Sinusitis and Orbital Cellulitis Due to Community-Associated Methicillin-Resistant Staphylococcus Aureus

Riad O. El Fakih, M.D.[1]
Thomas A. Moore, M.D., F.A.C.P.[1,2]
Maha Assi, M.D., M.P.H.[1,2]
[1]University of Kansas School of Medicine-Wichita
Department of Internal Medicine
[2]Infectious Disease Consultants, Wichita, KS

Introduction

Community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA) has a predilection to cause severe skin and soft tissue infection in both immunocompetent and immunocompromised adults.[1] Other serious invasive infections, such as necrotizing pneumonia, sepsis, bacteremia, sinusitis, and urinary tract infections, are on the rise.[2] We report a case of bacterial sinusitis and orbital cellulitis due to CA-MRSA.

Case Report

A 56-year-old woman developed mild pain around her left eye six days prior to hospital admission. Although over-the-counter analgesics were helpful initially, the pain increased in intensity prompting the patient to seek emergent care.

Her physical exam was within normal limits, except for left maxillary sinus tenderness. Pansinusitis was found on a CT scan of the sinuses (see Figure 1). The patient was prescribed amoxicillin/clavulanate and released. She returned for evaluation in the clinic two days later with worsening pain and swelling around the left eye.

Her left eye was swollen, erythematous, warm to touch, and tender to palpation. Her left pupil was normal in size and reactive. The left conjunctiva was erythematous. There was decreased ocular motility with pain elicited by eye movement.

Upon hospital admission, a CT scan of the brain and sinuses revealed extensive paranasal sinusitis and evidence of new inflammatory changes in the postseptal region of the left orbit as compared to the previous study done three days prior. These findings were consistent with left orbital cellulitis (see Figure 2).

The patient's past medical history was remarkable for hypertension and asthma. She had no history of smoking, alcohol intake, or drug abuse. Her medications included an albuterol inhaler as needed, hydrochlorothiazide 25 mg daily, and amoxicillin/clavulanate.

Ampicillin/sulbactam was started empirically. About eight hours later, the patient underwent endoscopic drainage of both the maxillary and left frontal and ethmoid sinuses. Gram's stain of material from surgery revealed moderate neutrophils and moderate gram positive cocci, a finding that prompted the addition of vancomycin 1g intravenously (IV) every 12 hours.

Ampicillin/sulbactam was changed to piperacillin/tazobactam 3.375g IV every six hours the following day. Cultures yielded a predominant growth of methicillin-resistant *Staphylococcus aureus* (MRSA) and a light growth of *Escherichia coli*. The MRSA exhibited a susceptibility profile typical for the USA300 strain (CA-MRSA). A follow-up sinus CT scan done two days after the

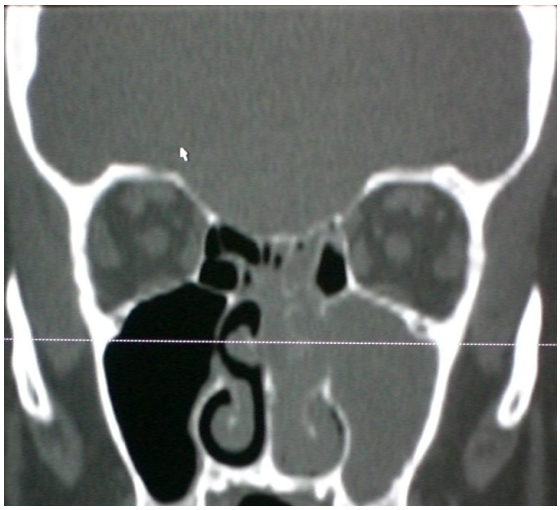

Figure 1. Pansinusitus on CT scan of the sinuses.

