

Ophthalmology

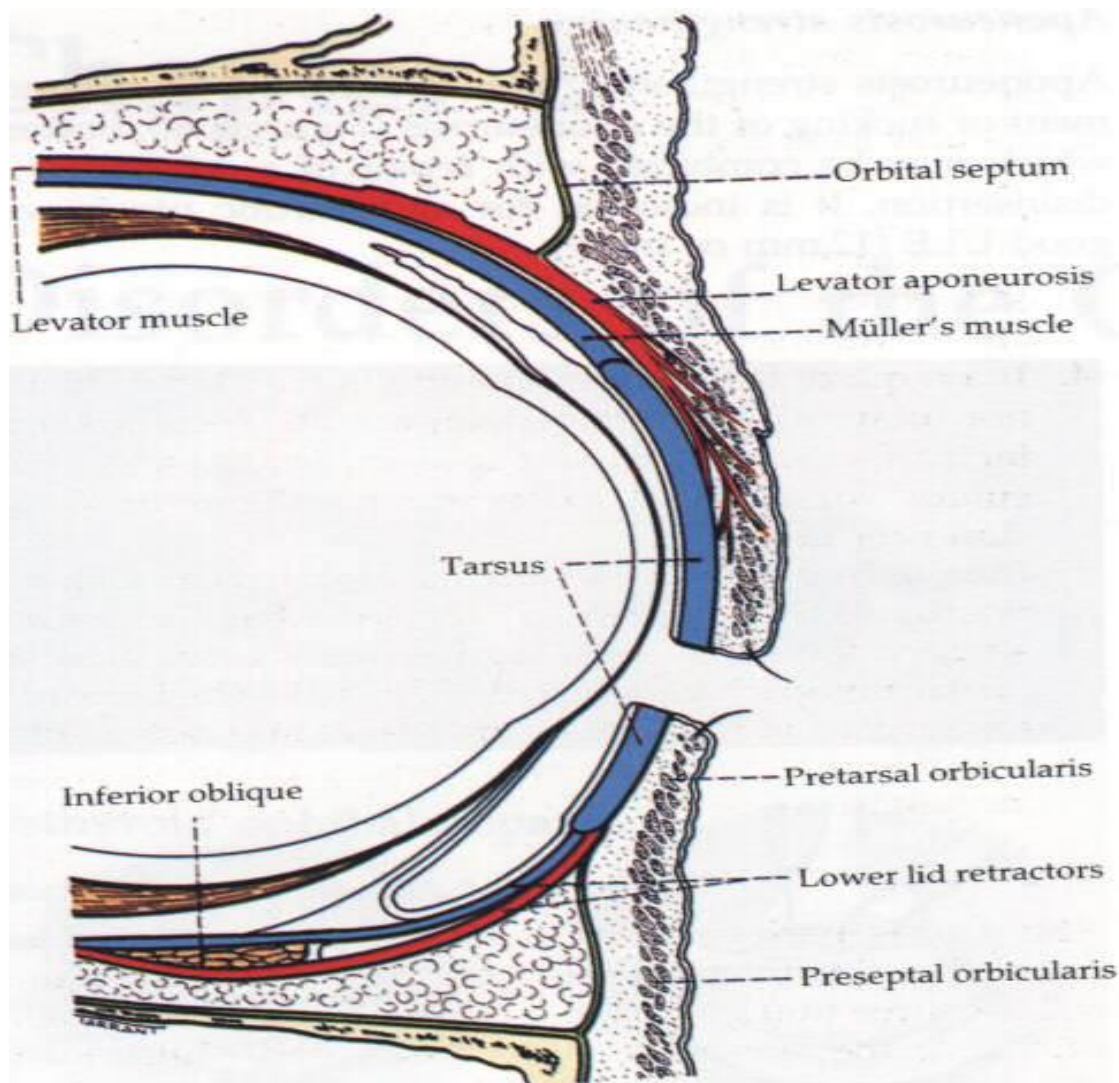
Eyelids (2 lec.)

