Beyond The Red Eye: Rational Clinical Management And Antibiotic Stewardship In Pediatric Acute Bacterial Conjunctivitis At Primary Care Level

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Abstrak: Konjungtivitis bakterial akut merupakan salah satu kondisi okular tersering yang ditemukan pada pelayanan kesehatan primer pediatrik. Penyakit ini ditandai oleh inflamasi konjungtiva akibat infeksi bakteri yang dapat menyebabkan ketidaknyamanan, gangguan penglihatan sementara, serta peningkatan risiko penularan pada kontak serumah dan anak usia sekolah. Meskipun sebagian besar kasus bersifat self-limiting, diagnosis dini dan tata laksana yang tepat tetap penting untuk mempercepat pemulihan klinis serta mengurangi penggunaan antibiotik yang tidak rasional. Artikel ini bertujuan membahas manifestasi klinis, diagnosis, tata laksana, dan luaran tindak lanjut konjungtivitis bakterial akut pada anak di pusat pelayanan kesehatan masyarakat dengan menekankan pentingnya *pengelolaan antibiotik* dalam praktik layanan primer. Secara klinis, konjungtivitis bakterial umumnya ditandai dengan hiperemia konjungtiva, sekret mukopurulen, kelopak mata lengket saat bangun tidur, serta iritasi okular ringan. Diagnosis ditegakkan terutama berdasarkan anamnesis dan pemeriksaan oftalmologis, termasuk penilaian tajam penglihatan dan evaluasi segmen anterior untuk menyingkirkan keterlibatan kornea maupun kondisi okular serius lainnya. Tata laksana meliputi pemberian antibiotik topikal, edukasi higiene, serta pemantauan perbaikan klinis. Pada kasus ini, didapatkan perbaikan bermakna setelah terapi yang ditunjukkan dengan resolusi injeksi konjungtiva dan hilangnya sekret okular pada evaluasi tindak lanjut. Pengenalan klinis secara dini dan penggunaan antibiotik yang rasional sangat penting untuk mengoptimalkan luaran pasien sekaligus meminimalkan resistensi antimikroba di fasilitas pelayanan kesehatan primer.

Kata kunci: konjungtivitis bakterial akut, *pengelolaan antibiotik*, infeksi okular, pediatrik, pelayanan primer, mata merah.

Abstract: *Acute bacterial conjunctivitis is one of the most common ocular conditions encountered in pediatric primary healthcare services. The disease is characterized by inflammation of the conjunctiva caused by bacterial infection and may lead to discomfort, temporary visual disturbance, and increased transmission risk among household contacts and school-aged children. Although many cases are self-limiting, prompt diagnosis and appropriate management remain important to accelerate clinical recovery and reduce unnecessary antibiotic exposure. This paper aims to discuss the clinical presentation, diagnosis, management, and follow-up outcomes of pediatric acute bacterial conjunctivitis in a community health center while emphasizing the importance of antibiotic stewardship in primary care practice. Clinically, bacterial conjunctivitis commonly presents with conjunctival hyperemia, mucopurulent discharge, eyelid sticking upon waking, and mild ocular irritation. Diagnosis is primarily established through history taking and ophthalmologic examination, including visual acuity assessment and anterior segment evaluation to exclude corneal involvement or other serious ocular conditions. Management includes topical antibiotic therapy, hygiene education, and monitoring for clinical improvement. In this case, significant improvement was observed after treatment, demonstrated by resolution of conjunctival injection and disappearance of ocular discharge during follow-up evaluation. Early clinical recognition and rational antibiotic use are essential to optimize patient outcomes while minimizing antimicrobial resistance in primary healthcare settings.*

Keywords: *acute bacterial conjunctivitis, antibiotic stewardship, ocular infection, pediatric, primary care, red eye*

Introduction

Conjunctivitis is an inflammatory disorder involving the conjunctival tissue and represents one of the leading causes of ocular complaints among pediatric patients in primary healthcare facilities. The condition may be caused by bacterial, viral, allergic, or irritative etiologies, each requiring

different therapeutic approaches (Patel and Diaz, 2021). Accurate clinical differentiation is therefore essential to ensure proper management and prevent unnecessary antibiotic administration.

