

February 2, 2018

Ike Ansie is a fully-vaccinated 2yo male with no PMH presenting to the emergency room with a swollen left eye and fever. Mom first noticed that his left eye appeared a little puffy three days ago but opted to observe since he otherwise continued to sleep, eat, drink, and play like his usual self. Last night, however, she reports that he was febrile and fussy. This morning, the swelling was so bad that he was no longer able to fully open his left eye. Ike does not have any sick contacts, has not traveled recently, and mom denies any recent trauma or injuries.

In the ED, his vital signs were: 38.5C, HR 140, RR 18, BP 104/58, SpO₂ 100% on RA. On exam, you find that he has an edematous, erythematous, left periorbital induration that is warm to touch. His conjunctivae are clear and pupils are equal and reactive to light. He is able to easily move both eyes in every direction without pain. The remainder of the physical exam is normal. Of the following, the most appropriate inpatient antibiotic regimen for this patient is:

- A. Ceftriaxone ± metronidazole
- B. Vancomycin
- C. Trimethoprim-sulfamethoxazole
- D. Ampicillin-sulbactam ± vancomycin
- E. Amoxicillin-clavulanate

D. Ampicillin-sulbactam

This is the best choice for empiric inpatient antibiotic therapy as it covers the most common bacterial etiologies of periorbital, or preseptal, cellulitis: *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Staphylococcus aureus*, and anaerobes. Of note, ampicillin-sulbactam only covers methicillin-susceptible *S. aureus*. The addition of vancomycin can be considered in sicker appearing children or if you are concerned about MRSA. But given this patient's localized findings, in the absence of vital sign instability or orbital involvement, ampicillin-sulbactam monotherapy is the most appropriate choice of action.

Ceftriaxone would cover Streptococci and gram negatives like *H. influenzae*. While the addition of metronidazole would confer anaerobic coverage, keep in mind that neither would provide MRSA coverage. Ampicillin-sulbactam is preferred over this two-drug regimen as ceftriaxone's unnecessarily broad gram negative coverage make it a suboptimal choice for empiric treatment.

Vancomycin is an excellent antimicrobial against gram positive bacteria, including MRSA, but it does not provide any gram negative or anaerobic coverage.

In general, periorbital cellulitis can be attributed to two groups of organisms: skin flora going in vs sinus organisms coming out. Trimethoprim-sulfamethoxazole (TMP-SMX), given its coverage against Staphylococci and gram negatives, works well for the former but not for the latter. Preseptal cellulitis stemming from facial lacerations or abrasions are typically due to Staph or Strep whereas trauma to or infection of the eyelids are more commonly caused by GAS, Staph, *H. influenzae*, and/or *Moraxella*. In contrast, sinus-borne infections are typically predominated by anaerobes. As such, TMP-SMX is not the best choice for periorbital cellulitis due to its lack of coverage against anaerobic organisms.

Amoxicillin-clavulanate has coverage against Streptococci but lacks activity against Staphylococci. In combination, however, the complementary actions of TMP-SMX and amoxicillin-clavulanate would be equally appropriate as an outpatient empiric or as a step-down regimen upon cessation of IV antibiotics. That said, this patient's severe periorbital edema warrants admission in order to definitively rule out orbital cellulitis. Meanwhile, his symptoms can be monitored closely. Clinical improvement is observed after receiving just 2-3 doses of antibiotics due to the impedance of toxin-mediated disease progression.