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Anatomy:

Eyelids are thin movable curtains composed of skin on their anterior surface and mucus membrane (conjunctiva) on the posterior surface, they contain:

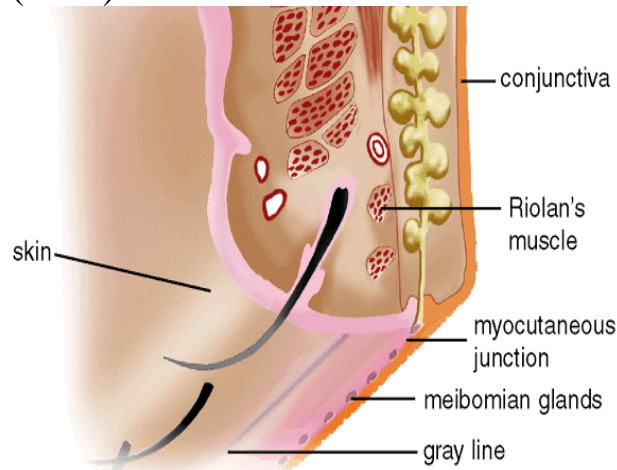
- 1- Smooth muscles (Müller's muscles).
- 2- Striated muscles (Orbicularis oculi and Levator palpebrae superioris "LPS").
- 3- Dense fibrous plates (Tarsal plates).
- 4- Glands.
- 5- Nerves and blood vessels.



The contents of the lid are distributed as follows: the anterior surface is made of skin which has a round edge with the lid margin, the subcutaneous tissue, muscular layer, the submuscular (areolar tissue) layer, the orbital septum which end as a tarsal plate (that forms the architecture of lid) and finally the conjunctiva (palpebral) which is situated most posterior.

The free margin of the eyelids contains:

1- The lashes (Cilia).



2- Grey line.

3- Orifices of Meibomian glands.

4- Mucocutaneous junction

5- Superior and inferior puncti of Naso-Lacrimal System (NLS).

Muscles of the eyelids:

1- Orbicularis oculi muscle:

It is a thin oval sheet of concentric striated muscle surrounding the palpebral fissure.

It can be divided into:

a- Peripheral (orbital) part: This is involved in forceful closure of lids.

b- Central (palpebral) part: This is involved in involuntary blinking, voluntary nonforceful closure and participates in forceful closure with the orbital part.

c- Muscle of Rioland's: this part is represented by the gray line of lid margin.

d- lacrimalis muscle: that attached to the fundus of lacrimal sac. This part is involved in pumping action of lacrimal drainage system.

Nerve supply:

Sensory: Ophthalmic branch of trigeminal nerve

Motor: Facial nerve.

2- Levator palpebrae superioris muscle:

It is originates from the periosteum covering the lesser wing of sphenoid bone at the apex of the orbit.

The aponeurosis inserts into:

a- Skin of the upper eyelid, so it forms skin creases on the eyelid.

b- Upper edge and anterior surface of the tarsal plate.

c- Medial and lateral palpebral ligaments.

Function: To keep the palpebral fissure open against gravity & tone of orbicularis oculi muscle.

Nerve supply:

Sensory: Ophthalmic branch of trigeminal nerve

Motor: Oculomotor nerve.

3- Superior palpebral muscle (Müller's muscle or superior tarsal muscle):

It is a small sheet of *smooth* muscle originated from the under surface of the LPS muscle and inserted to the upper edge of the upper tarsal plate.

Nerve supply: Sympathetic nerves.

Function: Like LPS, is to keep the palpebral fissure open against gravity.

Glands in the eyelids:

1- Meibomian glands (Tarsal glands):

Modified sebaceous gland located in the tarsal plate. The upper tarsus contains **30-40** glands, while the lower tarsus contains **20-30** glands.

Function: It secret the lipid forms the outer layer of the tear film.

2- Zeis glands:

Modified sebaceous gland opened with lash follicles.

3- Glands of Moll:

They are modified sweat gland whose ducts also open into lash follicle or directly in the anterior lid margin between the lashes.

Congenital anomalies of eyelids:

1- Ablepharon: Absence of the eyelids.

Treatment: Reconstructive plastic surgery.

2- Ankyloblepharon: Imperfect separation of the eyelids.

Treatment: Open the adhesion in between.

3- Coloboma of the eyelids: Common congenital anomaly in which there is failure of a portion of the lid to develop leading to notch in the lid margin.

Treatment: Plastic surgery.

4- Blepharophimosis: Narrowing of the palpebral fissure.

Treatment: Plastic surgery at pre-school age.

5- Epicanthus: Common anomaly. There is a vertical skin fold in the medial canthal region, which conceals the medial angle and caruncle giving a picture simulates convergent squint (pseudosquint).

