The conjunctiva is a transparent mucus membrane

**Applied anatomy**

- The conjunctiva is divided into the following 3 parts:
  - *Palpebral* which starts at the mucocutaneous junction and is firmly adherent to tarsal plates.
  - *Forniceal* which is loose and redundant so that it swells easily and is thrown into folds.
  - *Bulbar* which lines the anterior sclera.
- The *conjunctival epithelium* is between two and five cell layers thick. With chronic exposure and drying, the epithelium may become keratinized.
- The *stroma* (substantia propria) consists of richly vascularized connective tissue which is separated from the epithelium by a basement membrane. The accessory lacrimal glands are located within the stroma. The mucin secretors are of the following three types

**Clinical features**

The followings should be considered in the differential diagnosis of conjunctival inflammation are: (1) type of discharge, (2) type of conjunctival reaction, (3) presence of pseudomembranes or true membranes and (4) presence or absence of lymphadenopathy.

1. **Discharge**

The following are the main types of discharge:

- *Watery* discharge composed of a serous exudate and a variable amount of reflexly secreted tears. It is typical of viral and toxic inflammations.
- *Mucoid* discharge is typical of vernal conjunctivitis and keratoconjunctivitis sicca.
- *Purulent* discharge occurs in severe acute bacterial infections.
- *Mucopurulent* discharge occurs in mild bacterial as well as chlamydial infections.

2. **Conjunctival Reactions**

**Follicular Conjunctival Reaction**

- Clinically, they appear as multiple, discrete, slightly elevated lesions reminiscent of small grains of rice. The THREE main causes of follicles are (1) viral infections, (2) chlamydial infections, (3) hypersensitivity to topical medication.

**Papillary Conjunctival Reaction**

- Papillae can develop only in the palpebral conjunctiva and the bulbar conjunctiva at the limbus. Papillae are most frequently seen in the upper palpebral conjunctiva. A papillary reaction is more non-specific and of less diagnostic value than a follicular response. The 4 main causes of papillae are (1) chronic blepharitis, (2) vernal disease, (3) bacterial infection, (4) contact lens related problems.
3. Pseudomembranes and Membranes

- Pseudomembranes characteristically, they can be easily peeled off leaving the epithelium intact. The four main causes are (1) severe adenoviral infection, (2) ligneous conjunctivitis, (3) gonococcal conjunctivitis and (4) autoimmune conjunctivitis.
- True membranes Attempts to remove the membrane may be accompanied by tearing of the epithelium and bleeding. The main causes are infections resulting from β-haemolytic streptococci and diphtheria.

4. Lymphadenopathy

- Lymphatic drainage of the conjunctiva is to the preauricular and submandibular nodes.
- Lymphadenopathy is a feature of (1) viral infections, (2) chlamydial infections and (3) severe gonococcal conjunctivitis.

**DISORDERS OF THE CONJUNCTIVA**

**Bacterial conjunctivitis**

*Simple bacterial conjunctivitis*

- Simple bacterial conjunctivitis is a very common and usually self-limiting condition. The most common causative organisms are Staphylococcus epidermidis and Staphylococcus aureus but other Gram-positive cocci, including Streptococcus pneumoniae, are also frequent pathogens as are the Gram-negative Haemophilus influenzae and Moraxella lacunata.
- Clinical features
  - Presentation is with an acute onset of redness, grittiness, burning and discharge. Photophobia may be present if there is associated severe punctate epitheliopathy or peripheral corneal infiltrates. On waking, the eyelids are frequently stuck together and difficult to open as a result of the accumulation of exudate during the night. Both eyes are usually involved, although one may become affected before the other by a day or so. Examination shows conjunctival hyperaemia which is maximal in the fornices a mild papillary reaction, a mucopurulent discharge and lid crusting.
- Treatment
  - Even without treatment, simple conjunctivitis usually resolves within 10-14 days and laboratory tests are not routinely performed. Before initiating treatment, it is important to bathe all discharge away. Initial treatment is broad-spectrum antibiotic drops during the day and ointment at night until the discharge has ceased.

**Viral conjunctivitis**

*Adenoviral keratoconjunctivitis*

- The spectrum of disease varies from mild and almost inapparent, to full-blown cases characterized by two syndromes: (1) pharyngoconjunctival fever (PCF) and (2) epidemic keratoconjunctivitis (EKC), both of which occur in epidemics and are highly contagious for up to 2 weeks. Because the viruses can be spread by finger-to-eye contact, it is important for ophthalmologists to wash their hands after being in contact with an acute red eye.
- Clinical features
  - Conjunctivitis Presentation is with acute onset of watering, redness, discomfort and photophobia. Both eyes are affected in about 60% of cases.
• Examination shows lid oedema, a follicular response which is frequently associated with a preauricular adenopathy. In severe cases, subconjunctival haemorrhages, chemosis and pseudomembranes may develop.
• Treatment is unsatisfactory but spontaneous resolution within 2 weeks is the rule. Topical steroids should be avoided unless the inflammation is very severe and the possibility of herpes simplex infection has been excluded.

