



Management of Preseptal Cellulitis in Rural Practice: Challenges and Therapeutic Success – A Case Report

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ABSTRACT

Introduction: Preseptal cellulitis is an infection localized to the anterior portion of the orbital septum. The most common causes are *Staphylococcus aureus* and *Streptococcus* species. Beta-lactam antibiotics are considered the first-line treatment. However, rural settings pose challenges due to limited diagnostic resources and widespread antibiotic use without medical supervision. **Case:** A 29-year-old woman presenting to a rural health center with eyelid swelling and localized pain. The patient had a history of irrational amoxicillin use. Limited access to culture testing and guidelines led to empiric ciprofloxacin therapy. The patient demonstrated significant clinical improvement after five days of treatment. There was no disease progression or complications. **Discussion:** Amoxicillin-clavulanate and cephalosporin remain the preferred treatments for preseptal cellulitis because they provide appropriate coverage against common gram-positive pathogens. Ciprofloxacin is not routinely recommended as monotherapy because of its variable activity against streptococci, potential adverse effects, and risk of promoting antimicrobial resistance. Nevertheless, previous reports have included ciprofloxacin in alternative regimens for patients with severe beta-lactam allergy or limited therapeutic options. In this case, its use represented a context-specific clinical decision based on prior incomplete antibiotic exposure, medication availability, and the absence of microbiological testing. Careful clinical assessment and close monitoring were essential to ensure treatment safety. **Conclusion:** This case illustrates the potential use of ciprofloxacin as a pragmatic alternative in resource-limited environments where first-line agents are unavailable.

Keywords: Case report, ciprofloxacin, preseptal cellulitis, rural health.

ABSTRAK

Pendahuluan: Selulitis preseptal adalah infeksi terlokalisasi di bagian anterior septum orbita. Penyebab tersering selulitis preseptal adalah *Staphylococcus aureus* dan spesies *Streptococcus*. Antibiotik golongan *beta-lactam* dianggap sebagai terapi lini pertama. Namun, fasilitas kesehatan di daerah sering menghadapi tantangan akibat keterbatasan sumber daya diagnostik dan maraknya penggunaan antibiotik tanpa pengawasan medis. **Kasus:** Perempuan berusia 29 tahun datang ke puskesmas di daerah pedesaan dengan keluhan bengkak kelopak mata dan nyeri lokal. Pasien memiliki riwayat penggunaan *amoxicillin* secara tidak rasional. Keterbatasan akses terhadap pemeriksaan kultur dan antibiotik sesuai pedoman menyebabkan dimulainya terapi empiris dengan *ciprofloxacin*. Pasien menunjukkan perbaikan klinis yang signifikan setelah lima hari pengobatan. Tidak ditemukan progresivitas penyakit ataupun timbulnya komplikasi. **Pembahasan:** *Amoxicillin-clavulanate* dan *cephalosporin* tetap menjadi terapi pilihan untuk selulitis preseptal karena memiliki cakupan yang sesuai terhadap patogen gram positif yang umum ditemukan. *Ciprofloxacin* tidak direkomendasikan secara rutin sebagai monoterapi karena aktivitasnya yang bervariasi terhadap bakteri *Streptococcus*, potensi efek samping, dan risiko peningkatan resistensi antimikroba. Meskipun demikian, beberapa laporan sebelumnya mencantumkan *ciprofloxacin* sebagai bagian dari regimen alternatif pada pasien dengan alergi berat terhadap antibiotik *beta-lactam* atau keterbatasan pilihan terapi. Dalam kasus ini, penggunaan *ciprofloxacin* merupakan keputusan klinis yang disesuaikan dengan konteks, dengan mempertimbangkan riwayat penggunaan antibiotik yang tidak tuntas, ketersediaan obat, dan tidak tersedianya pemeriksaan mikrobiologi. Penilaian klinis yang cermat dan pemantauan ketat diperlukan untuk menjamin keamanan terapi. **Simpulan:** Kasus ini menggambarkan potensi penggunaan *ciprofloxacin* sebagai alternatif pragmatis di lingkungan dengan sumber daya terbatas, terutama jika obat lini pertama tidak tersedia. **Selvania Ohman, George Raden Mas Said. Penatalaksanaan Selulitis Preseptal di Praktik Pedesaan: Tantangan dan Keberhasilan Terapi – Laporan Kasus.**

Kata Kunci: Laporan kasus, *ciprofloxacin*, selulitis preseptal, kesehatan pedesaan.