Abnormalities in shape and position:

1- Entropion:

It is an inward rolling of the lid margin causing continuous rubbing of the cornea, which leads to conjunctival congestion, painful watery eye (tears

production due to stimulation of cornea) and sometimes epithelial defect and even corneal ulceration. So, it is a vision threatening disease.

Causes (Types) of entropion:

a- Congenital: which is very rare.

b- Spastic entropion: secondary to any condition that causing severe ocular irritation (irritation leads to overriding of Orbicularis oculi muscle fibers), e.g.: conjunctivitis, keratitis and ocular surgery.

Treatment: of underlying cause and taping of lid (turned outward).

c- Senile entropion (involutional entropion): affecting elderly patients and usually involves the lower lid.

Treatment: is surgical correction.

d- Cicatricial entropion: secondary to any condition causing scarring and shrinkage of conjunctiva, e.g.:

i- Chlamydial conjunctivitis.

ii- Chemical conjunctivitis (whether it is acidic or alkaline).

iii- Autoimmune conjunctivitis. e.g. Cicatricial pemphigoid and Stevens-Johnson syndrome

iv- Irritation conjunctivitis.

2- Ectropion:

It is an outward rolling of the lid margin causing exposure of the palpebral and bulbar conjunctiva. This exposure leads to exposure conjunctivitis, exposure keratitis and watery eye. Long-standing cases lead to:

i- Dry and thick conjunctiva and even keratinization.

ii- Corneal ulceration. So, it is vision threatening disease too.

iii- Redness, crusting and dermatitis of skin due to?

Causes (types) of ectropion:

a- Congenital ectropion.

b- Paralytic ectropion (Atonic): seen in cases of facial nerve palsy.

Treatment: we should wait for 6 months for spontaneous recovery e.g. (Bell's palsy) then lateral tarsorrhaphy is indicated.

c- Senile ectropion (involutional): due to atrophy of orbicularis oculi muscle and tarsal plate. Treatment: surgical correction.

d- Cicatricial ectropion: which is occur secondary to:

i- Chemical burns of skin.

iii- Radiation of skin.

ii- Infection of skin.

iv- Improper suturing of lid wound.

v- Trauma to the lid.

e- Mechanical ectropion of lower lid, when there is large mass that evert it.

3- Blepharoptosis:

It is an abnormal low position or drooping of the upper eyelid. It could be unilateral or bilateral, and both of them could be partial or complete. Normally the upper lid covers only 2 mm from cornea but if more, this called blepharoptosis.

Causes of blepharoptosis:

a- Simple congenital blepharoptosis: the LPS muscle is very poor and there is absence of skin creases.

b- Neurogenic blepharoptosis:

i- Oculomotor nerve palsy (congenital or acquired) : causing **severe** blepharoptosis.

ii- Horner's syndrome (congenital or acquired): causing **mild** blepharoptosis.

iii- Marcus Gunn Jaw-winking syndrome: it is a congenital anomaly in which, nerve to LPS is a branch from nerves to mastication muscle (i.e. from trigeminal nerve).

iv- 3rd nerve misdirection: either acquired or congenital.

*** Why it is severe in (i) and mild in (ii)?**

c- Myogenic blepharoptosis:

i- Myasthenia gravis: there is a defect in the neuro-muscular junction (damage to acetyl choline receptors).

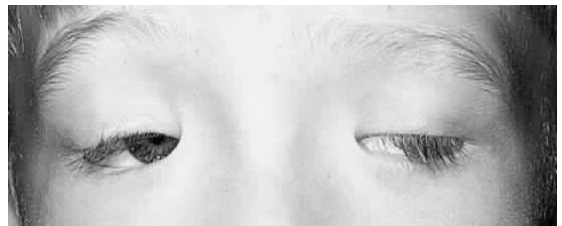
Treatment : *medical treatment.*

ii- Myotonic dystrophy.

iii- Ocular myopathy (localized defect similar to myasthenia gravis).

iv- Simple congenital myogenic blepharoptosis.

v- Blepharophimosis syndromes: it is a syndrome in which, there are bilateral ptosis, bilateral palpebral fissure narrowing, bilateral ectropion, and increase in the distance between the two medial canthi (telecanthus).



d- Aponeurotic blepharoptosis:

there is atrophy or damage in aponeurosis(specialized tendon) of LPS muscle.