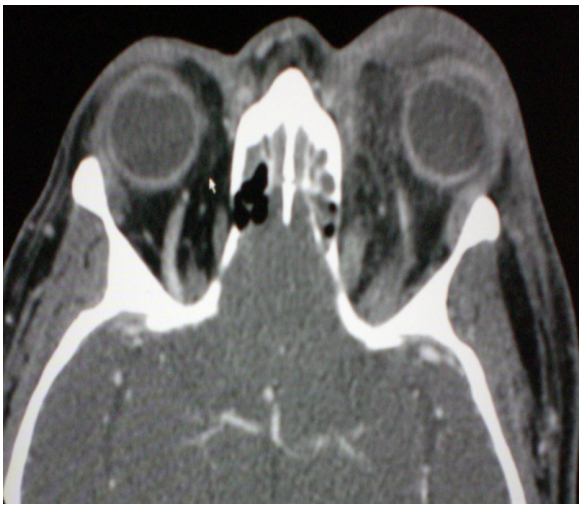

Figure 2. CT findings consistent with left orbital cellulitis**.**

surgery showed significant improvement of inflammatory changes (see Figure 3). The patient was dismissed to complete a 21-day course of vancomycin 1g IV every 12 hrs as an outpatient. Recovery was uneventful.

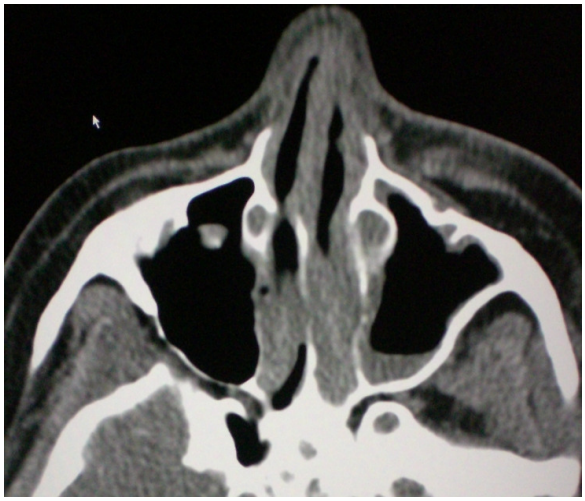

Figure 3. Significant post-surgical improvement of the inflammatory changes.

Discussion

Staphylococcus aureus is a common cause of disease, particularly in colonized persons. The prevalence of MRSA colonization is estimated at 0.8%.[3] Strains of MRSA were first detected in 1961, but occurred sporadically and were only resistant to ß-lactam antibiotics.[4,5] Resistant hospital-acquired strains appeared in Australia in the late 1970s and subsequently spread to hospitals worldwide.[6,7]

Hospital-acquired MRSA is one of the most common causes of bacterial healthcare-associated infection, responsible for 40 to 70% of *S. aureus* infections in intensive care units.[8,9] In the United States, CA-MRSA was first reported in 1982 in a large, urban Michigan hospital.[10] The infection was found in a cluster of 40 persons, including 24 who were injection drug users. While CA-MRSA primarily causes skin and soft tissue infections, other serious invasive infections are on the rise.[2]

Current recommendations for the diagnosis and treatment of acute bacterial rhinosinusitis are based on the expected prevalence, spontaneous resolution rate, and specific drug-resistance patterns of pathogens.[11] Recent literature has indicated an increasing prevalence of *S. aureus* in sinus cultures. Culture rates were 32.7% for *Streptococcus pneumoniae,* 31.6% for *Hemophilus influenzae,* 10.1% for *S. aureus,* and 8.8% for *Moraxella catarrhalis*.[12] CA-MRSA sinusitis has been reported in literature, however, there are no data about the prevalence.

The most feared complications of sinusitis are orbital and central nervous system (CNS) complications. Devastating outcomes, such as temporary or permanent loss of vision, diplopia, residual proptosis, optic neuritis, and epidural or subdural infection may develop if appropriate treatment is delayed.[13]

Two cases of MRSA sinusitis with orbital cellulitis has been reported in the English literature.[1,13] The patient reported by Mehra et al.[13] had a history of chronic intravenous drug use, an iatrogenic displacement of the tooth-root tip, and residual visual symptoms after completion of treatment. The case reported by Rutar et al.[1] resulted in bilateral blindness.

Patients with immotile cilia syndrome and cystic fibrosis and those with a history of IV drug use are prone to infections with resistant bacterial species, including MRSA. Our patient had none of these risk factors or those for CA-MRSA infection such as young age, incomplete development of the immune system, participation in contact sports, sharing towels or athletic equipment, having a weakened immune system, or living in crowded or unsanitary conditions.[14] She also did not have a prior history of skin and soft tissue infection with CA-MRSA.

CA-MRSA should be included in the differential diagnosis of progressive sinusitis not responding to standard antimicrobial coverage even in the absence of classic risk factors for MRSA. Early microbiologic diagnosis might be helpful in preventing severe complications such as orbital or CNS extension.

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