MRSA Conjunctivitis
Justyna Lewczuk, OD; Yelena Smart, OD; Cathy Marques, OD; Malinda Cafiero-Chin OD

Abstract:
When conventional methods of treating conjunctivitis are not improving patient signs and symptoms, cultures for antibiotic resistance are mandated. A positive culture for MRSA needs attention because it requires a more aggressive approach and possible interaction with a formulating pharmacist.

I. Case History
- Patient Demographics
64 year old white man with acute bilateral conjunctivitis

- Ocular History and Medical History
Medical History:
 (+) Pneumonia
 (+) Dementia, Vascular
 (+) Benign Prostate Hypertrophy
 (+) Dysphagia, unspecified
 (+) Bacteremia, MRSA
 (+) Anemia
 (+) Hypertension
 (+) Hypothyroid
 (+) Schizophrenia
 (+) Asthma
 (+) Hyperlipidemia
 (+) Depression
 (+) Cardiac Disease
 (+) Non-Hodgkin’s Lymphoma

Ocular History:
 (+) Nuclear Cataracts OU

-Medications
Divalproex
Lisinopril
Aripiprazole
Aspirin
Ferrous Sulfate
Omeprazole
Senna Tablets
Terazosin
Haloperidol
Levothyroxine

-Other Salient information – n/a
II. Pertinent findings

-Clinical
Visual Acuity right eye (OD) 20/40+1 PH: 20/25 left eye (OS) 20/40- PH: 20/25
Slit Lamp:
  Lids/Lashes: white-green mucous discharge OU matted lashes OU
  Conjunctiva: bulbar conjunctiva 1+injection OU
  palpebral conjunctiva 1+injection with 1+papillae OU
  Cornea: trace superficial punctate keratitis OU
  Iris: flat (-) NVI OU
  Lens: anterior cortical cataracts 1+ OU
  Nuclear sclerotic cataracts 2+ OU

Goldman Tonometry: OD: 14mm Hg OS: 16 mm Hg at 10:00 AM
Dilated Fundus Exam: Cup to disc ratio: 0.45 pink, healthy, distinct, flat OU
  Macula: clear, flat OU
  Posterior Pole and Periphery: unremarkable

-Physical
Upon subsequent visits, a small left cheek infection without tenderness to touch or pain was present. Pt denied any pain, fever, chills, fatigue, shortness of breath, muscle aches, and nausea

-Laboratory Studies
Upon subsequent visits, when the patient was not responding to tobramycin or moxifloxacin, a culture was taken and sent for laboratory analysis. The cultures were positive for moderate staphylococcus aureus methicillin resistance bacteria in both eyes. The antibiotic susceptibility test results showed that the bacteria was resistant to: cephalothin, ciprofloxacin, clindamycin, erythromycin, levofoxacin, and penicillin. The pathogen was susceptible to rifampin, tetracycline, trimethoprim and sulphamethoxazole combination, and vancomycin.

-Radiology Studies were not needed

III. Differential Diagnosis
Bacterial conjunctivitis, allergic conjunctivitis, viral conjunctivitis, keratoconjunctivitis sicca, dacyrocystitis, canalicularis, meibomitis, anterior blepharitis, posterior blepharitis, preseptal cellulitis, orbital cellulitis, blepharoconjunctivitis, keratitis

-Primary/Leading:
  MRSA conjunctivitis

IV. Diagnosis and discussion
Methicillin resistant Staphylococcus aureus (MRSA) infection is a growing concern in medicine and is present in surgical and non-surgical patients. Most MRSA
infections are skin infections that occur at sites of visible skin trauma, such as cuts and abrasions, and areas of the body covered by hair (1).

The mode of transmission for MRSA can be either through direct contact with a person from the community, community-acquired (CA) MRSA, or in hospitals, hospital-acquired (HA) MRSA (5). The more severe or potentially life-threatening infections occur in HA-MRSA among patients and healthcare workers. Other high risk groups are patients who participate in full contact sports, patients in nursing homes, patients with a history of dialysis, patients who are immune deficient, and spouses or children of healthcare workers (2). It is important to recognize patients who are in high risk groups for having MRSA and consider MRSA a differential diagnosis in patients who have chronic ocular discharge despite having previously been treated with anti-infective treatments.

If a patient is suspected of having MRSA conjunctivitis, a culture and gram stain should be performed. A culture confirms the presence of the resistant bacteria however results can take 2-4 days (8). Most laboratories perform disk diffusion on an oxacillin screening agar plate or broth micro-dilution for susceptibility testing. The diagnostic criteria for MRSA is a minimum inhibitory concentration greater or equal to 4 ug/mL. For faster results, polymerase chain reaction (PCR) results can be ready in 1-2 hours (8). A positive result will come back with a list of medications indicating susceptibility and resistance to enable the clinician to modify the current treatment plan, if necessary.

V. Treatment, management

Overuse of oral antibiotics has allowed MRSA to become more efficient and quick to damage its host. MRSA is resistant to methicillin and other beta-lactamase antibiotics because it has an enzyme that attacks the B-lactam ring of the antibiotic (5). Also, it has become increasingly resistant to cephalosporins and fluoroquinolones. The most important goal for the optometrist to keep in mind in a patient with MRSA is to protect the patient’s vision. The visual outcome can be very poor from damage that can occur to the corneal epithelium and stroma leading to scarring and opacity (6).

