🔥 CONJUNCTIVITIS

📌 Definition

Inflammation of the conjunctiva

🧠 CLASSIFICATION

❑ Based on Aetiology

🦠 Infective

- Bacterial
- Viral
- Chlamydial
- Fungal

🚫 Non-infective

- Allergic
- Autoimmune
- Chemical

- Toxic

2️⃣ Based on Type of Discharge

Discharge	Causes
Watery	Viral, acute allergy, toxic
Mucoid	Chronic allergy, KCS
Mucopurulent	Mild bacterial, chlamydia
Purulent	Gonococcal, severe bacterial

3️⃣ Based on Conjunctival Reaction

- 🔹 Follicular Conjunctivitis
  - Viral infections
  - Chlamydia
  - Trachoma
  - Topical drugs (epinephrine, eserine)
- 🔹 Papillary Conjunctivitis

- Allergic (VKC, AKC)
- Autoimmune (SJS, cicatricial pemphigoid)
- Contact lens / sutures
- Chronic blepharitis
- Topical atropine

🩺 CLINICAL FEATURES

🔹 Symptoms

- Lacrimation
- Grittiness
- Burning, stinging
- Itching → hallmark of allergic conjunctivitis ⭐

🔹 Signs

- Discharge (watery → purulent)
- Conjunctival hyperaemia 🔴
- Chemosis
- Papillae (allergy)

- Follicles (viral)
- Membranes (diphtheria)
- Preauricular lymphadenopathy
- Corneal involvement → keratitis

🦠 BACTERIAL CONJUNCTIVITIS

🟡 MUCOPURULENT CONJUNCTIVITIS (Pink Eye)

📌 Definition

Acute conjunctivitis with mucopurulent discharge

🦠 Common Organisms

- Staphylococcus aureus
- Streptococcus pneumoniae
- Haemophilus influenzae

🩺 Clinical Features

Symptoms

- Acute redness
- Foreign body sensation
- Burning
- Sticky discharge

Signs

- Redness maximal in fornix & palpebral conjunctiva
- Mucopurulent flakes
- Matted eyelashes
- Mild papillary reaction
- Normal vision

🔍 Diagnosis

- Clinical

💊 Treatment

- Conjunctival irrigation
- Lid hygiene
- Topical antibiotics:
    - Chloramphenicol

    - Gentamicin
    - Tobramycin
    - Ciprofloxacin / Ofloxacin / Moxifloxacin
- Ointment at bedtime
- ⚠️ 60% resolve spontaneously within 1 week

🔴 PURULENT CONJUNCTIVITIS (Gonococcal)

📌 Definition

Hyperacute conjunctivitis with profuse purulent discharge

🦠 Cause

- *Neisseria gonorrhoeae*

👶 Affected Groups

- Infants → during delivery
- Adults → genital autoinoculation

🩺 Clinical Features

- Sudden onset

- Profuse thick pus
- Severe pain
- Lid oedema
- Chemosis
- Preauricular lymphadenopathy
- Corneal ulceration common ⚠️

🔍 Diagnosis

- Gram stain
- Culture & sensitivity

💊 Treatment

- Hospitalization
- Copious irrigation
- Topical antibiotics
- Systemic antibiotics
- Topical atropine if cornea involved

🧠 EXAM PEARLS 💡

- Follicles → viral, Papillae → allergic
- Itching = allergy
- Gonococcal conjunctivitis = emergency
- Preauricular lymph nodes → viral

🧿 MEMBRANOUS CONJUNCTIVITIS

📌 Definition

Membranous conjunctivitis is an acute inflammation of the conjunctiva characterized by the formation of a membrane over the conjunctival surface.

🦠 Aetiology

- Corynebacterium diphtheriae
- Very rare nowadays due to widespread immunization 💉

🔬 Pathology

- Severe (violent) inflammation of conjunctiva
- Deposition of fibrinous exudate:
  - On the surface and
  - Within the substance of conjunctiva
- This leads to true membrane formation

👉 Important concept (Exam favourite 💡):

- Removal of membrane is:
  - Difficult
  - Causes epithelial tearing
  - Leads to bleeding

👁️ Clinical Features

🔹 Symptoms & Signs

- Mild to moderate eyelid swelling
- Serous discharge
- Whitish membrane present on:

    - Palpebral conjunctiva
    - Forniceal conjunctiva
- Bulbar conjunctiva is usually spared
- Redness of eye
- Preauricular lymphadenopathy present

⚠️ True Membrane vs Pseudomembrane

Feature	True Membrane	Pseudomembrane
Cause	Diphtheria	Non-diphtheritic
Composition	Fibrin within conjunctiva	Coagulated exudate
Removal	Difficult	Easy
Bleeding on removal	✔ Yes	❌ No
Epithelium damage	✔ Present	❌ Absent

📌 Hence, diphtheritic membrane = TRUE membrane

🚨 Complications

👁️ Cornea

- Corneal ulceration

👁️ Conjunctiva (Cicatrization leads to)

→ Xerophthalmia
→ Symblepharon
→ Ankyloblepharon
→ Entropion
→ Trichiasis

🎯 Ciliary Body

- Paralysis of accommodation due to toxin effect

🧪 Diagnosis

Based on:

- Clinical features
- Laboratory confirmation:
  - Staining
  - Culture & sensitivity

💊 Treatment (Treat as diphtheria unless proven otherwise ⚠️)

