



Infectious Disease Epidemiology Section
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CONJUNCTIVITIS

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Conjunctivitis, also called pinkeye, is an inflammation of the conjunctiva that can be caused by bacterial or viral infections, as well as allergic reactions or eye injuries.

Epidemiology

The causes of conjunctivitis are often age related.

- In newborns, infection may occur during birth, most often from *Chlamydia trachomatis* or *Neisseria gonorrhoeae* which can cause serious ocular damage.
- In infants, recurrent conjunctivitis may be a sign of nasolacrimal duct obstruction.
- In children, the most common causes are those listed above: viral, bacterial, allergic, or related to a foreign body. Acute conjunctivitis among children may be bacterial (eg nontypable *Haemophilus influenzae*, *Streptococcus pneumoniae*) or viral (eg, adenoviruses, enteroviruses, HSV).
- In children older than 5 years of age bacterial conjunctivitis is uncommon although nontypeable *S. pneumoniae* can cause outbreaks of conjunctivitis in school-age children, college students and military recruits.
- Outbreaks of seasonal conjunctivitis in the southern states occur during the summer or early fall and primarily affected young children. Some of the etiologic agents are *Haemophilus aegyptius* (known as the Kochs-Weeks bacillus and now as *H. influenzae* biotype III). Mechanical vector transmission by gnats has long been suggested. In many areas of the southern United States, these insects are prevalent during the warm months. Gnat-borne transmission has been documented in animal studies.
- Acute hemorrhagic conjunctivitis (AHC) typically is caused by one of two enteroviruses (CA24 or enterovirus 70). This disease is transmitted person-to-person usually through contact with contaminated hands or through sharing of contaminated personal-care items. No specific treatment is available for AHC; however, the illness is self limiting, and severe complications are rare. Nonetheless, because of its extremely contagious nature, AHC can disrupt the local economy and require substantial health-care resources.
- Mild bilateral conjunctivitis, iritis, keratitis, or uveitis is sometimes present in Reiter syndrome but often lasts for only a few days. Reiter syndrome is an oculo-urethro-synovial syndrome that complicates non-gonococcal urethritis (*Chlamydia trachomatis*), Shigella, and Campylobacter infections.

Except when viral or bacterial conjunctivitis is accompanied by systemic signs of illness, infected children should be allowed to remain in school once any indicated therapy is implemented, unless their behavior is such that close contact with other students cannot be controlled.

Infection occurs through direct contact or through contamination of hands followed by autoinoculation. Respiratory tract spread from large droplets also may occur. The organisms that cause viral or bacterial conjunctivitis may be present in nasal secretions as well as in the discharge from the eyes. Persons can become infected when their hands become contaminated with these secretions and then they rub their eyes. Spread of infection is minimized by careful hand washing.

Infected persons should be presumed to be contagious until symptoms have resolved.

The incubation period depends on the etiologic agent.

Clinical Description

All types involve redness and burning or itching of the eyes. The drainage from the eye may be a white or yellowish pus as a result of bacterial or viral infections, but is often clear and watery in allergic conjunctivitis.

Topical antibiotic therapy is indicated for bacterial conjunctivitis, which usually is distinguished by a purulent exudate.

Herpes simplex virus conjunctivitis usually is unilateral and may be accompanied by vesicles on adjacent skin. Evaluation of HSV conjunctivitis by an ophthalmologist and administration of specific antiviral therapy are indicated. Conjunctivitis due to adenoviruses or enteroviruses is self-limited and requires no specific antiviral therapy.

Acute hemorrhagic conjunctivitis (AHC) is characterized by sudden onset of painful, swollen, red eyes with subconjunctival hemorrhages and excessive tearing. Most cases are self-limited but highly contagious, with the potential for causing considerable illness. Adenoviruses and picornaviruses are the most common cause of AHC outbreaks.

Laboratory Tests

Diagnosis is made primarily from the clinical manifestations, although cultures of purulent drainage or conjunctival swabs may be needed to identify the specific infectious agent in cases of bacterial conjunctivitis.

Surveillance

Conjunctivitis is a syndrome which is not a reportable condition. Although most cases of conjunctivitis are sporadic, outbreaks are not infrequent and do get reported.

The Louisiana Office of Public Health and CDC are interested in evaluating the effectiveness of control measures and the usefulness of topical antibiotic therapy in future outbreaks caused by *S. pneumoniae*.

