Bacterial conjunctivitis is inflammation of the conjunctiva as a result of bacterial infection.

It presents with conjunctival injection, mucopurulent discharge, and crusty eyelids. The diagnosis is usually clinical. The condition is often self-limiting, but there is good evidence that antibiotics improve remission rates. Most of the current evidence suggests that the choice of topical antibiotics and the treatment regimen do not significantly affect the rate of recovery from infection. Failure to recognise and treat bacterial conjunctivitis may lead to complications, such as keratitis or anterior uveitis.

Aetiology: The aetiology of the condition is most commonly Staphylococcus species in adults, and Streptococcus pneumonia and the Gram-negative organisms Haemophilus influenzae and Moraxella catarrhalis in children. Contact lens wearers are at particular risk for Gram-negative infections, such as Pseudomonas aeruginosa. Neisseria gonorrhoeae is primarily a neonatal aetiology. Conjunctivitis is a common cause of pediatric primary care visits and is a common ophthalmologic complaint in the pediatric emergency department (ED). Conjunctivitis can be extremely contagious. It is feared that it may be easily spread in day care centers and school classrooms, leading to absences and lost time from work for parents. The most common causes of conjunctivitis are bacterial and viral infections. In the primary care setting, treatment is based solely on the clinical examination.

Its prevalence is significant to the general population, because it is a leading cause of day care and school absences. Even though most cases of bacterial conjunctivitis are self-limited, it can take up to three weeks for the infection to clear. Treatment of acute conjunctivitis helps to shorten the clinical course, reduces spread of the contagion and discomfort, and allows the patient to resume activities earlier. The aetiology is difficult to delineate on clinical grounds alone, and there is much pressure on physicians to prescribe antibiotics due to the social impact the diagnosis holds. Thus, physicians are faced with the dilemma of potentially overprescribing antibiotics in an era of increasing bacterial resistance and increased awareness of cost. One recent study estimates an annual incidence rate of 135 per 10,000 in the US. The same study found the estimated total direct and indirect cost of treating bacterial conjunctivitis in the US to be $589 million annually. Accounting for a 20% variation in annual incidence rate and treatment cost resulted in an estimated cost range of $377 to $857 million annually.

**POTENTIAL PITFALLS**

- Contact lens wearers are predisposed to Gram-negative infections, carrying a higher risk of complications, such as bacterial keratitis. Pseudomonas and Acanthamoeba infections in contact lens wearers can lead to serious, sight-threatening complications if not recognised and treated appropriately. The contact lens storage case may be the nidus of the infection.
- If there is an associated keratitis or anterior uveitis, referral to a specialist may be recommended.
- Beware of combination topical antibiotic agents that contain steroids. These should be used with extreme caution and monitored by a specialist.

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**Effective TWICE DAILY treatment for bacterial conjunctivitis**

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**REFERENCES:**
The study found that topical antibiotics expedite recovery from bacterial conjunctivitis. The choice of antibiotic usually does not affect outcome.

**ASSESSMENT**

Assessment should include:

- Redness, foreign body sensation and purulent/mucopurulent discharge are common complaints; there may be itching, chemosis, or conjunctival papillae
- Ask about contact lens wear
- Assess for corneal involvement and intraocular involvement
- Conjunctival swabs can be done for Gram stain, culture, and sensitivity to clarify diagnosis, particularly in more severe or refractory cases
- Moderate to severe eye pain, photophobia, or change in visual acuity should raise suspicion for more serious causes.

Indications for specialist referral:

- Patients should be seen every 2-3 days until signs and symptoms are resolved. Failure to respond to topical antibiotics may warrant referral to a specialist. Indications for specialist referral include:
  - Change in visual acuity
  - Evidence of keratitis and/or anterior uveitis on slit-lamp examination
  - Moderate-to-severe eye pain
  - Failure to improve or worsening of symptoms in spite of treatment.

Pediatric and emergency medicine literature lacks clinical diagnostic indicators to assist practitioners in making a more informative decision about the need for ocular antibiotics because results from a culture of the conjunctiva may be delayed by several days. Most cases of acute infectious conjunctivitis are self-limited, and 64% resolve in two to five days. Untreated, acute bacterial conjunctivitis is clinically cured within three to five days in 28% of cases, and by eight to ten days there is a 72% clinical cure rate. There is bacteriologic cure of 19% and 31% of the same untreated groups. If treated with antibiotics, these numbers improve to 62% clinical cure at three to five days and 91% at eight to ten days, with bacteriologic cure of 71% and 79%, respectively. Recent studies have shown that topical antibiotics impact microbiologic remission by 6-10. Thus, there is support for treating bacterial conjunctivitis because it leads to more rapid and improved rates of clinical remission.

The Red Book and the National Health and Safety Performance Standards guidelines suggest that children with conjunctivitis without systemic illness should be allowed to remain in school once indicated therapy is implemented. This is especially important for parents whose children attend day care and school, because treatment may not only hasten symptomatic resolution but also shortens absences, allowing parents to return to work more quickly. Early recognition and treatment may also be important in decreasing transmission of infective pathogens.

Practitioners rely on certain signs and symptoms listed in the literature and major textbooks that will distinguish a bacterial from a viral origin of conjunctivitis. Purulence, swollen eyelid, and a papillary response are generally associated with bacterial etiologies, while watery discharge, a follicular response, and a preauricular node are more indicative of a viral picture. However, these signs and symptoms are associative findings and are nonspecific. A recent literature review by Rietveld et al. found no evidence for these commonly used predictors. Rietveld et al. additionally showed that acute bacterial conjunctivitis in the adult population is predicted by a positive history of early morning glued eyes and a lack of history of itch and previous episodes of conjunctivitis.