➡️ Management Flowchart

Suspected membranous conjunctivitis → Treat as diphtheritic → Irrigation of conjunctiva → Attempt to peel membrane → Anti-diphtheritic serum → Antibiotics (topical + systemic)

Specific Treatment

- Anti-diphtheritic serum: 4,000–10,000 units
- Topical antibiotics (drops)
- Systemic antibiotics (oral/injectable)

- Conjunctival irrigation to remove discharge

🦠 VIRAL CONJUNCTIVITIS

📌 Definition

Acute inflammation of conjunctiva characterized by:

- Watery discharge
- Redness of eye

🧬 Common Viruses

- Adenovirus (most common) 🥇
- Picornavirus
- Herpes simplex virus
- Measles virus
- Chickenpox virus
- Molluscum contagiosum

👁️ ADENOVIRUS CONJUNCTIVITIS

- Double-stranded DNA virus
- Most common cause of viral conjunctivitis
- Causes two clinical syndromes 👇

🔲 EPIDEMIC KERATOCONJUNCTIVITIS (EKC)

📌 Definition

Acute follicular conjunctivitis associated with superficial punctate keratitis

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🦠 Aetiology

- Adenovirus serotypes 8, 19, 37
- Highly contagious 😷
- Incubation period: ~8 days
- Spread by contact with ocular secretions

- Occurs in epidemics

👁️ Clinical Features

🔹 Symptoms

- Acute onset watering
- Redness
- Discomfort
- Photophobia
- Bilateral involvement in ~60%

🔹 Signs

- Eyelid oedema
- Watery discharge
- Diffuse conjunctival hyperaemia
- Severe cases may show:
    - Chemosis
    - Subconjunctival haemorrhage
    - Pseudomembrane

➡️ After few days

- Follicles in palpebral & forniceal conjunctiva

🌫️ Keratitis (Very Important 💡)

- Occurs in 80%
- Appears 7–10 days after infection

➡️ Course:

Diffuse epithelial keratitis

→ May resolve in 2 weeks

→ OR develop subepithelial infiltrates

→ Persist for months to years (immune mediated)

🧠 Lymph Nodes

- Preauricular
- Submandibular

🧪 Diagnosis

- Usually clinical
- Investigations (if not resolving):
  - Giemsa stain → mononuclear cells
  - Immunofluorescence
  - PCR (most sensitive)
  - Rising antibody titre
  - Rapid immunochromatographic tear test (10 min)

💊 Treatment

- Self-limiting (1–2 weeks)
- Symptomatic management:
  - Cold compress ❄️
  - Topical antibiotics (prevent secondary infection)
  - Dilute topical steroids → only if vision affected by infiltrates
- Antivirals ineffective

2️⃣ PHARYNGOCONJUNCTIVAL FEVER (PCF)

📌 Definition

Acute follicular conjunctivitis associated with:

- Fever
- Pharyngitis

🦠 Aetiology

- Adenovirus serotypes 3, 4, 7

👁️ Clinical Differences from EKC

- Prominent systemic symptoms:
  - Fever (101–104°F)
  - Headache
  - Pharyngitis
- Conjunctival signs milder
- Corneal involvement in ~30%

- Spread via respiratory secretions

🧬 PICORNAVIRUS CONJUNCTIVITIS

🦠 Aetiology

- Enterovirus 70
- Incubation: 1–2 days
- Highly contagious but self-limiting

👁️ Clinical Features

- Seen in overcrowded, low-hygiene settings
- Bilateral red eyes
- Watery discharge
- Subconjunctival haemorrhage
- Chemosis (palpebral conjunctiva)
- Punctate keratitis may occur

💊 Treatment

- No specific treatment
- Cold compress
- Antibiotics (secondary infection)
- Dilute steroids if required

🔥 HERPES SIMPLEX VIRUS CONJUNCTIVITIS

🦠 Aetiology

- Herpes simplex virus
- Follicular conjunctivitis
- Usually part of primary herpetic infection
- Common in children & young adults

👁️ Clinical Features

- Vesicles on eyelids
- Watery discharge

- Diffuse hyperaemia
- Chemosis & pseudomembrane (children)
- Follicles develop
- Corneal involvement in ⅔ cases:
    - Punctate lesions
    - Superficial stromal opacities
    - Multiple dendrites (important differentiator 💡)

🧪 Diagnosis

- Clinical
- Decreased corneal sensation
- Fluorescein staining
- Viral antigen detection
- Rising antibody titre

💊 Treatment

- Supportive

- Cold compress
- ❌ Steroids contraindicated
- ❌ Antivirals not used unless cornea involved
- Antibiotics to prevent secondary infection

🧿 MOLLUSCUM CONTAGIOSUM CONJUNCTIVITIS

📌 Definition

Viral infection of skin and conjunctiva

🦠 Aetiology

- Poxvirus (DNA)
- Spread by direct contact
- Viral particles from lid lesions → tear film
- Common in children
- Severe cases in AIDS patients

👁️ Clinical Features

- Chronic unilateral irritation
- Mucoid discharge
- Pale waxy umbilicated lid nodule (classic!)
- Follicular conjunctivitis
- Rare: pannus formation

🧪 Diagnosis

- Characteristic lid lesion
- Follicular conjunctivitis

💊 Treatment

- Often self-resolving (months-years)
- Removal of lid lesion:
    - Shave excision
    - Cryotherapy
    - Cauterization
    - Expression

🦠 CHLAMYDIAL CONJUNCTIVITIS

- Obligate intracellular gram-negative bacteria
- Exists as:
    - Elementary body (infectious)
    - Reticulate body (replicating)

Causes:

- Trachoma (A-C)
- Adult inclusion conjunctivitis (D-K)
- Neonatal inclusion conjunctivitis (D-K)

Trachoma 👁️

A major cause of preventable blindness worldwide

Definition 📘

Trachoma is a chronic, bilateral cicatricial keratoconjunctivitis caused by *Chlamydia trachomatis*.