- i- Involutional (senile).
- ii- Post operative.

e- Mechanical blepharoptosis:

There is increases weight of the eyelid:

Causes:

- i- Trachoma, VKC, large chalazion, abcess and eyelid tumor.
- ii- Cicatricial (due to LPS and superior rectus muscles fibrosis).
- iii- Trauma (collection of fluid).
- iv- Lack of support (phthisical or nanophthalmos): it is not a real ptosis, but the lid drops as there is no support below it due to small size of eyeball & best called pseudoptosis.

Treatment of ptosis: The treatment of all types is surgical *except in myasthenia gravis, where the treatment is medical*. Surgical procedures are:

- a- Levator resection.
- b- Frontalis brow suspension (Sling operation).
- c- Tarso-conjunctival resection (Fasanella servete procedure).

Choice of one of these three types depends on:

- a- Aetiology of ptosis.
- b- Severity of ptosis: Mild, moderate or severe.
- c- Function of LPS: Good, fair or poor.

4- Trichiasis:

Backward misdirection of the eyelashes (cilia), sometimes it is associated with entropion and it is called pseudotrichiasis.

Causes:

- a- Any cause leads to entropion of the eyelid, so, it is Pseudo-trichiasis.
- b- Trachoma without or with entropion, so it is True or pseudo-trichiasis respectively.
- c- Chronic blepharitis: which causes True trichiasis.

Treatment: *For isolated misdirection cilia (true trichiasis)*

- a- Epilation: Repeated every few weeks.
- b- Electrolysis: Destruction to hair follicles by cauterization.
- c- Cryosurgery: Destruction to hair follicles by freezing.
- d- Laser ablation: Destruction to hair follicles by laser.

For pseudo-trichiasis: done by correction of entropion surgically.

5- Blepharospasm:

Involuntary sustained closure of the eyelids which occurs either spontaneously (essential blepharospasm) or by sensory stimuli (2ndary blepharospasm).

Treatment:

Is to treat the underline cause and in sever, and resistance cases Botulinum toxin injection is indicated. It is temporary measure and can be repeated frequently.

6- Madarosis:

It is a decrease in number or complete loss of lashes.

Causes:

Local Causes: chronic blepharitis, burns, radiation and infiltrating tumor.

Systemic causes: generalized alopecia, psoriasis, SLE, syphilis and leprosy.

Benign nodules and cysts:

1- Chalazion (Meibomian cyst):

It is a *chronic lipogranulomatous inflammatory* lesion caused by *blockage* of meibomian gland orifices and *stagnation* of sebaceous secretions and there is **NO** infection. when there is infection this called internal hordeolum.

It is more frequent and multiple in patients with acne rosacea or seborrhoeic dermatitis and other sebaceous gland dysfunctional diseases.

Presentation: Painless nodule and occasionally blurred vision (*Why?*)

Signs:

a- Round, firm lesion in the tarsal plate.

b- Polypoid granuloma on eversion of lid (i.e. seen from the palpebral part of conjunctiva).

c- Sometimes there is associated blepharitis.

d- Mechanical ptosis may present.

Treatment:

a- Surgical:

The most common method, if the lesion is recurrent or multiple then biopsy should be taken specially in old age patient (to exclude sebaceous gland carcinoma which is extremely rare).

b- Steroid injection:

Good alternative to surgery, 0.1-0.2 ml triamcinolone infiltrated around the lesion, the success rate is 80%. In unresponsive cases, another injection is

given two weeks later. Chalazion should be small in size to be treated with steroid injection.

c- Systemic tetracyclines:

As prophylaxis, particularly in acne rosacea and seborrhoeic dermatitis where chalazion is frequently recurrent.

2- Internal Hordeolum:

It is a small abscess caused by an acute *staphylococcal infection of Meibomian glands*.

Signs: Tender, inflamed swelling within the tarsal plate.

Treatment:

a- which is done through using topical antibiotics (ointments more important than drops). (Why?). Systemic antibiotics are needed if there is associating lid infection.

b- Incision and curettage for the residual nodule after the acute infection has subsided.

3- External hordeolum (Stye):

It is an acute small staphylococcal abscess of a lash follicle and its associated gland of Zeis.

Signs:

- Tender inflamed swelling *in the lid margin*, which points anteriorly through the skin.
- More than one lesion may present.
- Occasionally minute abscess may involve the entire margin.