The most common ophthalmic MRSA infections are preseptal cellulitis and/or lid abscess, followed by conjunctivitis (7). Treatment with topical antibiotics is still the most effective medical approach for treating MRSA conjunctivitis. Treatment plans become complicated by antibiotic resistance. Therefore, it is important that a culture be performed at one week follow up if the patient is not responding to the antibiotic they were using or if the patient’s condition worsened.

The first line treatment for MRSA ocular infections is topical fortified vancomycin (4). The topical dosing schedule for vancomycin is 25 to 50 mg/mL every six hours. Most pharmacies can readily make this fortified antibiotic and it has a good safety profile (4). Additionally, polytrim has been shown to be effective for treating most MRSA infection, but it is not the first line treatment (4). Oral medications for the treatment of MRSA are clindamycin, tetracyclines and trimethoprim-sulfamethoxazole (9). Rifampin has been shown to work however only when it is used with other antibiotics (9). If you choose to treat the patient with oral clindamycin, the patient must be monitored more closely because 19% of patients treated with it have shown resistance (10). In severe infections that require intravenous antibiotics, vancomycin, linezolid, quinupristin-dalfopristin, daptomycin, tigecycline and telavancin are used (9).
New pharmaceutical drugs on the market for MRSA are tigecycline and telavancin (9). Tigecycline is reserved for hospitalized patients who have serious life threatening infections with complicated skin infections, intra-abdominal infections and community-acquired pneumonia from MRSA (13). Tigecycline is administered intravenously and it does not require dosage adjustments in patients with impaired renal or liver function (13). Telavancin is the newest drug approved by the FDA for the treatment of MRSA infections (11). Currently this antibiotic is restricted to serious and life threatening infections in hospitalized patients with complicated skin and skin structure infections caused by gram positive bacteria and MRSA (11). The advantage of this medication over vancomycin is that it is an injection given once a day and there is no need to monitor drug levels (9). The primary mode of elimination of telavancin is through the renal system. The half life of telavancin in patients with renal dysfunction is extended. Therefore, prior to initiation of treatment with this medication patients should have their creatinine levels and/or blood urea nitrogen checked and in cases of renal dysfunction, dosing adjustments should be made. Clinical studies have shown that telavancin is not inferior to vancomycin in confirmed MRSA infections (11). Currently however, tigecycline and telavancin are not available in ophthalmic preparations.

If a patient with MRSA or is at high risk of having MRSA presents in your office, it is important to protect yourself, your staff and the other patients. There are preventative measures that a doctor should abide by: cover any traumas to the skin until fully healed, always wash hands in between patients and immediately after contact with the patient, wear gloves, use a mask to prevent passage of nasal MRSA, and properly disinfect equipment, instruments and work surfaces with proper commercial disinfectant (3). Make sure to add a flag status for the patient in his or her chart for future knowledge.

At initial presentation to the optometry clinic, the patient came in complaining of chronic, recurrent discharge in both eyes for which he was treated for by the nursing home staff for the past several weeks with tobramycin drops. The patient’s condition was not improving and after examination, a diagnosis of chronic conjunctivitis was made. Tobramycin was discontinued and the patient was started on moxifloxacin every four hours and polytrim every four hours, alternating between the two. Additionally, cultures were obtained of both conjunctivae. At one week follow up, the culture results indicated the pathogen was moderate staphylococcus aureus methicillin resistant bacteria in both eyes. This bacteria is resistant to penicillin, fluoroquinolones and cephalosporins and susceptible to trimethoprim (polytrim), vancomycin and tetracycline. At the next visit, his conjunctivitis was improving. We discontinued the moxifloxacin but increased the dosage of polytrim to one drop both eyes every three hours. The following week, his conjunctivitis continued to improve and the same treatment plan was continued. He returned the next week with mild improvement in the discharge but presented with a redness extending along the inferior orbital area without a complaint of tenderness. In addition to the polytrim, oral tetracycline 250 mg twice a day for ten days was added for this skin infection. He returned in one week with the skin infection resolving however the conjunctivitis was worsening. The patient was instructed to finish the tetracycline and switch the polytrim to fortified vancomycin one drop (31 mg/ML) every six hours in both eyes. At follow up, the patient reported feeling much better and no longer had discharge or a cheek infection. In addition to the topical and oral medications, our patient
was doing warm compresses four times a day, lid hygiene twice a day and frequent hand washing while being treated for MRSA conjunctivitis.

-Bibliography, literature review encouraged

VI. Conclusion pearls, take away points if indicated
MRSA is of grave concern in healthcare today, and can affect many aspects of patient health, including the eye. It is a dangerous infection and effective treatment depends on rapid and efficient recognition by the optometrist to help protect the patient’s vision. In patients who have recalcitrant conjunctivitis, it is important to consider MRSA as a differential diagnosis. Optometrists need to be familiar with the trends and characteristics of MRSA infections and current treatment protocols due to its increasing prevalence and virulence. Additionally, doctors should follow infection prevention control in their practice and educate their patients on proper prevention techniques.