Data in this study showed an even higher predominance of bacteria identified in cases of conjunctivitis (78% culture positive). The leading isolated organism was nontypeable H. influenzae, followed by S. pneumoniae. These data support results from prior studies and also indicate some change in the types and frequency of isolates. Additionally, the researchers isolated S. aureus in 2% of culture-positive cases. Although prior studies have listed this organism as either a contaminant or normal flora, the...
The presence of these later findings regard to the reliability of this finding. Children in this study were younger than symptom. Because many enrolled from the caregivers' perception of this data may represent information bias associated with bacterial conjunctivitis, though lack of burning is significantly lack of sensation of burning eyes and to be statistically significant was the eyelashes crusting or gluing. Also found and examination findings of eyelids or these techniques minimized sampling errors and risks for contamination.

Physicians underestimate the prevalence of bacteria as an aetiology of conjunctivitis. Yet, despite physicians' estimates, antibiotics were prescribed 83% of the time and were correctly prescribed 86% of the time. Although not quantified in this study, the authors believe that this high rate of treatment was triggered by parental concerns regarding day care and/or school absences. Other studies have also shown this high rate of antibiotic treatment.

In this study, five independent variables were significantly associated with positive bacterial cultures. These included a history of gluey or sticky eyelids or eyelashes in the morning, examination findings of mucoid or purulent eye discharge, and examination findings of eyelids or eyelashes crusting or gluing. Also found to be statistically significant was the lack of sensation of burning eyes and the absence of watery discharge. Even though lack of burning is significantly associated with bacterial conjunctivitis, data may represent information bias from the caregivers’ perception of this symptom. Because many enrolled children in this study were younger than five years, clinicians are cautioned to use their best clinical judgment with regard to the reliability of this finding. The presence of these later findings could be suggestive of allergic or viral aetiology. Binary logistic regression identified a history of gluey or sticky eyelids or eyelashes in the morning and the presence of mucoid or purulent discharge on examination as independent variables. When combined as a clinical prediction tool, it yielded high diagnostic characteristics (posttest probability of 96%). The authors believe that physicians may use these historical and examination findings to better delineate their treatment strategies.

There are a large number of cases of paediatric conjunctivitis that are bacterial in origin, with H. influenzae as the overwhelmingly predominant organism. Based on the data, empirical ophthalmic antibiotic therapy for children presenting with conjunctivitis may be appropriate if used with guidance of the diagnostic indicators identified in the study.

 Conjunctivitis in children is predominantly bacterial, with nontypeable H. influenzae being the most common organism. A history of gluey or sticky eyelids and physical findings of mucoid or purulent discharge are highly predictive of bacterial infection. Based on the above data, empirical ophthalmic antibiotic therapy may be appropriate in children presenting with conjunctivitis.

### Fucidic Acid

When comparing the clinical and bacteriological effects of fucidic acid and chloramphenicol eye drops in neonates with a clinical diagnosis of acute conjunctivitis of suspected bacterial origin, authors found the following results: 89% of the neonates treated with fucidic acid were cured, compared to 87% of those treated with chloramphenicol. The drug was used as instructed in 80% of patients treated with fucidic acid and in 78% of those treated with chloramphenicol.

A total of 456 newborns with gestational age of 32 weeks with acute conjunctivitis of suspected bacterial origin acquired within the first 28 days of life were included in the study. They were randomly assigned to a 7-day treatment with eye drops using either fucidic acid (1.0%) applied twice per day, or chloramphenicol (0.5%) applied six times per day. It was found that treating neonatal conjunctivitis with fucidic acid is easier than with chloramphenicol, and is equally effective.

### Convenience and Compliance

The ultimate aim of any prescribed medical therapy is to achieve certain desired outcomes in the patients concerned. These desired outcomes are part and parcel of the objectives in the management of the diseases or conditions. However, despite all the best intention and efforts on the part of the healthcare professionals, those outcomes might not be achievable if the patients are non-compliant. This shortfall may also have serious and detrimental effects from the perspective of disease management. Hence, therapeutic compliance has been a topic of clinical concern since the 1970s due to the widespread nature of non-compliance with therapy.

There have been numerous studies on therapeutic noncompliance over the years. Jin et al. (2008) found that the rate of compliance decreased as the number of daily doses increased. This is illustrated by one study where compliance was assessed by pill counts and self-reports that showed that non-compliance increased with an increase in the frequency of prescribed dosing: 20% for once daily; 30% for twice daily; 60% for three times a day; and 70% for four times daily. Similarly, a meta-analysis found that there was a significant difference in compliance rate between patients taking antihypertensive medication once daily and twice daily (92% and 88%, respectively) (Iskedjian et al. 2002). Thus, simplifying the medication dosing frequency could improve compliance markedly.

High compliance may lead to clinical success but low compliance may result in treatment failure, emergence of resistant strains, and increased healthcare costs through relapses of infection and hospitalisations. Apart from the frequency of the daily dosing, other factors can also affect compliance to treatment. These factors can be categorised as patient-centered (i.e. age, gender, health literacy), therapy-related (i.e. taste or odor of the medication, adverse events, long duration of treatment), as well as factors associated with the healthcare system, social and economic status of the patient, and the severity of disease. Another interesting view is that patients may obtain the highest compliance around doctor's visits which means that contact between patient and doctor during treatment may result in higher compliance. It is now evident that clinicians should take into consideration the patient’s compliance before prescribing an antibiotic.

**References available on request.**