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INTRODUCTION

Preseptal cellulitis is an inflammation of the soft tissues located anterior to the orbital septum. The orbital septum is a fibrous structure that separates the orbital contents into preseptal and postseptal compartments. The preseptal space lies in front of the septum, while the postseptal compartment is located posteriorly. The preseptal space is located anterior to the orbital septum. In contrast, the postseptal compartment lies posterior to this structure. Inflammation that extends beyond the orbital septum is termed orbital cellulitis. Both preseptal cellulitis and orbital cellulitis are most commonly caused by bacterial infections.^{1,2} The predominant pathogens responsible for preseptal cellulitis are gram-positive cocci, particularly *Staphylococcus* and *Streptococcus* species, including *Streptococcus pyogenes* and *Streptococcus pneumoniae*. Patients with preseptal cellulitis often present with eyelid swelling and erythema. Systemic symptoms, such as malaise and low-grade fever, may also be present. Diagnosis is primarily based on clinical evaluation. The main objective is to prevent disease progression. Potential complications include vision loss, cavernous sinus thrombosis, brain abscess, osteomyelitis, and septicemia.¹⁻³

Diagnostic and therapeutic resources are readily available in urban centers. In contrast, rural healthcare systems face distinct challenges in the management of preseptal cellulitis. Patients in remote areas often experience delays in accessing timely and appropriate care.⁴ These delays increase the risk of adverse outcomes.⁵ Studies have shown that rural healthcare providers face multiple barriers to delivering optimal care. They often lack sufficient diagnostic equipment. The availability of essential medications is limited. Financial and insurance constraints further hinder service delivery. Geographic isolation complicates patient access to care. There is also a persistent shortage of both primary care and specialty clinicians.⁶ These systemic issues are compounded by widespread irrational antibiotic use in rural communities. People in rural areas often have habits such as self-medicating, purchasing antibiotics from pharmacies without a prescription, stopping medication before completing the course, and not following the prescribed

dosage instructions correctly. These habits can result in suboptimal treatment outcomes and increase the risk of bacteria developing resistance to antibiotics.^{7,8}

Clinicians have reported favorable outcomes with early recognition, timely intervention, and appropriate antibiotic use despite these obstacles. A positive case outcome highlights the value of multidisciplinary collaboration and individualized treatment strategies. Comprehensive history taking and detailed physical examination remain essential, particularly in atypical presentations of periorbital cellulitis. Preseptal cellulitis typically has an excellent prognosis when it is accurately diagnosed and appropriately managed, and most patients achieve full recovery.⁹

This case report presents the clinical features, management challenges, and therapeutic outcomes of preseptal cellulitis in the context of rural healthcare services. It also highlights barriers in rural areas, including limited access to imaging examinations and specialist care, as well as the problem of irrational antibiotic use.

CASE

A 29-year-old woman presented with swelling, pain, and redness around the left eyelid, present for approximately four days (**Figure 1**). About one week before the onset of symptoms, the patient experienced itchiness in the left eye. Two days prior to presentation, fever developed, for which paracetamol 500 mg three times daily was taken for symptom relief.

The patient denied any history of ocular trauma or visual disturbances such as blurred vision or diplopia. There was also no previous

history of eye infections, known drug allergies, or systemic conditions such as diabetes mellitus or hypertension. Contact lens use and exposure to environments associated with increased risk of eye infections were likewise denied.

Notably, the patient admitted to frequently purchasing amoxicillin without a prescription and using it irrationally, often discontinuing treatment prematurely once symptomatic improvement was perceived. This pattern of behavior raised concern for antimicrobial resistance, influencing the choice of empiric therapy. On physical examination (**Table**), the patient appeared in generally good condition. Examination of the left ocular region (regio ocularis sinistra) revealed edema and erythema involving both the upper and lower eyelids. Visual acuity, pupillary reflexes, and color discrimination were within normal limits. There was no evidence of proptosis or restriction in ocular motility. The right eye (regio ocularis dextra) was unremarkable. Palpation of the affected area elicited localized tenderness. A random blood glucose test yielded results within normal limits.