Acute bacterial conjunctivitis is frequently characterized by conjunctival redness, mucopurulent discharge, eyelid crusting, and ocular discomfort. Common bacterial pathogens in children include *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *Haemophilus influenzae* (Azari and Barney, 2020). In contrast, viral conjunctivitis is usually associated with watery discharge and upper respiratory tract symptoms, whereas allergic conjunctivitis predominantly presents with itching and bilateral tearing.

In many developing countries and resource-limited healthcare settings, microbiological testing is not routinely available. Consequently, diagnosis relies heavily on clinical evaluation through history taking and physical examination. Under these circumstances, general practitioners play a critical role in establishing diagnosis, initiating treatment, providing patient education, and recognizing referral indications.

Despite its generally favorable prognosis, inappropriate use of topical antibiotics in conjunctivitis remains common. Excessive antibiotic prescribing contributes to the growing burden of antimicrobial resistance worldwide (Shekhawat et al., 2021). Therefore, implementation of antibiotic stewardship principles in primary care ophthalmology practice is increasingly important.

This paper presents a pediatric case of acute bacterial conjunctivitis managed at a community health center and discusses the importance of rational clinical management and antibiotic stewardship in primary healthcare settings.

Method

This study employed a descriptive case report design. Clinical information was obtained from history taking, ophthalmologic examination, treatment records, and follow-up evaluations of a pediatric patient diagnosed with acute bacterial conjunctivitis at a community health center.

Clinical assessment included visual acuity testing, external ocular inspection, pupillary reflex evaluation, and anterior segment examination. Diagnostic consideration was based on characteristic clinical manifestations and exclusion of alternative ocular conditions.

Relevant evidence-based literature and clinical guidelines were reviewed to support interpretation of findings, therapeutic decisions, and discussion regarding rational antibiotic use in primary care practice.

Case Presentation

A 5-year-old boy was brought to the Integrated Management of Childhood Illness clinic at a community health center with complaints of redness in both eyes for two days. The symptoms were accompanied by yellow mucous discharge, eyelid sticking upon waking, mild itching, and burning sensation. The patient denied severe ocular pain, blurred vision, photophobia, or history of trauma. No prior ophthalmic medication had been used. The patient's sibling reportedly experienced similar symptoms several days earlier, suggesting possible household transmission. No history of allergic disease was identified.

Physical examination demonstrated normal visual acuity in both eyes. Bilateral conjunctival hyperemia accompanied by mucopurulent discharge was observed. No corneal opacity, foreign body, eyelid edema, or anterior chamber inflammation was identified. Pupillary reflexes were normal, and no preauricular lymphadenopathy was present.

Based on the history and clinical findings, acute bacterial conjunctivitis was diagnosed. The patient received chloramphenicol 1% ophthalmic ointment once nightly and gentamicin 0.3% eye drops four times daily. The caregiver was educated regarding hand hygiene, avoidance of eye rubbing, and prevention of disease transmission within the household. Clinical improvement was noted during follow-up evaluation, with marked reduction of conjunctival redness and complete resolution of ocular discharge after treatment.

Discussion

Acute conjunctivitis remains one of the most frequently encountered ocular disorders among children in primary healthcare settings and may arise from infectious or non-infectious etiologies (Mahoney *et al.*, 2023). Accurate differentiation between bacterial, viral, and allergic conjunctivitis is essential because management strategies vary substantially according to the underlying cause (Johnson *et al.*, 2022). Failure to establish an appropriate diagnosis may result in unnecessary antibiotic prescribing and increased healthcare burden (Shekhawat *et al.*, 2021).

In the present case, the patient presented with bilateral conjunctival hyperemia accompanied by mucopurulent discharge and eyelid sticking upon waking. These findings strongly supported acute bacterial conjunctivitis. Mucopurulent discharge and eyelid mattering are among the most predictive clinical features associated with bacterial conjunctivitis in children (Mahoney *et al.*, 2023). The history of household contact with similar symptoms further suggested transmissible infectious conjunctivitis.

The absence of preauricular lymphadenopathy, upper respiratory tract symptoms, severe itching, photophobia, and watery discharge reduced the likelihood of viral or allergic etiologies.

Previous studies have demonstrated that viral conjunctivitis more frequently presents with watery secretion and respiratory symptoms, while allergic conjunctivitis is characterized predominantly by intense itching and bilateral tearing (Johnson *et al.*, 2022; Mahoney *et al.*, 2023). Because microbiological testing is not routinely available in primary healthcare facilities, diagnosis often relies on detailed history taking and ophthalmologic examination (Kementerian Kesehatan Republik Indonesia, 2021). Figure 1 demonstrates the characteristic appearance of conjunctival hyperemia and ocular discharge during the acute infectious phase. Similar clinical manifestations have been consistently reported in pediatric conjunctivitis literature (Mahoney *et al.*, 2023).