- Chronic → long-standing disease
- Bilateral → affects both eyes
- Cicatricial → leads to scarring
- Keratoconjunctivitis → involves both conjunctiva and cornea

⭐ Exam Pearl:

Trachoma is the leading infectious cause of preventable irreversible blindness worldwide.

Aetiology 🦠

Feature	Details
Causative organism	*Chlamydia trachomatis*
Serotypes	A, B, Ba, C

Incubation period	5 – 12 days
Global burden	~ 150 million people affected
Contribution to blindness	10–15% of global blindness

Epidemiological Factors 🌍

Trachoma is common in:

- Poverty-stricken communities
- Overcrowded living conditions
- Poor hygiene
- Limited access to clean water

Transmission 🔄

Spread occurs through:

- Direct contact with infected conjunctival secretions
- Fomites (towels, handkerchiefs)
- Flies acting as mechanical vectors
- Autoinoculation from genital reservoirs

⭐ Key Point:

The disease is highly contagious during the active inflammatory phase.

Pathogenesis 🔬

The disease progresses through repeated infections → chronic inflammation → scarring → blindness.

Step-by-Step Pathogenesis

Chlamydia trachomatis infection → Entry into conjunctival & corneal epithelial cells → Formation of intracellular inclusion bodies → Subepithelial lymphocytic infiltration → Formation of lymphoid follicles → Follicle rupture and necrosis → Fibrosis and conjunctival scarring → Distortion of eyelids → corneal damage → Visual impairment / blindness

Key Structural Changes

Tissue	Pathological Change
Conjunctiva	Follicles → scarring
Cornea	Pannus formation
Eyelids	Entropion and trichiasis

⭐ Concept:

Blindness in trachoma occurs mainly due to corneal damage from eyelashes rubbing the cornea (trichiasis).

Clinical Features 🩺

The classical progression of trachoma was described by Arthur Ferguson MacCallan in 1908.

He classified trachoma into four stages.

MacCallan Stages of Trachoma

Stage	Key Feature	Activity
Stage I	Early follicular inflammation	Mild
Stage II	Active inflammatory disease	Highly active
Stage III	Scarring stage	Active but regressing
Stage IV	Sequelae and complications	Inactive

Stage I – Subclinical Stage 👁️

Symptoms

Usually minimal or absent

- Mild irritation
- Minimal discharge

Signs

- Low-grade conjunctival inflammation
- Immature follicles on upper tarsal conjunctiva
- Punctate epithelial keratitis in upper cornea

⭐ Why upper cornea?

Because the upper eyelid conjunctiva is mainly affected, so inflammatory changes extend to the superior cornea.

Stage II – Active Trachoma 🔥

This is the typical symptomatic stage.

Symptoms

- Watering (epiphora)
- Photophobia ☀️
- Foreign body sensation

Signs

☐ Follicular Hyperplasia

- Most important sign

- Seen mainly on:
    - Tarsal conjunctiva
    - Fornix
- Rare on bulbar conjunctiva, but when present → pathognomonic

Feature	Description
Size	0.5 – 5 mm
Characteristic	Expressible follicles

⭐ Exam Pearl:

Trachoma follicles are the only expressible follicles among follicular conjunctivitides.

2️⃣ Papillary Hypertrophy

- Enlarged conjunctival papillae
- May mask follicles

3️⃣ Corneal Pannus 🌫️

Definition:

Subepithelial vascularization of the cornea with lymphoid infiltration.

Feature	Description
Location	Usually upper cornea
Spread	May extend to central cornea
Effect	Causes corneal opacity

⭐ High-Yield Fact:

Superior pannus is characteristic of trachoma.

4️⃣ Corneal Ulceration

- Often occurs at the advancing edge of pannus

Stage III – Stage of Scarring 🧵

Inflammation begins to subside, but fibrosis becomes prominent.

Features

- Necrosis of follicles
- Linear or stellate conjunctival scars

Important Signs

❑ Arlt's Line

Feature	Description
Definition	Linear scar on tarsal conjunctiva
Location	~ 2 mm from eyelid margin

Cause	Healing of follicles

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2 Herbert's Pits ⭐

Feature	Description
Definition	Shallow pigmented depressions at limbus
Cause	Cicatrization of limbal follicles
Significance	Pathognomonic of trachoma

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3 Regression of Pannus

- Vascular cornea persists
- Lymphocytic infiltration decreases

Stage IV – Sequelae Stage ⚠️

This stage has no active infection, but severe structural damage.

Features

- Dense corneal opacity
- Marked visual impairment
- Eyelid deformities

WHO Classification of Trachoma (1987) – FISTO 📊

A simplified field grading system.

