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What is the best initial treatment for orbital cellulitis in children?

Evidence-based answer

Although antibiotics are the best initial treatment, surgical intervention is warranted when a child has:

- visual impairment, complete ophthalmoplegia, or well-defined abscess on presentation, or
- no clearly apparent clinical improvement by 24 hours (strength of recommendation

[SOR]: **C**, based on patient-oriented case-series studies).

Target antimicrobial therapy toward the common pathogens associated with predisposing factors for orbital cellulitis, such as sinusitis—and pay attention to local resistance patterns (SOR: **C**, based on patient-oriented case series).

Clinical commentary

Rare but serious risk factors

The incidence of *Haemophilus influenzae*-related periorbital cellulitis appears to have plummeted with the advent of Hib vaccine. And while no national data have been published, case series support my clinical observation that the overall incidence of periorbital cellulitis has dropped as well.

The arrival of heptavalent pneumococcal vaccine may further contribute to its welcome scarcity. Take this changing bacteriology—in conjunction with local resistance patterns—into account when considering antibiotic coverage.

When confronted by the rare case of periorbital cellulitis, I always consider risk factors that may change my management, such as immunization status and asplenia. Also, meningitis is a rare but serious complication, so I also keep meningitis risk factors in mind, such as immunosuppression, coincident trauma, or a poor response to initial medical therapy.

Finally, any question of orbital involvement should prompt an emergent consultation.

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FAST TRACK

“I always consider risk factors that may change management, such as immunization status, asplenia, and risk factors for meningitis”

Evidence summary

Orbital cellulitis is a serious soft-tissue infection of childhood with very different etiologies.

- **Periorbital (or preseptal) cellulitis** is synonymous with **stage I** orbital cellulitis, in which there is induration, erythema, warmth, and tenderness of

the periorbital soft tissues, usually secondary to external inoculation, but the inflammation does not extend into the bony orbit.

- **Stages II, III, and IV** orbital cellulitis are progressively more invasive infections that generally arise from the sinuses; they may involve the retro-or-

TABLE

Choose antibiotic based on cause and likely pathogen^{1,2,6-8}

ANTECEDENT EVENT	LIKELY PATHOGENS	BEST DRUGS
Acute sinusitis	Streptococcus pneumoniae Haemophilus influenzae Moraxella catarrhalis	Penicillinase-resistant penicillins
Trauma	Staphylococcus aureus Group A β -hemolytic streptococci Increasing concern for methicillin-resistant <i>S aureus</i>	Penicillinase-resistant penicillins First-generation cephalosporins Consider drugs appropriate for methicillin-resistant <i>S aureus</i>
Chronic sinusitis	Anaerobes	Metronidazole Clindamycin

bital area. These stages of orbital cellulitis can cause proptosis, decrease visual acuity, or appear as abscesses on computed tomography scan.^{1,2}

Staged treatment

Many retrospective studies of stage II–IV orbital cellulitis with relatively few subjects and small prospective case series have been published with common themes for management recommendations:

- early intravenous antibiotics (likely for an inpatient), and
- involvement of otolaryngology and ophthalmology specialists.

No head-to-head trials have been completed to evaluate efficacy of specific antimicrobial regimens.

Oral antibiotics. First, treat stage I orbital cellulitis with oral antibiotics.

IV antibiotics. Modify treatment to intravenous antibiotics when there is no improvement within 24 hours or if you discover any characteristic of more severe orbital cellulitis.

Medical management of stage II–IV orbital cellulitis with intravenous antibiotics is the current standard of care until it is clear that one of the following is present:

- no improvement by 24 to 48 hours
- visual impairment
- complete ophthalmoplegia, or
- well-defined periosteal abscess.^{1,2}

Surgery. For refractory cases, surgical decompression will likely be required.

The evidence. A small case series

(n=9) found 21 children admitted to hospital for preseptal cellulitis, of whom 4 later were diagnosed with orbital cellulitis. There was a total of 9 cases of orbital cellulitis; however, only 1 required operative management of orbital cellulitis.³ In a prospective study to evaluate medical management (n=23), 87% of patients responded to intravenous antibiotics.⁴ No statistically significant long-term difference in subperiosteal abscesses (as a complication of orbital cellulitis) was found in another retrospective study comparing medical to surgical management.⁵

Target the likely pathogens

Direct antimicrobial therapy toward common pathogens for likely sources of infection, paying attention to local resistance patterns and the pathogens usually associated with sinusitis (TABLE).^{1,2,6-8}

A retrospective case series of 94 patients of all ages in China implicated *Staphylococcus aureus* and streptococcal species based on cultures taken from eye purulence and abscesses.⁶ Another retrospective case series from Vanderbilt (n=80) found streptococci as the most common cause, based on blood and wound cultures in the Hib vaccination era; however, only 12 wounds returned positive cultures.⁷

Steroids have no proven benefit

Systemic steroids have no proven benefit in the treatment of pediatric orbital

FAST TRACK

Target common pathogens for the likely source of infection—and pay attention to local resistance patterns

cellulitis with subperiosteal abscess.

A small retrospective cohort study of the benefit of intravenous steroids in addition to antibiotics showed no decrease in hospital stay or need for surgical decompression ($n=23$, $P=.26$ and $.20$, respectively).⁹ Without prospective data and a power analysis, lack of benefit of steroids cannot be definitively shown.

Recommendations from others

Infectious Disease Society of America. The guidelines for the management of skin and soft-tissue infections implicate β -hemolytic streptococci as the most common cellulitis pathogen, but also recommend empiric coverage against *S aureus*.

Periorbital and orbital cellulitis are not specifically addressed in these guidelines, but oral dicloxacillin, cephalexin, clindamycin, or erythromycin are recommended for superficial cellulitis, provided there is no known resistance to these antibiotics.

Intravenous penicillinase-resistant penicillins (nafcillin) or a first-generation cephalosporin (cefazolin) may be used for more severe infections.

For penicillin-allergic patients, the IDSA recommends clindamycin or vancomycin.¹⁰

Sanford Guide to Antimicrobial Therapy.

Nafcillin plus ceftriaxone and metronidazole is the recommended treatment for orbital cellulitis.

For patients allergic to penicillin, vancomycin plus levofloxacin and metronidazole are recommended.⁸

Neither the American Academy of Ophthalmology nor the International Council of Ophthalmology offers clinical statements on orbital cellulitis. ■

Acknowledgments

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