Diagnosing Conjunctival Problems

Background[1]

The conjunctiva is the thin mucous membrane lining the eyelid. It is reflected at the upper and lower fornices on to the anterior surface of the eyeball. It fuses with the cornea along the conjunctival limbus forming a circular 'opening' for the cornea. The conjunctival limbus is situated about 1 mm anterior to the edge of the corneal limbus (where the transparent cornea stops and the opaque sclera starts).

The conjunctiva is a highly vascular membrane. It is related to the cornea via the epithelial cell border which is continuous between the conjunctiva and the cornea. Thus, infections, inflammatory conditions and trauma can all potentially extend from one structure to the other.

Symptoms in conjunctival problems

Specific symptoms vary according to the exact underlying problem. There are some common features to conditions affecting the conjunctiva:

- Red eye.
- Epiphora (watering eye).
- Irritation - this may be a foreign body sensation due to the presence of follicles or papillae. Itching is the hallmark of allergic conjunctivitis but may also occur in blepharitis or kerato-conjunctivitis sicca.
- Pain - this is generally mild. Unless there is obvious trauma, significant pain is unusual and should trigger suspicion of corneal involvement.
- Discharge.

Assessment of the conjunctiva

There are three components to conjunctival examination:

Visual assessment

- **Conjunctival reaction** - this refers to the redness of the eye. It ranges from mild (the eye is 'pink'), such as in a mild allergic reaction, to severe, such as in a serious infection. It may be diffuse or focal and may be limited to the area of the limbus (perilimbal injection - traditionally ascribed to uveitis). A subconjunctival haemorrhage will be a deep red colour, obscuring the underlying sclera.
- **Discharge** - this may provide a clue as to the aetiology of a conjunctivitis. Watery discharge suggests an acute viral infection. Mucoid discharge suggests a vernal infection. Purulent discharge occurs in bacterial infections.
- **Presence of follicles or papillae** - distinguishing one from the other can be tricky and both can occur together.
  - **Papillae** - occur in allergic, bacterial and gonococcal conjunctivitides. They are formed when the conjunctival inflammation is effectively limited by fibrous septa, so giving rise to the appearance of vascular bulges. Generally found on the upper tarsal conjunctiva, they can coalesce to form giant (cobblestone) papillae.
  - **Follicles** - are more often associated with viral conjunctivitis. They are lymphoid collections and are raised gelatinous pale bumps (resembling small grains of rice). They tend to occur on the lower tarsal conjunctiva and along the upper tarsal border.

- **Oedema (chemosis)** - transluscent swelling of the conjunctiva, suggesting severe inflammation. This commonly occurs immediately after cataract surgery and, in this context, it is not worrying as long as it settles. It can also occur if there is infection or irritation, including that caused by retrobulbar masses or thyroid orbitopathy.
- **Scarring** - this may occur as a result of trachoma, ocular cicatricial pemphigoid, atopic conjunctivitis or prolonged use of topical medication. The lid may be difficult to pull down or to evert.

**Look for what you can't see**
- **Evert the lids** - foreign bodies and lesions may be completely concealed within the conjunctival fornices.
- **Stain with fluorescein** - a small conjunctival laceration may well show up when it was otherwise not visible. It is particularly important to do this when there is a strongly suggestive history but no obvious tear. If you are still struggling, ask the patient to look in the opposite direction to the suspected site of injury, so gently causing the conjunctiva to unfold and stretch out.
- **Swab** - this is necessary in the case of severe, purulent conjunctivitis, follicular conjunctivitis (to differentiate viral from chlamydial infection) and in neonatal conjunctivitis.

**Examine structures other than the conjunctiva**
Any patient presenting with apparent conjunctival problems should be further assessed for associated ocular problems:

- Assess visual acuities and cornea.
- Assess for associated blepharitis.
- Pain, photophobia, reduced visual acuity and headache suggest uveitis.
- Check the preauricular and submandibular nodes, as lymphadenopathy occurs in viral, chlamydial and gonococcal infections.