Code	Meaning
TF	Trachomatous follicles (≥5 follicles >0.5 mm on superior tarsus)
TI	Trachomatous inflammation obscuring ≥50% of deep tarsal vessels

TS	Trachomatous scarring
TT	Trachomatous trichiasis (≥1 eyelash touching globe)
CO	Corneal opacity blurring iris details

⭐ Mnemonic:

F I S T O → Follicles, Inflammation, Scarring, Trichiasis, Opacity

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Complications ⚠️

Eyelid Complications

Condition	Explanation
Trichiasis	Eyelashes turn inward
Distichiasis	Extra row of eyelashes

Entropion	Inward turning of eyelid
Ptosis	Drooping eyelid

Conjunctival Complications

- Dry eye
- Due to destruction of:
    - Goblet cells
    - Lacrimal gland ductules

Corneal Complications

- Pannus
- Corneal vascularization
- Corneal opacity
- Blindness

Diagnosis 🔍

Clinical Diagnosis

Usually based on typical signs:

- Follicles
- Papillae
- Punctate epithelial keratitis
- Corneal pannus
- Conjunctival scarring

Laboratory Diagnosis

Test	Purpose
Giemsa stain	Detect inclusion bodies
Fluorescent antibody test	Detect chlamydial antigen

ELISA	Detect antibodies
PCR	Highly sensitive detection
McCoy cell culture	Isolation of organism

Treatment 💊

Treatment aims to eradicate infection and prevent complications.

❑ Medical Treatment

Hygienic Measures

- Improve personal hygiene
- Clean living environment
- Treat infected family members

Topical Antibiotics

Drug	Dose
Tetracycline 1% ointment	4× daily for 6 weeks
Erythromycin 1% ointment	4× daily
Sulphacetamide drops	3–4× daily for 8 weeks

Systemic Antibiotics

Drug	Dose
Azithromycin ⭐	1 g weekly for 3 weeks (drug of choice)
Erythromycin	500 mg twice daily

Doxycycline	100 mg twice daily

⚠️ Note:

Tetracyclines are contraindicated in pregnancy and children <12 years.

2️⃣ Surgical Treatment 🔪

Indicated for complications, especially:

- Trichiasis
- Entropion
- Severe corneal damage

Procedures aim to correct eyelid position and prevent corneal injury.

Summary 🧠

Feature	Key Point
Organism	*Chlamydia trachomatis*
Serotypes	A, B, Ba, C
Hallmark lesion	Follicles
Pathognomonic sign	Herbert's pits
Major corneal lesion	Superior pannus
Classification	MacCallan stages
WHO grading	FISTO
Drug of choice	Azithromycin
Blindness cause	Trichiasis → corneal scarring

Adult Inclusion Conjunctivitis 👁️

Definition 📘

Adult Inclusion Conjunctivitis is an acute follicular conjunctivitis caused by genital strains of *Chlamydia trachomatis*.

It is commonly associated with sexually transmitted chlamydial infection.

⭐ Exam Pearl:
Adult inclusion conjunctivitis is often associated with chlamydial urethritis in males and cervicitis in females.

Aetiology 🦠

Feature	Details
Causative organism	*Chlamydia trachomatis*

Serotypes	D – K
Transmission	Usually venereal (sexually transmitted)
Risk group	Sexually active young adults

Modes of Transmission

Genital chlamydial infection → Direct contact with infected genital secretions → Autoinoculation to the eye (hand-to-eye spread) → Conjunctival infection

Other possible routes:

- Shared eye cosmetics
- Contaminated swimming pools
- Indirect contact with infected secretions

⭐ Key Point:
Unlike trachoma (A–C serotypes), adult inclusion conjunctivitis is caused by genital strains (D–K).

Pathogenesis 🔬

Genital infection with *Chlamydia trachomatis* (D–K) → Transfer of organism to eye → Infection of conjunctival epithelial cells → Intracellular inclusion body formation → Follicular inflammatory response → Chronic conjunctival irritation and discharge

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Clinical Features 🩺

Symptoms

Similar to acute mucopurulent conjunctivitis:

- Ocular discomfort 👁️
- Foreign body sensation
- Mucopurulent discharge
- Mild photophobia

Signs

Sign	Description
Mucopurulent discharge	Thick discharge from conjunctiva
Conjunctival hyperaemia	Redness of eye
Follicles	Predominantly on lower conjunctiva
Keratitis	Superficial epithelial keratitis in upper cornea
Preauricular lymphadenopathy	Enlarged lymph nodes in front of ear

⭐ Exam Tip:

Preauricular lymphadenopathy + follicles strongly suggests chlamydial conjunctivitis.

Diagnosis 🔍

Clinical Diagnosis

Based on typical features:

- Follicles on lower conjunctiva
- Mucopurulent discharge
- Preauricular lymphadenopathy

Laboratory Diagnosis

Investigations are similar to those used for trachoma:

Test	Purpose
Giemsa stain	Detection of inclusion bodies
Direct fluorescent antibody test	Identification of chlamydial antigen
ELISA	Detection of antibodies
PCR	Highly sensitive detection of organism

Cell culture	Isolation of *Chlamydia*

Treatment 💊

Drug of Choice

Drug	Dose
Azithromycin ⭐	1 g single oral dose

Alternative Treatments

Drug	Dose
Erythromycin	500 mg twice daily for 7 days
Doxycycline	100 mg twice daily for 7 days

⭐ Important:

Sexual partners should also be treated to prevent reinfection.

Neonatal Conjunctivitis (Ophthalmia Neonatorum) 👶

Definition 📘

Neonatal conjunctivitis is conjunctival inflammation occurring within the first month of life.

It is commonly acquired during passage through the birth canal.