Differentiating the etiology of conjunctivitis is critically important because inappropriate treatment may lead to avoidable medication use and delayed recovery. The comparison presented in Table 1 summarizes the major clinical differences among common conjunctivitis subtypes.

Table 1. Clinical Comparison of Common Types of Conjunctivitis

Type	Common Etiology	Main Clinical Features	Ocular Discharge	Characteristic Findings	Initial Management
Bacterial conjunctivitis	*S.aureus*, *S. pneumoniae*, *H. influenzae*	Red eye, eyelid crusting, foreign body sensation	Thick mucopurulent	Acute onset, sticky eyelids	Topical antibiotics and hygiene measures
Viral conjunctivitis	Adenovirus	Red eye, burning sensation, watery eye	Watery/serous	URI symptoms, preauricular lymphadenopathy	Supportive management
Allergic conjunctivitis	Allergic reaction	Intense itching, tearing	Mucoid/watery	Bilateral itching, atopy history	Antihistamines and allergen avoidance
Irritative conjunctivitis	Dust, smoke, chemicals	Irritation and redness	Minimal	Exposure history	Saline irrigation
Hyperacute conjunctivitis	Severe redness and swelling	Severe redness and swelling	Profuse purulent	Rapid progression	Systemic antibiotics and referral

Sources: *Mahoney et al. (2023); American Academy of Ophthalmology (2022); Johnson et al. (2022)*

Table 1 highlights the importance of recognizing characteristic symptom patterns during initial evaluation. In the current case, bilateral redness with mucopurulent discharge and eyelid sticking strongly aligned with bacterial conjunctivitis and did not demonstrate clinical features suggestive of viral, allergic, or hyperacute disease. Such clinical comparison is especially useful in primary healthcare settings where microbiological investigations are limited.

Although acute bacterial conjunctivitis is generally self-limiting, topical antibiotic administration may shorten symptom duration and reduce disease transmission (Yeu and Hauswirth, 2020). The patient received chloramphenicol ophthalmic ointment and gentamicin eye drops because these medications are commonly available and widely used in primary healthcare facilities.

Selection of treatment should be based on suspected etiology rather than empirical use in all red-eye presentations. Therapeutic approaches according to etiology are summarized in Table 2**.**

Table 2. Therapeutic Management of Conjunctivitis According to Etiology

Etiology	Recommended Therapy	Typical Regimen	Supportive Meassures
Bacterial	*Chloramphenicol ointment,*	1 – 2 times daily,	Hand hygiene,
	Gentamicin eye drop,	4 – 6 times daily,	Avoid towel sharing,
	Tobramycin eye drops	4 times daily	Ocular cleaning
Viral	Artificial tears	As needed	Cold compress
Allergic	Topical antihistamines	Twice daily	Allergen avoidance
Irritative	Saline irrigation	As needed	Remove irritant exposure
Hyperacute	Systemic antibiotics	Guideline based	Urgent referral

Sources: *American Academy of Ophthalmology (2022); WHO (2023); Yeu and Hauswirth (2020)*

Table 2 emphasizes that treatment strategies differ considerably among conjunctivitis etiologies. Antibiotics are primarily indicated for bacterial infection and provide minimal benefit in viral disease (Mahoney *et al*., 2023). Therefore, inappropriate empirical antibiotic administration may contribute to increasing antimicrobial resistance and healthcare costs (Shekhawat *et al*., 2021).

Supportive measures also play an important role in successful management. Caregivers were instructed regarding hand hygiene, avoidance of eye rubbing, and prevention of towel sharing. These interventions are especially relevant because pediatric conjunctivitis demonstrates high transmissibility within household and school environments (Centers for Disease Control and Prevention, 2024).

During follow-up evaluation, marked improvement was observed with resolution of conjunctival hyperemia and disappearance of mucopurulent discharge. Figure 2 demonstrates post-treatment clinical recovery following topical antibiotic administration.