Treatment:

a- Hot compresses to produce vasodilatation of blood vessels: is to increase the circulation in the area and also for liquefaction of sebum to prevent stagnation in the duct of affected gland.

b- Topical antibiotics to prevent infection of neighboring glands (ointment is a must).

c- Epilation (removal of eyelashes by a forceps) to enhance drainage of pus.

d- Systemic antibiotics if there is no response on topical or in 2ndary preseptal cellulitis.

Note: An infection anterior to the orbital septum (affecting anterior lamella of eyelid) is "*preseptal cellulitis*" while infection posterior to orbital septum is *orbital cellulitis*.

Marginal Chronic Blepharitis

Chronic blepharitis is a very common condition which is usually bilateral symmetrical.

Types of chronic blepharitis:

- 1- Anterior:
 - a- Staphylococcal infection.
 - b- Seborrheic dysfunction.
 - c- Mixed.
- 2- Posterior:
 - a- Meibomianitis.
 - b- Meibomian seborrhea.
 - c- Mixed.
- 3- Mixed (any one of the anterior type plus any one of the posterior).

Pathogenesis of chronic blepharitis:

1- Anterior chronic staphylococcal blepharitis: due to staphylococcal over proliferation.

2- Anterior chronic seborrhoeic blepharitis: is usually associated with seborrhoeic dermatitis e.g. scalp, naso labial folds, retro auricular area and sternum.

Neutral lipids are converted by Bacterial lipase into irritating fatty acids responsible for increase of symptoms.

3- Posterior chronic blepharitis: Associated with dysfunction of Meibomian gland (ocular rosacea) which is in some patients associated with acne rosacea of the face.

Symptoms of chronic marginal blepharitis: (anterior and posterior)

They are: Burning, grittiness, mild photophobia, crusting and redness of the lid margin & sometimes red eye. Although it is chronic disease its symptoms are characterized by remissions and exacerbations. The symptoms are usually worse in the mornings (in contrast to dry eye). There is much discrepancy between symptoms & signs.

Signs of anterior blepharitis:

- a- The anterior lid margins show (by slit-lamp) hyperaemia and telangiectasia. In longstanding cases the lid margin became scarred and hypertrophied (due to recurrent infections), intrafollicular abscess may be present (staphylococcal blepharitis).
- b- Two types of scales: (important in differentiation)
 - i- Staphylococcal blepharitis: Are *hard* and *brittle* and are *centered* around the lashes (collarettes).

- ii-** Seborrhoeic blepharitis: Are *soft* and *greasy* and located *anywhere* on lid margin or on the lashes.
- c-** In longstanding cases, trichiasis, madarosis and occasionally poliosis (whitening of the eyelashes) will occur.

Complications of anterior blepharitis:

- a-** External hordeolum (stye).
- b-** Tear film instability (due to the abnormal lipid secretion that affects the tear film).
- c-** Hypersensitivity to staphylococcal exotoxins → papillary conjunctival reaction, punctate epitheliopathy and marginal keratitis.

Treatment:

- a-** Lid hygiene: removing crusts and toxic products by scrubbing the lid margins daily with either commercially lid scrub or a cotton bud tipped in 25% solution of baby shampoo.
- b-** Topical antibiotic ointment: fusidic acid or chloramphenicol.
- c-** Weak topical steroids: e.g. fluorometholone to control hypersensitivity to exotoxins.
- d-** Tear substitutes.

Signs of posterior blepharitis (Meibomian seborrhea or meibomianitis):

- a-** Small oil globules capping the meibomian gland orifices.
- b-** Pressure on tarsal plate results in expression of copious amounts of abnormal toothpaste like meibomian oil.
- c-** The posterior lid margin shows diffuse or localized inflammation centered around meibomian gland orifices.
- d-** Blockage of the main meibomian ducts gives rise to secondary cystic dilatation and occasionally meibomian cysts.
- e-** Frothy secretion at lid margins & ocular canthi.

Complications:

- a-** Tear film instability & dry eyes.
- b-** Papillary conjunctivitis plus punctate epitheliopathy.
- c-** Internal hordeolum.
- d-** chalazia.

Treatment:

- a-** Systemic tetracyclines (*Corynebacterium acnes*) for 6-12 weeks: one of the followings,
 - i-** Tetracycline: Four times daily for 1 week, then twice daily for 5-11 weeks.
 - ii-** Doxycycline: Twice daily for 1 week, then once daily for 5-11 weeks.
 - iii-** Minocycline.
- b-** Erythromycin when (*a*) is contraindicated.