Management included both local and systemic interventions. The patient was advised to apply warm compresses to the left eyelid three to four times daily to reduce edema and promote drainage. Paracetamol 500 mg was continued orally three times daily as needed for fever and discomfort. For suspected localized bacterial infection, chloramphenicol 1% eye ointment was prescribed to be applied to the affected eye four times daily for five days. Additionally, oral ciprofloxacin 500 mg twice daily for five days was initiated as systemic antibiotic therapy. The initial clinical impression was consistent with preseptal cellulitis or inflammatory eyelid



*Photo documentation by Selvania Ohman.

Figure 1. Clinical appearance of the left eye on day 1 of examination.



pathology, and appropriate treatment was commenced.

By day 5, the patient exhibited marked clinical improvement (**Figure 2A**). Eyelid swelling had decreased, the eye was partially opened, and conjunctival hyperemia had significantly diminished. She reported reduced discomfort and improved ocular function.

By day 10, the periorbital inflammation had resolved completely (**Figure 2B**). The eyelid had returned to its normal contour without residual swelling, erythema, or discharge. The conjunctiva appeared normal, and visual acuity remained at 20/20 bilaterally. No ocular motility disturbances or symptom recurrence were noted. This case demonstrates a favorable response to treatment, resulting in full functional and cosmetic recovery within 10 days. Continued observation was advised, and the patient was counseled on recognizing signs of recurrence or secondary complications.

DISCUSSION

Preseptal cellulitis is a soft tissue infection confined to the anterior portion of the orbital

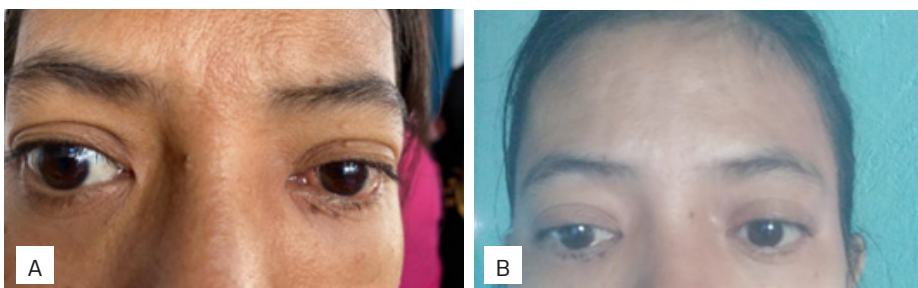
septum and is frequently caused by gram-positive organisms such as *Staphylococcus aureus* and *Streptococcus* species, particularly *S. pyogenes* and *S. pneumoniae*. Although clinically less severe than orbital cellulitis, preseptal cellulitis still poses a risk of serious complications if not promptly and appropriately managed. Diagnosis is primarily clinical, with hallmark signs including eyelid edema, erythema, low-grade fever, and malaise, especially in pediatric populations. Standard first-line therapy for preseptal cellulitis is oral amoxicillin-clavulanate or cephalosporins, widely recommended in guidelines.¹⁻³ However, clinical experience in rural settings indicates that limited access to diagnostic tools, essential medications, and specialist care often presents significant challenges.⁵

This case from a rural area was diagnosed with preseptal cellulitis and was successfully treated with ciprofloxacin as empiric therapy. Ciprofloxacin was chosen due to the patient's prior irrational use of amoxicillin before seeking care at a healthcare facility, raising concerns about potential antimicrobial resistance. The management deviated from guideline-

recommended therapy, as ciprofloxacin was used instead of first-line beta-lactam antibiotics.^{1,3} However, this deviation was not solely the result of "irrational use," but rather a pragmatic decision influenced by the patient's prior irrational and incomplete use of amoxicillin, which raised concerns about resistance, as well as the limited availability of guideline-recommended antibiotics in rural healthcare facilities. Thus, although ciprofloxacin is not considered a first-line option, its use in this case represented a rational adaptation to contextual limitations and did not compromise patient safety or clinical outcomes.¹⁰

In addition to the limited access to culture and sensitivity testing in rural health settings, the unavailability of guideline-recommended antibiotics, particularly second-generation cephalosporins, further justified the use of ciprofloxacin as an effective and accessible alternative in this resource-limited context.