**Conjunctivitis**[2]
See separate articles to find out more about:

- **Viral conjunctivitis.**
- **Bacterial conjunctivitis** including:
  - Simple bacterial conjunctivitis
  - Gonococcal conjunctivitis
  - Chlamydial conjunctivitis
  - Ophthalmia neonatorum

- **Allergic conjunctivitis.**
- **Other types of conjunctivitis** (eg, toxic conjunctivitis, pediculosis, floppy eyelid syndrome, etc).

**Conjunctival trauma**

**Subconjunctival haemorrhage**
See separate article Subconjunctival haemorrhage

**Conjunctival foreign bodies**
See separate article Corneal Foreign Bodies, Injuries and Abrasions.

**Conjunctival lacerations**[3]

- **Nature**: these may be minor and isolated, such as may occur in gardeners, or may be in the context of more extensive injury.
- **Key features**: foreign body sensation, lacrimation, minimal pain. Laceration visible on examination. Small lacerations will only be seen on fluorescein staining.
- **Management**: ensure that there is no associated injury - is the small laceration actually an entry point for an intraocular foreign body? Small lacerations (≤ about 2 mm) should heal spontaneously. Give antibiotic cover as for a foreign body (above). Larger lacerations may need suturing and need referral.
Seidel's test: assesses for the presence of anterior chamber leakage due to globe perforation. Apply a strip of 10% fluorescein to the affected area and view it with a cobalt blue filter. The fluorescein appears as a dark orange colour. Any leaking aqueous will dilute it, giving it a bright luminescence (Seidel's positive). This indicates a perforation. Put a hard shield over the eye, and refer urgently.

Degenerative conditions

Cogan's senile plaque

- **Nature**: found in older people (generally >70 years old) - the exact pathophysiology is unknown but they represent areas of scleral translucency. They are benign.
- **Key features**: vertically ovoid irregular dark grey-brown areas seen in the 3 o'clock and 9 o'clock positions, lateral to the cornea. They may eventually calcify and become white.
- **Management**: they do not need any treatment.

Pinguecula

- **Nature**: a very common and benign yellow-white thickening which is usually bilateral and caused by ultraviolet (UV) exposure. Most pingueculae are found over the age of 40.
- **Key features**: small yellow-white deposits at the 3 o'clock or 9 o'clock positions, adjacent to the limbus. They look like a tiny (usually triangular-shaped) cluster of pale, translucent pips. Because the corneal surface is raised, the tear film may be interrupted, causing a loss of lubrication of the eye over the pinguecula, leading to pingueculitis.
- **Management**: they are left alone unless they become inflamed, in which case they are then treated with a short course of weak steroids. They are occasionally removed on cosmetic grounds.

Pterygium

- **Nature**: this is a benign fibrovascular conjunctival growth, usually from the nasal side of the sclera. It is a triangular (pointing towards the pupil) fibrovascular growth on the conjunctival tissue. It is associated with environmental stress to the eye - UV light, dryness and dust and is more common in those who have lived in hot dry climates.
- **Key features**: painless opacity slowly growing over the cornea from the nasal limbus.
- **Management**: simple surgical excision can be carried out (either for cosmetic reasons or because it is encroaching on the central visual axis) but recurrence is frequent. Sunglasses and artificial tears may help prevent further growth.

Concretions

- **Nature**: very commonly occurring chalky white/yellow deposits which are usually found on the inferior tarsal conjunctiva. They are more common in the elderly and in those with meibomian gland disease (see separate article Blepharitis).
- **Key features**: these are usually asymptomatic (unless very large when a foreign body sensation is experienced), well-defined deposits.
- **Management**: they are left alone unless symptomatic when they can be removed under topical anaesthetic, with a needle.

Retention cyst

- **Nature**: a very common, benign lesion.
- **Key features**: this is an asymptomatic (unless very large) clear fluid-filled lesion occurring anywhere in the conjunctiva.
- **Management**: they are left alone unless symptomatic when they can be removed, under topical anaesthetic, with a needle.