Aetiology 🦠

Cause	Organism

Chlamydial	*Chlamydia trachomatis* (D–K)
Gonococcal	*Neisseria gonorrhoeae*
Bacterial	Staphylococcus, Streptococcus pneumoniae, *Haemophilus influenzae*
Viral	Herpes simplex virus type 2
Chemical	Silver nitrate / prophylactic antibiotic drops

Timing of Onset ⏱️

Cause	Time of Onset
Chemical conjunctivitis	Within few hours
Gonococcal conjunctivitis	2–4 days

Other bacteria	4–7 days
HSV infection	1–2 weeks
Chlamydial infection	1–3 weeks

⭐ Exam Trick:

Timing of onset is a classic exam question for neonatal conjunctivitis.

Types of Neonatal Conjunctivitis

1️⃣ Chlamydial Conjunctivitis

(Neonatal Inclusion Conjunctivitis)

Epidemiology

- Most common cause of neonatal conjunctivitis

- Acquired during delivery from infected mother

Clinical Features

Feature	Description
Onset	1–3 weeks after birth
Discharge	Mucopurulent
Conjunctiva	Hyperaemia with mild papillary reaction
Follicles	Absent (palpebral tissue not fully developed)
Cornea	Superior pannus may occur

⭐ Important Concept:

Follicles are absent in neonates because the conjunctival lymphoid tissue is not fully developed.

2️⃣ Gonococcal Conjunctivitis ⚠️

This is the most severe and rapidly progressive form.

Aetiology

Caused by Neisseria gonorrhoeae

Clinical Features

Feature	Description
Onset	2–4 days after birth
Discharge	Profuse purulent discharge
Eyelids	Severe oedema
Conjunctiva	Hyperaemia with pseudomembrane formation
Cornea	Keratitis common

⭐ Exam Pearl:

Gonococcal infection may cause rapid corneal ulceration and perforation.

3️⃣ Other Bacterial Conjunctivitis

Common organisms:

- Staphylococcus
- Streptococcus pneumoniae
- Haemophilus influenzae

Clinical Features

Feature	Description
Onset	4–5 days after birth
Eyelids	Swollen
Discharge	Mucopurulent

Conjunctiva	Hyperaemia

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4 Viral Conjunctivitis

Caused by Herpes simplex virus type 2

Clinical Features

Feature	Description
Onset	1–2 weeks after birth
Presentation	Blepharoconjunctivitis
Cornea	Keratitis may occur

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5 Chemical Conjunctivitis

Occurs after prophylactic eye drops used at birth.

Clinical Features

Feature	Description
Onset	Within few hours
Symptoms	Mild conjunctival redness
Duration	Resolves within 24 hours

⭐ Important:

No treatment is usually required.

Treatment 💊

❑ Chlamydial Conjunctivitis

Type	Treatment

Topical	Tetracycline 1% ointment or sulphacetamide drops for 4 weeks
Systemic	Erythromycin 50 mg/kg/day for 2 weeks

⭐ Systemic therapy is necessary because infection may involve nasopharynx and lungs.

---

2 Gonococcal Conjunctivitis

Topical Antibiotics

- Benzyl penicillin drops
- Gentamycin drops
- Tobramycin drops

Systemic Treatment

Drug	Dose

Benzyl penicillin	50,000 units/kg for 7 days
Cefotaxime	100 mg/kg single IM dose

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3 Other Bacterial Conjunctivitis

- Topical antibiotics (neomycin or tobramycin)
- Ointment at bedtime
- Systemic antibiotics if severe

---

4 Viral Conjunctivitis (HSV)

Treatment	Details
Topical acyclovir	5 times daily
Systemic acyclovir	For 14 days

Topical antibiotics may be used prophylactically to prevent secondary bacterial infection.

Complications of Neonatal Conjunctivitis ⚠️

Untreated infection can lead to:

Neonatal conjunctivitis → Corneal inflammation (keratitis) → Corneal ulceration → Corneal opacity → Conjunctival scarring → Visual impairment

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Revision Table 🧠

Type	Onset	Discharge	Key Feature
Chemical	Few hours	Mild	Self-limiting
Gonococcal	2–4 days	Profuse purulent	Severe eyelid oedema

Other bacteria	4–7 days	Mucopurulent	Moderate inflammation
HSV	1–2 weeks	Watery	Keratitis
Chlamydial	1–3 weeks	Mucopurulent	Most common

Allergic Conjunctivitis 🌿

Definition 📘

Allergic conjunctivitis is inflammation of the conjunctiva caused by hypersensitivity to allergens, characterized mainly by itching and redness of the eye.

⭐ Important Concept:

The conjunctiva is more sensitive to allergens than skin, so even small allergen exposure can trigger symptoms.

Types of Allergic Conjunctivitis 🧠

Type	Key Feature
Acute allergic conjunctivitis	Sudden allergic reaction
Seasonal allergic conjunctivitis	Associated with pollen seasons
Perennial allergic conjunctivitis	Occurs throughout the year
Vernal keratoconjunctivitis (VKC)	Severe allergic disease in children
Atopic keratoconjunctivitis	Chronic allergy in adults
Phlyctenular keratoconjunctivitis	Hypersensitivity to microbial antigens

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Acute Allergic Conjunctivitis 🌼

Definition

An acute inflammatory allergic reaction of the conjunctiva triggered by environmental allergens.

Pathogenesis 🔬

Environmental allergen (e.g., pollen) → Allergen binds IgE antibodies on mast cells → Mast cell degranulation → Release of mediators (histamine, prostaglandins, leukotrienes) → Vasodilation and increased vascular permeability → Conjunctival inflammation, itching, redness

⭐ This represents a Type I hypersensitivity reaction.