**Keratitis**

- Keratitis is rarely a problem in PCF, but it may be severe in patients with EKC.
- Treatment with topical steroids is indicated only if the eye is uncomfortable or visual acuity diminished. Steroids do not shorten the natural course of the disease but merely suppress the corneal inflammation so that the lesions tend to recur if treatment is discontinued prematurely.

**Trachoma**

- Trachoma is an infection caused by Chlamydia trachomatis. It is a disease of underprivileged populations with poor conditions of hygiene; currently, trachoma is the leading cause of preventable blindness in the world.
- **Presentation** is during childhood with the formation of bulbar and palpebral conjunctival follicles and diffuse infiltration with papillae. This is followed by chronic inflammation which eventually causes conjunctival scarring; this, in turn, may lead to trichiasis and corneal complications in older children and adults.

**World Health Organization grading is as follows:**

- **TF** = trachomatous follicular inflammation of more than five follicles larger than 0.5 mm on the upper tarsus.
- **TI** = trachomatous intense inflammation with thickening obscuring over 50% of large, deep, tarsal vessels.
- **TS** = trachomatous (conjunctival) cicatrization with white lines, bands or sheets of fibrosis in the tarsal conjunctiva.
- **TT** = trachomatous trichiasis of at least one inverting eyelash or evidence of recent removal.
- **CO** = corneal opacity obscuring at least part of pupil margin & causing a visual acuity of less than 6/18.
- Treatment of active disease is similar to adult inclusion conjunctivitis. The most important preventive measure is strict personal hygiene within the family, especially washing the faces of young children.

**Allergic conjunctivitis**

**Seasonal allergic conjunctivitis**

- Seasonal allergic (hay fever) conjunctivitis is a very common allergic reaction triggered by airborne antigens such as mould spores, pollen, grass, hair, wool and feathers.
- **Presentation** is with acute, transient attacks of itching, lacrimation & redness during the hay fever season.
- **Examination** shows mild chemosis and a diffuse papillary reaction. In severe cases, the eyelids may be slightly oedematous but the cornea is never involved.
- **Treatment** is with a topical mast cell stabilizer instilled four to six times a day in the form of 2% sodium cromoglycate drops. Although topical steroids are also efficacious, their use is not appropriate because of their potential for unwanted side effects.
- Although systemic antihistamines are effective in suppressing other symptoms of hay fever, they are of limited benefit in the eye.
Acute allergic conjunctivitis

- Acute allergic conjunctivitis is an urticarial reaction caused by a large amount of allergen reaching the conjunctival sac. Clinically, the condition is characterized by a sudden onset of severe chemosis and swelling of the eyelids. Most cases resolve spontaneously within a few hours and, apart from reassurance, require no specific treatment.

Vernal keratoconjunctivitis

- Vernal keratoconjunctivitis (VKC) (spring catarrh) is an uncommon recurrent, bilateral, external, ocular inflammation affecting children and young adults.
  - Clinical features
    - The main symptoms are intense ocular itching which may be associated with lacrimation, photophobia, foreign body sensation and burning. Thick mucus discharge from the eyes and ptosis also occurs. The symptoms may occur throughout the year, but are characteristically worse during the spring and summer. The three main clinical types are (1) palpebral, (2) limbal and (3) mixed.
  - Treatment
    - Topical steroids are usually effective but may not achieve complete control of the disease in all cases. As prolonged treatment is usually required, steroid-induced complications are high and they must be used with great caution.
    - Sodium cromoglycate 2% drops four times daily is very useful in enabling patients to reduce or even discontinue steroid medication. It is not, however, as effective as steroids in controlling acute exacerbations and only 20% of patients respond to cromoglycate alone.

Conjunctival degenerations

Pinguecula

- A pinguecula is an extremely common lesion which consists of a yellow-white deposit on the bulbar conjunctiva adjacent to the nasal or temporal aspect of the limbus. Some pingueculae may enlarge very slowly but surgical excision is seldom required.

Pterygium

- A pterygium is a triangular sheet of fibrovascular tissue which invades the cornea. Pterygia typically develop in patients who have been living in hot climates and may represent a response to chronic dryness and exposure to the sun.
- Treatment by surgical excision is indicated either for cosmetic reasons or in cases of progression towards the visual axis. The most favoured method is excision of the conjunctival component followed by grafting of free conjunctiva, usually from the bulbar surface of the same eye.

Concretions

- Conjunctival concretions are small yellow white deposits commonly present in the palpebral conjunctiva of the elderly. They may also occur in patients with chronic conjunctival inflammatory conditions. Concretions are usually discrete but confluent concretions are not uncommon. They can be easily removed with a needle.