Blistering mucocutaneous diseases
Cicatricial pemphigoid

- **Nature**: an idiopathic subepidermal blistering and scarring autoimmune condition occurring in the mucocutaneous parts of the body. It always occurs bilaterally (not necessarily symmetrically) but isolated conjunctival involvement is not common.
- **Features**: typically this occurs in the middle-aged patient, and is more common in females. Nonspecific viral conjunctivitis-type symptoms occur initially with progressive appearance of papillae, bullae and eventually fibrosis. Diffuse hyperaemia and oedema persist during the latent phases of the condition.
- **Management**: topical steroids, subconjunctival mitomycin C and silicone contact lenses are used initially. Most patients will also benefit from systemic steroids, dapsone ± cytotoxic agents. Surgery is reserved for those with complications such as cicatricial entropion or serious corneal complications.

Stevens-Johnson syndrome

- **Nature**: Stevens-Johnson syndrome is an acute, severe blistering disease of unknown exact aetiology (hypersensitivity to drugs and viral infections appear to be precipitating factors). A vasculitis affects the skin and mucous membranes (90% of patients have conjunctival involvement).
- **Features**: it occurs in young, previously healthy individuals (more often males) who present with fever, malaise, sore throat (± a cough) and arthralgia. A mild conjunctivitis is noted in all but a handful of patients who experience a severe membranous or pseudomembranous conjunctivitis.
- **Management**: topical and systemic steroids (± antivirals if herpes is suspected to have triggered it), lubricants and possibly surgical intervention where the vasculitis and complications such as severe scarring have occurred.

Inflammatory conditions

- **Mucus fishing syndrome**: the patient embarks on cycles of fishing out mucus from the conjunctiva. The most common underlying cause of mucus formation is keratoconjunctivitis sicca but this repetitive trauma results in more mucus formation (and more fishing out). Treatment of the underlying cause and patient counselling are important.
- **Ligneous conjunctivitis**: this is a very rare disorder characterised by the repetitive formation of pseudomembranes around the conjunctiva. The mouth, nasopharynx, trachea and vagina may also be affected. It is treated with topical ciclosporin.

Conjunctival lesions

Pigmented lesions

- **Conjunctival epithelial melanosis**: this is a benign condition seen in dark-skinned patients. It is characterised by asymmetrical, bilateral flat, patchy brown pigmentation occurring from childhood.
- **Congenital ocular melanosis**: this consists of multiple slate-grey lesions occurring in the episclera, caused by melanocytic hyperplasia. This may be a precursor to melanoma formation and therefore these patients are monitored in the eye clinic.
- **Conjunctival naevus**: this is a relatively uncommon but benign pigmented lesion most commonly occurring adjacent to the limbus in the first two decades of life. If it causes irritation or if there is suspicion of malignant change, it should be excised.
- **Primary acquired melanosis**: this is an uncommon, usually unilateral condition affecting middle-aged Caucasian patients, characterised by progressive, diffuse pigmentation of the sclera. The lesions are flat - any nodular appearance should raise suspicion of melanoma.
- **Conjunctival melanoma**: this accounts for 2% of ocular malignancies. It is unusual for it to arise completely spontaneously - there will usually have been preceding acquired melanosis (60-70% of cases) or a naevus (20% of cases). It presents as a dark brown/grey nodule (amelanotic melanomas are bright pink) in the fifth to sixth decade of life. It most often occurs in Caucasians (it is very rarely in patients of African origin), often near the limbus. Well circumscribed lesions are excised but diffuse lesions also benefit from cryotherapy or mitomycin C. Recurrences are treated by resection ± radiotherapy. There is a 25% mortality rate at 10 years.
Squamous tumours

- **Conjunctival papilloma**: this can be either pedunculated (caused by infection with the human papillomavirus which may occur at birth) or sessile (a non-infectious condition occurring in middle age which is thought to be linked to UV light exposure). Pedunculated papillomas appear as clusters and are most often located in the fornix or palpebral conjunctiva. Small lesions are left alone as this is a self-limiting condition but large ones may need excision biopsy or cryotherapy. Sessile (neoplastic) papillomas appear as (often single) vascular frond-like lesions growing over the bulbar conjunctiva. Treatment is by excision.