Epidemiology

Factor	Details
Age	Common in children

Season	Spring and summer
Trigger	Pollen exposure
Risk	Children playing outdoors

Clinical Features

Symptoms

- Severe itching ⭐ (most characteristic symptom)
- Watering of eyes
- Redness
- Mild irritation

Signs

Sign	Description

Conjunctival hyperaemia	Redness of eye
Chemosis ⭐	Conjunctival edema (hallmark sign)
Watery discharge	Non-purulent

⭐ Exam Pearl:

Chemosis is the hallmark sign of acute allergic conjunctivitis.

Treatment 💊

Treatment	Purpose
Cold compresses	Reduce inflammation
Topical antihistamines	Relieve itching
Adrenaline 0.1% drops	Reduce chemosis

Mast cell stabilizers	Prevent recurrence

Seasonal and Perennial Allergic Conjunctivitis 🌸

Definition

A non-specific allergic inflammation of the conjunctiva caused by environmental allergens.

These are the most common ocular allergic disorders, affecting about 20% of the population.

⭐ Usually associated with allergic rhinitis (hay fever).

Types

- [ ] Seasonal Allergic Conjunctivitis (SAC)

Key Characteristics

Feature	Description
Frequency	Most common ocular allergy
Associated condition	Allergic rhinitis (hay fever)
Season	Spring and summer
Allergens	Grass, tree, and weed pollens

---

2 Perennial Allergic Conjunctivitis (PAC)

Key Characteristics

Feature	Description
Frequency	Less common

Severity	Usually milder
Pattern	Symptoms occur year-round
Allergens	House dust, animal dander, fungi

Pathogenesis

Airborne allergen → IgE mediated mast cell activation → Histamine release → Vasodilation and conjunctival edema → Itching, redness, tearing

---

Clinical Features

Symptoms

- Recurrent redness
- Itching ⭐
- Watering

- Sneezing
- Nasal discharge

Signs

Sign	Description
Lid edema	Swelling of eyelids
Conjunctival hyperaemia	Redness
Chemosis	Conjunctival edema
Papillary reaction	Mild papillary hypertrophy

Treatment 💊

General Measures

- Avoid exposure to allergens
- Cold compresses

Topical Medications

Drug Class	Example	Action
Antihistamines	Emedastine	Relieves itching
Vasoconstrictors	Naphazoline	Reduces redness
Mast cell stabilizers	Sodium cromoglycate	Prevent mediator release
Mast cell stabilizers	Lodoxamide	More potent

Dosage example:

- Sodium cromoglycate → 4 times daily
- Lodoxamide → 4 times daily

Systemic Treatment

- Oral antihistamines may be used when itching is severe.

Steroids

- Rarely required
- Reserved for severe cases

⚠ Prolonged steroid use can cause glaucoma and cataract.

Vernal Keratoconjunctivitis (VKC) 🌞

(Spring Catarrh)

Definition

A chronic, recurrent, bilateral allergic inflammation of the conjunctiva and cornea, usually occurring in children and adolescents.

Epidemiology

Factor	Details
Age	5–15 years
Sex	More common in boys
Season	Spring and summer
Family history	Often associated with atopy

Atopy Explained 🧬

Atopy is a genetic predisposition to develop allergic hypersensitivity reactions when exposed to environmental allergens.

Examples include:

- Asthma
- Allergic rhinitis
- Eczema

Pathogenesis 🔬

Environmental allergen → IgE antibody formation → Antigen binds IgE on mast cells → Mast cell degranulation → Release of inflammatory mediators

Main mediators released:

- Histamine
- Serotonin
- Substance P

These mediators cause:

→ Conjunctival inflammation
→ Papillary hypertrophy
→ Corneal involvement

⭐ VKC involves Type I and Type IV hypersensitivity reactions.

Clinical Types of VKC

Type	Main Site Involved
Palpebral form	Upper tarsal conjunctiva
Limbal form	Limbus
Mixed form	Both palpebral and limbal

Symptoms

Typical symptoms include:

- Severe itching ⭐
- Lacrimation (watering)
- Photophobia
- Burning sensation
- Foreign body sensation
- Frequent blinking

Usually bilateral and recurrent.

Palpebral Form

Signs

Feature	Description
Conjunctival hyperaemia	Redness

Papillary hypertrophy	Mainly upper tarsal conjunctiva
Cobblestone papillae ⭐	Flat-topped polygonal papillae
Giant papillae	Large cauliflower-like masses
Ropy mucus discharge	Thick sticky mucus
Ptosis	Due to heavy upper eyelid

⭐ Cobblestone papillae are a classic exam finding of VKC.

Limbal Form

Signs

Feature	Description

Limbal hyperaemia	Redness around limbus
Limbal edema	Swelling
Gelatinous papillae	Thickened limbal conjunctiva
Trantas dots ⭐	White dots composed of eosinophils

⭐ Trantas dots are pathognomonic for VKC.

Mixed Form

Shows features of both palpebral and limbal disease.

Corneal Involvement (Keratopathy) ⚠️

Corneal damage occurs mainly in palpebral VKC.

Inflammation of conjunctiva → Release of inflammatory toxins → Corneal epithelial damage

Types of Corneal Changes

Change	Description
Punctate epithelial erosions	Earliest sign
Macroerosions	Larger epithelial defects
Shield ulcer ⭐	Mucus plaque covering ulcer
Subepithelial scarring	Ring-shaped scars
Superficial vascularization	Due to chronic inflammation

⭐ Keratoconus occurs more commonly in VKC due to frequent eye rubbing.

