery.

B. The patient was unable to stay for dilated eye exam because of extreme pain and discomfort in lower back, the site of abscess removal. Patient reported he physically could not stay in the seated position any longer but did agree to return for dilated fundus exam.

C. When the patient returned, dilation revealed round white retinal lesions in both eyes. The size of the lesion in the right eye was larger, and there was a hazy appearance to the center of the lesion, indicating a mild, superficial overlying vitritis. Choroidal vasculature was slightly obscured by apparent vitritis. There were also surrounding hemorrhages and exudates indicating an inflammatory response in the retina. The left eye also had a white lesion, smaller in size with surrounding hemorrhages. A subretinal hemorrhage adjacent to optic nerve in the left eye was also evident. At this point an unspecified chorioretinitis was our suspicion, but we along with the patient were unaware of MRSA bacteremia.

D. Patient did not return for his next follow up; research of medical records revealed that the patient had returned to hospital a few days after our last exam with a fever and was subsequently admitted for “failure to thrive.” Blood cultures came back positive for MRSA bacteremia and patient was immediately started on IV Daptomycin. The etiology of bacteremia was from prior surgery to remove spinal epidural abscess. With an increase in frequency of community associated MRSA and an apparent increase in resistance to antibiotics over 5 years, it was imperative that our patient
received proper treatment and close follow up. In a 5-year study that analyzed 612 patients with Staphylococcus aureus bacteremia, 56 (9%) of those patients had ocular involvement. Furthermore, 41 (6.7%) had chorioretinitis and 15 (2.5%) had endophthalmitis.

E. By the time the patient was well enough to return for follow up, patient had been on IV antibiotics for approximately 2 weeks. Upon dilation there was an obvious improvement of retinal signs, which correlate to initiation of systemic antibiotics. This led us to believe that the chorioretinitis was in fact secondary to MRSA bacteremia and once therapy was initiated, improvement was noted and the patient began to thrive.

F. Lab work was ordered to rule out other causes including: Lupus, Rheumatoid Arthritis, Sarcoidosis, Crohn’s Reactive arthritis, Ankylosing Spondylitis, psoriatic arthritis, giant cell arteritis, polyarthritis nodosa, Wegener’s Granulomatosis, toxoplasmosis, tuberculosis, Lyme, and syphilis. All lab work came back negative.

VIII. Treatment and Management
A. At initial presentation for anterior scleritis, the patient was started on Indomethacin 50mg PO TID, Prednisone Acetate 1% oph sol QID OD, Cyclopentolate 1% oph sol BID OD. The patient was also put on Omeprazole to ease gastric discomfort that often accompanies NSAID medication.
B. Compliance with these medications was questionable; patient later admitted never picking up medications. He stated he was on so many that he “couldn’t keep them all straight.”
C. When patient returned for follow-up #1 there was improvement in signs of scleritis. We decided to keep patient on current treatment. However, with no etiology for suspected chorioretinitis, a retinal consult was warranted.
D. When patient did not show for next scheduled exam, we were able to retrieve new records indicating patient was diagnosed with MRSA bacteremia and was immediately initiated on IV Daptomycin, a strong systemic antibiotic. Daptomycin is the first of the cyclic lipopeptides and has shown rapid bactericidal activity against resistant strains of Staphylococcus aureus. In a recent study on the incidence and risk factors of ocular infections caused by Staphylococcus aureus bacteremia, patients with endophthalmitis were treated with intravitreal and parenteral antibiotics. However, patients with associated chorioretinitis were treated only with systemic antibiotics, which is what our patient was treated with. This prompt diagnosis and treatment of MRSA bacteremia in our patient was crucial to preventing progression of chorioretinitis to endophthalmitis. In fact, it appeared our patient showed improvement in signs within two weeks of being started on systemic antibiotics.
IX. Conclusion

A. Methicillin-resistant Staphylococcus aureus bacteremia is associated with significant risk of morbidity and mortality. As its incidence continues to rise it is important to understand its nature of metastasis to other systems of the body, including the orbit. There have been studies that show the incidence of metastasis in such conditions range from 13-39%. Ocular involvement is a critical condition because there is the potential for vision loss. Although there is success with current treatment approaches, there has been evidence of growing resistance to β-lactam antibiotics. With the continued rise in MRSA bacteremia cases over recent years, ophthalmologists need to realize the urgency in obtaining cultures and optometrists must refer in a timely manner. This case highlights the benefits of an evaluation by the proper specialists and demonstrates that with quick action and treatment, patients’ vision and life may be spared.

X. Bibliography