- **Conjunctival intraepithelial neoplasia (CIN)**: this is an uncommon, slowly progressive unilateral condition characterised by grey-white hyperplastic epithelium which extends on to the cornea. UV light exposure, human papillomavirus infection and AIDS are all risk factors. Localised lesions are treated by excision but more diffuse lesions may need additional treatment with chemotherapy such as 5-fluorouracil and interferon alfa-2b.

- **Conjunctival squamous cell carcinoma**: this rare tumour is slow-growing and of low-grade malignancy; it is more common in Caucasian patients and tends to occur at younger ages closer to the equator. It is a form of CIN that has broken through the basement membrane or that has metastasised. It presents as a gelatinous fleshy mass, usually near the limbus and commonly associated with prominent ‘feeder’ vessels. Xeroderma pigmentosum and AIDS are risk factors. It is treated with surgery and chemotherapy but advanced cases may warrant enucleation (taking out the contents of the globe) or exenteration (taking out the globe and adjacent structures). Mortality rate may be up to 8%.

Other conjunctival tumours

- **Conjunctival sebaceous gland carcinoma**: this is a very rare but aggressive tumour which may mimic chronic blepharconjunctivitis. It results from conjunctival invasion of sebaceous gland carcinoma and (less commonly) primary intraepithelial carcinoma.

- **Epibulbar choristoma**: a choristoma is a congenital overgrowth of normal tissue in an abnormal location. In this case, it may be dermoid (which may occur in isolation or in Goldenhar’s syndrome) or lipodermoid which only presents in adult life. The former is a smooth, soft, subconjunctival mass which can grow very large and the latter is a soft, movable subconjunctival mass often situated laterally. Dermoids may need surgical excision if they become symptomatic (irritation, disturbance of vision) but lipodermoids are best left alone as surgery is associated with complications such as scarring, ptosis and dry eye.

- **Conjunctival lymphoma**: this may range from benign, reactive hyperplasia to fully developed lymphoma. It usually presents late in life with a painless swelling which may occasionally irritate the patient. It is a slow-growing, salmon-pink infiltrate which creeps across the bulbar conjunctiva (ie over the sclera). Radiotherapy, chemotherapy, cryotherapy, local injection of interferon alfa-2b and surgical excision are all treatment options.

- **Conjunctival Kaposi’s sarcoma**: this is a slow-growing malignancy occurring in AIDS patients. There is a painless, slightly irritated, flat discolouration which may look a little like a long-standing subconjunctival haemorrhage. Focal radiotherapy and excision are possible treatment options if the patient experiences bleeding, and recurrent infection, or for cosmetic reasons.

- **Conjunctival pyogenic granuloma**: this benign, fleshy, pedunculated, vascular mass most commonly occurs at the site of chronic infection (such as where there has been a chalazion) or several weeks after surgery (such as following excision of a pterygium). It may cause irritation or inadequate lid closure depending on its size and location. It is treated by excision. It is misnamed, in fact, as it is neither pyogenic nor granulomatous.

Other conjunctival problems

- **Symblepharon**: this occurs when adhesions arise between bulbar and palpebral conjunctiva. This can happen in a number of situations - eg, following a burns injury, with recurrent pterygia, in Stevens-Johnson syndrome, etc.
Further reading & references

- Digital Reference of Ophthalmology; Edward S. Harkness Eye Institute
- Kolb H; Gross Anatomy of the Eye
- Clinical Ophthalmology: A Systematic Approach
- Fourteenth Annual Handbook of Ocular Disease Management; Review of Optometry

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