- c- Lid hygiene.
- d- Topical steroids.
- e- Tear substitutes.
- f- Warm compresses to melt solidified sebum and mechanical expression (to evacuate meibomian glands from their contents).

Benign tumours

Capillary haemangioma

Capillary haemangioma (strawberry naevus), although rare, is one of the most common tumours of infancy and presents shortly after birth. The female to male ratio is 3:1. Eyelid haemangiomas have a predilection for the upper lid and may have orbital extensions. Occasionally the lesion may also involve the skin of the face and some patients have strawberry naevi on other parts of the body. It is important to be aware of the association between multiple cutaneous lesions and visceral haemangiomas. Histology shows proliferation of varying-sized vascular channels in the dermis and subcutaneous tissue.

Signs: Unilateral, raised bright red lesion which blanches on pressure and may swell on crying. A large lesion on the upper lid may cause mechanical ptosis.

Treatment:

1-Observation: Rx may not be needed especially in small lesions that are not causing visual axis impairment & because the fact that 50% of cases resolved spontaneously by 5 yrs of age & about 70% by 7yrs.

2-Systemic Beta blockers.

3-Steroids: systemically, topically & more effectively by local injection.

Pyogenic granuloma

A pyogenic granuloma is a fast-growing vascularized proliferation of granulation tissue which is usually antedated by surgery, trauma or infection, although some cases are idiopathic. Histology shows granulation tissue with wide, thin-walled vascular channels and inflammatory cells infiltrating a loose stroma.

Signs: A painful, rapidly growing, vascular polypoidal lesion that may bleed following relatively trivial trauma.

Treatment: involves excision.

Xanthelasma

Xanthelasma is a common, frequently bilateral condition which is usually found in middle-aged and elderly individuals. Xanthelasma (and corneal arcus) can be associated with increased levels of serum cholesterol, especially in young males. Histology shows lipid-laden histiocytes in the dermis.

Signs: Multiple yellowish subcutaneous plaques usually located at the medial aspects of the eyelids.

Treatment: for cosmetic reasons is either by excision or preferably destruction with a carbon dioxide or argon laser. Patients with the highest recurrence rate are those with persistently elevated cholesterol levels.

Malignant tumours

Predisposing conditions:

General: old age, sun exposure, irradiation, immune suppression, smoking, fair skin, Scandinavian ancestry.

Rare: Young patients who suffer from one of the following conditions may develop eyelid malignancies;

1-Xeroderma pigmentosum is an AR disease characterized by skin damage on exposure to natural sunlight, which gives rise to progressive cutaneous pigmentation abnormalities, affected patients have a great propensity to the development of basal cell carcinoma (BCC), squamous cell carcinoma (SCC) and melanoma, which may be multiple. Conjunctival malignancies have also been reported.

2-Gorlin–Goltz syndrome (naevoid basal cell carcinoma syndrome) is a rare AD disorder.

3 -Muir–Torre syndrome is a rare AD condition.

4-Bazex syndrome is an XLD condition.

5-Other predispositions include immunosuppression, prior retinoblastoma and albinism.

Basal cell carcinoma

General features

BCC is the most common human malignancy and most frequently affects elderly patients. The most important risk factors are fair skin, inability to tan and chronic exposure to sunlight. Ninety per cent of cases occur in the head and neck and about 10% of these involve the eyelid. BCC is by far the most common malignant eyelid tumour, accounting for 90% of all cases. It most

frequently arises from the lower eyelid, followed in relative frequency by the medial canthus, upper eyelid and lateral canthus. The tumour is slow-growing and locally invasive but non-metastasizing. Tumours located near the medial canthus are more prone to invade the orbit and sinuses, are more difficult to manage than those arising elsewhere and carry the greatest risk of recurrence. Tumours that recur following incomplete treatment tend to be more aggressive.

Histology:

The tumour arises from the cells that form the basal layer of the epidermis. The cells proliferate downwards and characteristically exhibit palisading at the periphery of a tumour lobule of cells.

Clinical types:

The main clinical features of epidermal cell malignancy are ulceration, lack of tenderness, induration, irregular borders and destruction of lid margin architecture.