Treatment of Vernal Keratoconjunctivitis 💊

❑ Topical Therapy

First-Line Treatment

Drug	Action
Sodium cromoglycate	Mast cell stabilizer
Lodoxamide	Stabilizes mast cells & eosinophils

Dosage: 4 times daily

Antihistamines

Examples:

- Emedastine
- Epinastine

Used to reduce itching.

NSAIDs

Examples:

- Ketorolac
- Diclofenac

They block non-histamine inflammatory mediators.

Dual-Action Drugs

Drug	Action
Azelastine	Antihistamine + mast cell stabilizer
Ketotifen	Dual action
Olopatadine	Rapid symptom relief

Steroids (Severe Cases Only)

Examples:

- Fluorometholone 0.1%
- Prednisolone 0.5%
- Loteprednol 0.2%

⚠ Long-term steroid use may cause:

- Glaucoma
- Cataract

Other Treatments

Drug	Use
Acetylcysteine 5%	Mucolytic for mucus plaques
Cyclosporine 0.05%	Severe steroid-resistant VKC

Supratarsal Steroid Injection

Used in severe palpebral VKC.

Drugs used:

- Dexamethasone (4 mg/ml)
- Triamcinolone (40 mg/ml)

Injected into upper tarsal conjunctiva.

2️⃣ Systemic Therapy

Used only in severe cases.

Drug	Purpose
Oral antihistamines	Reduce itching
Systemic steroids	Severe inflammation
Azathioprine	Immunosuppression

Comparison Table ⭐

Feature	Acute Allergy	Seasonal/Perennial	VKC
Age	Children	Any age	5–15 years
Severity	Mild	Mild–moderate	Severe
Season	Spring	Seasonal or year-round	Spring
Main symptom	Itching	Itching	Severe itching
Special sign	Chemosis	Papillae	Cobblestone papillae
Cornea	Rare	Rare	Common

Atopic Keratoconjunctivitis (AKC) 👁️🧬

Definition

Atopic keratoconjunctivitis (AKC) is a rare, chronic, bilateral allergic inflammation of the conjunctiva and cornea associated with atopic dermatitis.

⭐ It represents a severe form of ocular allergy that typically occurs in adults with systemic atopy.

Pathophysiology 🔬

Environmental allergen exposure in an atopic individual → IgE-mediated immune response → Mast cell activation → Release of inflammatory mediators (histamine, cytokines) → Chronic conjunctival inflammation → Corneal involvement and scarring

⭐ Primarily a Type I hypersensitivity reaction.

Epidemiology

Factor	Feature
Age	Usually adulthood
Sex	Males > females
Associated diseases	Atopic dermatitis, asthma
Course	Chronic

Clinical Features

Systemic Association

Condition	Association
Atopic dermatitis	Very common

Asthma	Frequently present
Other atopic disorders	Often present

Ocular Findings

Many features resemble vernal keratoconjunctivitis (VKC) but with important differences.

Key Differences from VKC

Feature	VKC	AKC
Age	Children	Adults
Seasonality	Seasonal	Minimal seasonal variation
Papillae	Large cobblestone papillae	Micropapillae

Conjunctiva	Hyperemic	Pale tarsal conjunctiva
Scarring	Rare	Common
Corneal damage	Moderate	Severe

Symptoms

- Severe itching ⭐
- Burning sensation
- Lacrimation
- Photophobia
- Foreign body sensation

Signs

Sign	Description

Micropapillae	On tarsal conjunctiva and inferior fornix
Pale tarsal conjunctiva	Characteristic feature
Corneal vascularization	Severe and progressive
Corneal opacity	May impair vision
Conjunctival scarring	Common

Complications ⚠️

Complication	Explanation
Keratoconus	Due to chronic eye rubbing
Atopic cataract	Associated systemic disease

Corneal scarring	May lead to vision loss

Treatment 💊

Treatment principles are similar to VKC.

Topical Therapy

Drug	Purpose
Mast cell stabilizers	Prevent mediator release
Antihistamines	Reduce itching
Topical NSAIDs	Reduce inflammation
Cyclosporine	Immunomodulation
Steroids	Severe inflammation

⚠ Long-term steroid use must be monitored due to risk of glaucoma and cataract.

Phlyctenular Keratoconjunctivitis (Phlyctenulosis) 🦠

Definition

Phlyctenular keratoconjunctivitis is a localized nodular allergic inflammation of the conjunctiva or cornea caused by hypersensitivity to microbial antigens.

⭐ It represents a Type IV (delayed) hypersensitivity reaction.

Etiology

Cause	Details

Staphylococcal proteins	Most common cause today
Tuberculoprotein	Previously common
Parasitic proteins	Possible cause
Fungal proteins	Rare

Pathogenesis 🔬

Microbial antigen exposure → Cell-mediated immune reaction → T-lymphocyte activation → Local inflammatory response → Formation of phlyctenule (subepithelial nodule)

Phlyctenule Characteristics

Feature	Description
Size	0.5 – 3 mm
Nature	Subepithelial inflammatory nodule
Location	Conjunctiva or limbus
Course	Resolves in stages

Natural Course of Phlyctenule

Formation of inflammatory infiltrate → Elevation of nodule → Necrosis → Ulceration → Resolution

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Clinical Presentation

Phlyctenule may occur in:

Condition	Site
Phlyctenular conjunctivitis	Conjunctiva
Phlyctenular keratitis	Cornea
Phlyctenular keratoconjunctivitis	Both cornea and conjunctiva

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❑ Phlyctenular Conjunctivitis

Symptoms

- Lacrimation
- Irritation
- Mild itching

Secondary infection may cause mucopurulent discharge.