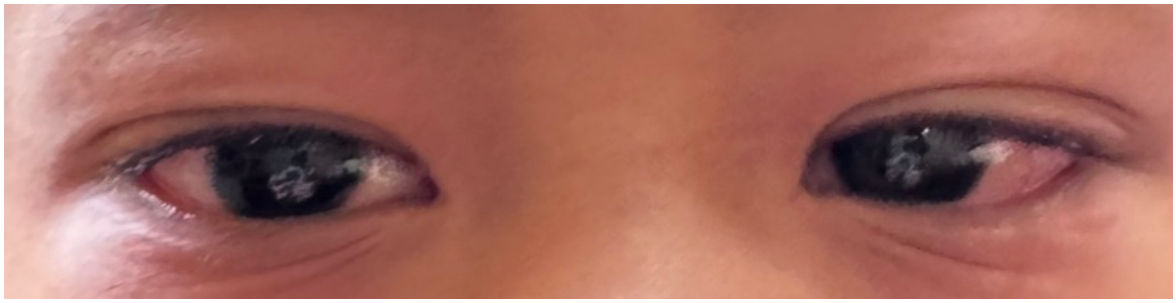

Figure 1. Initial clinical presentation showing bilateral conjunctival hyperemia with mucopurulent discharge in a pediatric patient diagnosed with acute bacterial conjunctivitis.

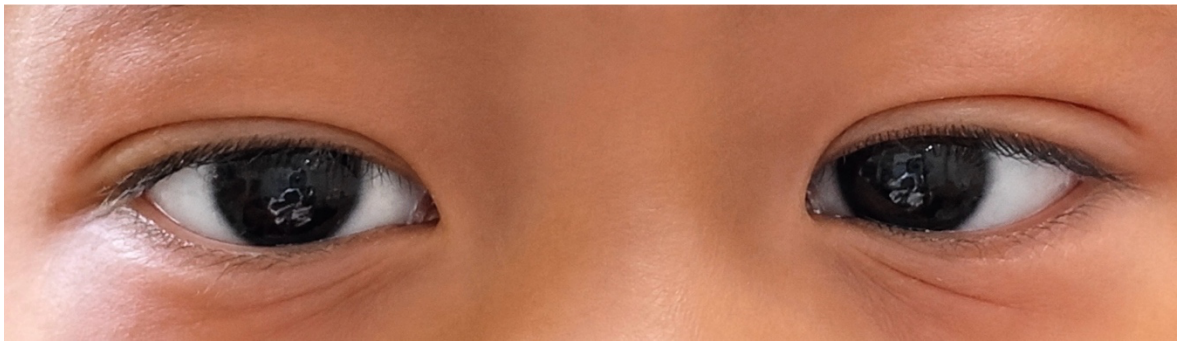

Figure 2. Post-treatment appearance demonstrating marked resolution of conjunctival injection and complete disappearance of ocular discharge after topical antibiotic therapy.

The favorable clinical response observed in Figure 2 supports the effectiveness of early diagnosis and appropriate management in uncomplicated pediatric bacterial conjunctivitis. No corneal involvement, visual impairment, severe ocular pain, or referral indications developed during treatment. This case highlights the important role of primary healthcare physicians in diagnosis, rational therapeutic selection, patient education, and implementation of antibiotic stewardship principles (World Health Organization, 2023).

Conclusion

Acute bacterial conjunctivitis remains a common ocular condition encountered in pediatric primary healthcare practice. This case demonstrates that accurate clinical assessment based on history taking and ophthalmologic examination is essential for distinguishing bacterial conjunctivitis from other causes of red eye and for guiding appropriate management. The presence of conjunctival hyperemia, mucopurulent discharge, and eyelid sticking upon waking strongly supported the diagnosis of bacterial conjunctivitis in this patient.

Appropriate treatment with topical antibiotics, combined with hygiene education and follow-up monitoring, resulted in significant clinical improvement without complications. This case highlights the important role of primary care physicians in early recognition, rational therapeutic decision-making, and patient education. Furthermore, adherence to antibiotic stewardship principles is crucial to ensure effective treatment while minimizing unnecessary antibiotic use and reducing the risk of antimicrobial resistance. Rational clinical management remains fundamental to achieving favorable outcomes in pediatric acute bacterial conjunctivitis at the primary care level.

Acknowledgments

The author would like to express sincere gratitude to H. Moh. Ruslan Regional General Hospital for its support and contribution to the completion of this work. Appreciation is also extended to all healthcare professionals and staff who assisted in patient care, data collection, and the preparation of this manuscript. Their valuable support and cooperation were greatly appreciated throughout the study process.

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