Case Definition

A case of conjunctivitis is defined as an eye infection or injury that results in inflammation of the conjunctiva. It is a clinical definition.

An outbreak of conjunctivitis consists of at least three cases of conjunctivitis with onset within a week in a group of persons with common exposure, excluding a common household. In other words, clusters of household cases will not be considered for intervention but a cluster in a day care center, a school will be considered for intervention.

Intervention

The purpose of intervention is to identify cases of conjunctivitis due to an infectious agent, to identify the organism (if possible), and to implement disease prevention and control measures where necessary.

- Upon receipt of a report of an outbreak conjunctivitis, contact the reporter (physician, hospital, school staff) to verify the diagnosis.

- If reporting comes from a non-medical reporter, inquire about medical diagnosis and if any, verify with the medical provider.
- Determine whether the case has been identified as bacterial, viral, allergic, or as a result of injury.
- If the case is identified as allergic conjunctivitis or an eye injury, no further intervention is required.
- If the case is identified as bacterial or viral, determine whether the patient attends child care or preschool:
 - If a child has white or yellowish discharge from their eyes, they should be excluded from child care until 24 hours after the initiation of treatment with an antibiotic (if bacterial) or resolution of symptoms (Exclusion Policy in Chapter XXI of State Sanitary Code).
 - Emphasize the importance of handwashing and personal hygiene among both children and staff of child care centers. Staff members should also observe other children for the development of symptoms.
 - Notify the child care center director that the child (and any other child identified with the infection) is to be excluded from school until 24 hours after initiation of treatment or resolution of symptoms.

Educate the family and child care staff on the potential for spread from shared towels and washcloths and the risk of transmission by hand to eye contact. The patient's personal items should be kept separate from those used by other people. Only disposable towels should be used in a child care setting.

Hospital precaution and isolation: Standard precautions

Newborn ophthalmia

Gonococcal Ophthalmia

For newborn infants, acceptable prophylaxis of ocular gonorrheal infection topical includes the following. All are considered equally effective. They are available in single-dose tubes.

1% silver nitrate solution,
0.5% erythromycin ointment,
1% tetracycline ointment

Povidone-iodine in a 2.5% solution is used in some countries but is not available in the United States. Silver nitrate causes more chemical conjunctivitis than other agents but is recommended in areas where the incidence of penicillinase-producing *Neisseria gonorrhoeae* (PPNG) is appreciable.

Infants born to women with untreated gonococcal infection should also be treated with systemic antibiotics: 1 dose of ceftriaxone (25-50 mg/kg) or cefotaxime (100 mg/kg), as well as topical prophylaxis. Infants who have gonococcal ophthalmia should be evaluated for signs of disseminated infection.

Chlamydial Ophthalmia

Neonatal ophthalmia due to *Chlamydia trachomatis* is common. Studies on the efficacy in preventing conjunctivitis (or nasopharyngeal colonization and pneumonia risk) have yielded conflicting results for erythromycin, tetracycline ointment and silver nitrate. Infants with ophthalmia neonatorum caused by *C trachomatis* should be evaluated and treated.

Nongonococcal Nonchlamydial Ophthalmia

Silver nitrate, povidone-iodine, and, probably, erythromycin are effective for preventing nongonococcal nonchlamydial conjunctivitis during the first 2 weeks of life.

Administration of Neonatal Ophthalmic Prophylaxis for Gonorrhea (Red Book 2003)

Before administering local prophylaxis, each eyelid should be wiped gently with sterile cotton. Two drops of a 1% silver nitrate solution or a 1-cm ribbon of antibiotic ointment (0.5% erythromycin or 1% tetracycline) are placed in each lower conjunctival sac. The eyelids should then be massaged gently to spread the solution or ointment. After 1 minute, excess solution or ointment may be wiped away with sterile cotton. None of the prophylactic agents should be flushed from the eyes after instillation since flushing may reduce the efficacy of prophylaxis.

Infants born by cesarean section should receive prophylaxis against neonatal gonococcal ophthalmia. Although gonococcal and chlamydial infections usually are transmitted to the infant during passage through the birth canal, infection by the ascending route also occurs.

Prophylaxis should be given shortly after birth. Some experts suggest that prophylaxis may be administered more effectively in the nursery than in the delivery room. Delaying prophylaxis for as long as 1 hour after birth to facilitate parent-infant bonding is unlikely to influence efficacy. Longer delays have not been studied for efficacy. Hospitals should establish a system to ensure that all infants are treated.