Signs

Sign	Description
Phlyctenule near limbus	Small nodular lesion
White central area	Surrounded by redness
Localized hyperaemia	Around lesion

Clinical Course

Phlyctenule formation → Necrosis → Conjunctival ulcer → Rapid healing

⭐ Healing occurs without scar formation.

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2 Phlyctenular Keratitis

Symptoms

- Pain
- Photophobia
- Tearing
- Blepharospasm

Signs

Phlyctenule appears at limbus → Spreads to cornea → Marginal corneal ulcer develops → Adjacent conjunctival hyperemia

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3 Phlyctenular Keratoconjunctivitis

In this form:

Limbal phlyctenule develops → Extends to conjunctiva and cornea → Produces features of both conjunctivitis and keratitis

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Diagnosis 🔎

Diagnosis is usually clinical.

Diagnostic Methods

Method	Purpose
Clinical examination	Primary diagnostic tool
Laboratory tests	Rarely required
Investigation of infection source	Identify causative antigen

Treatment 💊

Topical Therapy

Drug	Purpose

Topical steroids	Promote resolution
Topical antibiotics	Prevent secondary infection

Treat Underlying Cause

Important to treat source of antigen:

Cause	Treatment
Staphylococcal blepharitis	Lid hygiene + antibiotics
Worm infestation	Anthelmintic drugs
Tuberculosis	Anti-TB therapy

🌟 Conjunctivitis Diagnosis Table 🌟

Type of Conjunctivitis	Key Diagnostic Symptoms & Signs	Diagnostic Methods
Bacterial (Mucopurulent / Pink Eye)	Acute redness, sticky mucopurulent discharge, foreign body sensation, matted eyelashes, normal vision.	Clinical diagnosis.
Bacterial (Purulent / Gonococcal)	Sudden onset, profuse thick pus, severe pain, marked lid edema, chemosis, preauricular lymphadenopathy.	Gram stain, culture & sensitivity.
Membranous (Diphtheritic)	Mild to moderate eyelid swelling, serous discharge, whitish true membrane that bleeds and causes epithelial tearing when removed.	Clinical features, staining, culture & sensitivity.

Viral (Adenovirus – EKC)	Acute watering, redness, photophobia, follicles, watery discharge, preauricular/submandibular lymph nodes, punctate keratitis.	Usually clinical, Giemsa stain (mononuclear cells), Immunofluorescence, PCR, rapid tear test.
Viral (Adenovirus – PCF)	Associated with prominent systemic symptoms like high fever (101–104°F), headache, and pharyngitis.	Clinical diagnosis based on systemic association.
Viral (Picornavirus)	Bilateral red eyes, watery discharge, prominent subconjunctival hemorrhage, chemosis.	Clinical features.
Viral (Herpes Simplex)	Vesicles on eyelids, watery discharge, multiple dendrites on the cornea.	Clinical, decreased corneal sensation, fluorescein staining, viral antigen detection, rising antibody titre.

Viral (Molluscum Contagiosum)	Chronic unilateral irritation, mucoid discharge, pathognomonic pale waxy umbilicated lid nodule, follicular conjunctivitis.	Characteristic lid lesion, follicular conjunctivitis.
Chlamydial (Trachoma)	Expressible follicles, superior corneal pannus, Arlt's line (linear scar), Herbert's pits (limbal depressions).	Clinical (follicles/pannus/scarring), Giemsa stain, fluorescent antibody test, ELISA, PCR, McCoy cell culture.
Chlamydial (Adult Inclusion)	Mucopurulent discharge, follicles predominantly on lower conjunctiva, preauricular lymphadenopathy.	Clinical, Giemsa stain, direct fluorescent antibody test, ELISA, PCR, cell culture.

Neonatal (Ophthalmia Neonatorum)	Chemical: Onset within hours, mild redness . Gonococcal: Onset 2–4 days, profuse purulent discharge. Other Bacterial: Onset 4–5 days, mucopurulent discharge. Viral (HSV): Onset 1–2 weeks, watery discharge. Chlamydial: Onset 1–3 weeks, mucopurulent discharge, follicles absent.	Diagnosed clinically primarily by the specific timing of onset and discharge type.
Allergic (Acute)	Sudden severe itching, watering, redness, with chemosis (conjunctival edema) as the hallmark sign.	Clinical presentation and allergen exposure.

Allergic (Seasonal/Perennial)	Recurrent redness, itching, watering, sneezing, often associated with allergic rhinitis (hay fever).	Clinical presentation and seasonal/year-round patterns.
Allergic (Vernal - VKC)	Severe itching, cobblestone papillae (upper tarsal), ropy mucus discharge, Trantas dots (limbal), shield ulcers.	Clinical presentation (typically boys aged 5-15 in spring/summer).
Allergic (Atopic - AKC)	Severe itching, micropapillae, characteristic pale tarsal conjunctiva, associated with adult atopic dermatitis.	Clinical presentation (adults) and systemic association.
Phlyctenular	Nodular lesion (phlyctenule) with a white central area surrounded by localized hyperemia, mild itching, tearing.	Primarily a clinical diagnosis.

-> The End <-