Although most of the literatures¹⁻³ recommends beta-lactam antibiotics such as amoxicillin-clavulanate or cephalexin as first-line therapy for preseptal cellulitis, several studies also support the use of ciprofloxacin for its treatment. One study reported the administration of intravenous ciprofloxacin (400 mg IV every 12 hours) as part of a broad-spectrum empiric regimen for recurrent preseptal cellulitis in patients with a history of severe beta-lactam allergy (Stevens-Johnson Syndrome) and intolerance to vancomycin.¹⁰ Ciprofloxacin has also been recommended as a second-line antibiotic in severe cases of preseptal or orbital cellulitis, particularly in patients with a documented history of penicillin hypersensitivity.¹¹⁻¹³



*Photo documentation by Selvania Ohman.

Figure 2. A) Day 5: the left eyelid swelling is significantly reduced; **B)** Day 10: the left eye shows full resolution of clinical signs.

Table. Ophthalmic examination findings and clinical progression of the patient.

Study Parameter	Day 1	Day 5	Day 10
Visual Acuity (Snellen)			
Right Eye	20/20	20/20	20/20
Left Eye	20/20	20/20	20/20
Anterior Segment Exam			
Right Eye	Normal	Normal	Normal
Left Eye	Severe upper and lower eyelid edema with erythema and ptosis; conjunctival injection observed (Figure 1)	Decreased edema, no ptosis; conjunctiva appears less injected (Figure 2A)	Eyelid and conjunctiva return to normal appearance; no erythema or swelling (Figure 2B)



In such cases, ciprofloxacin is often combined with agents like vancomycin and administered intravenously for 10–14 days under close medical supervision. This approach is supported by a reported case of recurrent preseptal cellulitis seven years after Boston type II KPro surgery, in which orbital CT confirmed palpebral fat infiltration without postseptal extension. The patient was initially treated successfully with intravenous vancomycin, ciprofloxacin, and metronidazole, but recurrence occurred one month later. Because of severe β -lactam allergy and vancomycin intolerance, treatment was adjusted to ciprofloxacin, linezolid, and metronidazole, followed by oral moxifloxacin and linezolid after discharge. This case shows that antibiotic selection in KPro-associated preseptal cellulitis must consider infection severity, orbital involvement, pathogen coverage, and individual drug intolerance.¹⁰ Therefore, although not a first-line treatment, ciprofloxacin may be considered a rational alternative in settings with limited resources and a history of inadequate prior therapy.

On the other hand, several studies have

highlighted the limitations of ciprofloxacin as a primary treatment option. One study concluded that fluoroquinolone antibiotics do not offer significant advantages over β -lactams in the treatment of skin and soft tissue infections (SSTIs).¹⁴ Furthermore, ciprofloxacin, as a member of the fluoroquinolone class, has been associated with a higher risk of antimicrobial resistance and more severe adverse effects compared to first-line antibiotics. This concern is supported by findings from a study that identified ciprofloxacin as having the second-highest resistance rate to *Staphylococcus aureus*, following methicillin.¹⁵ Therefore, the use of ciprofloxacin as empiric therapy for preseptal cellulitis should be approached with caution.

CONCLUSION

In rural or remote healthcare settings where access to culture and sensitivity testing is limited, ciprofloxacin may be considered an initial empirical treatment option for patients with preseptal cellulitis, particularly when broad-spectrum coverage is required, and referral or microbiological confirmation is not immediately available. Its activity against

gram-negative organisms and selected atypical pathogens makes it a pragmatic first-line choice in resource-limited settings, provided that orbital cellulitis has been excluded, disease severity is carefully assessed, and the patient receives close clinical monitoring.

The favorable clinical response, as evidenced by the resolution of local symptoms without progression of infection or subsequent complications, supports this decision. These findings highlight the importance of thoroughly considering a patient's medical history in therapeutic decision-making, and underscore the need for context-based approaches in clinical practice, particularly in resource-limited environments.

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