1-Nodular BCC; is a shiny, firm, pearly nodule with small dilated blood vessels on its surface.

2-Noduloulcerative BCC (rodent ulcer); has central ulceration, pearly raised rolled edges and dilated and irregular blood vessels (telangiectasis) over its lateral margins & with time it may erode a large portion of the eyelid.

3-Sclerosing BCC (morphoeic) is less common and may be difficult to diagnose because it infiltrates laterally beneath the epidermis as an indurated plaque. The margins of the tumour may be impossible to delineate clinically and the lesion tends to be much more extensive on palpation than inspection.

4-Other types not usually found on the lid are cystic, adenoid, pigmented and multiple superficial.

Squamous cell carcinoma

General features

SCC is a much less common, but typically more aggressive tumour than BCC with metastasis to regional lymph nodes in about 20% of cases. Careful surveillance of regional lymph nodes is therefore an important aspect of initial management. The tumour may also exhibit perineural spread to the intracranial cavity via the orbit. SCC accounts for 5–10% of eyelid malignancies. The tumour has a predilection for the lower eyelid and the lid margin.

Histology:

The tumour arises from the squamous cell layer of the epidermis. It is composed of variable-sized groups of atypical epithelial cells with prominent nuclei and abundant eosinophilic cytoplasm within the dermis. Tumours may show characteristic keratin 'pearls' and intercellular bridges (desmosomes).

Clinical types:

The clinical types are variable and there are no pathognomonic characteristics. The tumour may be indistinguishable clinically from a BCC but surface vascularization is usually absent, growth is more rapid and hyperkeratosis is more often present.

1-Nodular SCC is characterized by a hyperkeratotic nodule which may develop crusting erosions and fissures.

2-Ulcerating SCC has a red base and sharply defined, indurated and everted borders but pearly margins and telangiectasia are not usually present.

3-Cutaneous horn with underlying invasive SCC

Sebaceous gland carcinoma

General features

Sebaceous gland carcinoma (SGC) is a slowly-growing tumour which most frequently affects the elderly, with a predisposition for females. It usually arises from the meibomian glands, although on occasion it may arise from the glands of Zeis or from sebaceous glands in the caruncle. In contrast to BCC and SCC, the tumour occurs more commonly on the upper eyelid where meibomian glands are more numerous. Sometimes there is simultaneous involvement of both lids on one side, probably due to intraepithelial spread or to spontaneous development of multiple primaries. The clinical diagnosis of SGC is frequently difficult because, in its early stages, external signs of malignancy may be subtle so that the tumour may resemble a chalazion or blepharitis. However, the presence of yellowish material within the tumour is highly suggestive of SGC.

Histology

The tumour consists of lobules of cells with pale foamy vacuolated lipid-containing cytoplasm and large hyperchromatic nuclei.

Clinical types:

Although SGC does not have a characteristic clinical appearance it may present with the following:

1-Nodular SGC presents as a discrete, hard nodule, most commonly within the upper tarsal plate, that may exhibit yellow discoloration due to the presence of lipid. Because the lesion may masquerade as a chalazion, it is recommended that any '**chalazion**' of an unusual consistency should undergo full-thickness resection and histological examination.

2-Spreading SGC infiltrates into the dermis and causes a diffuse thickening of the lid margin that may result in loss of lashes and be mistaken for '**chronic blepharitis**'.

3-Pagetoid spread refers to extension of the tumour within epithelium including the palpebral, forniceal or bulbar conjunctiva. This may lead to the mistaken diagnosis of an **inflammatory chronic conjunctivitis**.

Treatment of malignant tumours

1-Biopsy

The two types of biopsy are (a) incisional, using a blade or a biopsy punch, in which only part of the lesion is removed to allow histological diagnosis, and (b) excisional, in which the entire lesion is removed and a histological diagnosis made.

2-Surgical excision:

Surgical excision aims to remove the entire tumour with preservation of as much normal tissue as possible. Most small BCCs can be cured by excision of the tumour together with a 2–4 mm margin of clinically normal tissue. More radical surgical excision is required for large BCC and aggressive tumours such as SCC, SGC and melanoma. It may not be possible to close the defect at the time of initial removal, but it is necessary to ensure complete clearance of tumour prior to undertaking any reconstruction.

3-Radiotherapy:

The recurrence rate following irradiation is higher than after surgery, and radiotherapy does not allow histological confirmation of tumour eradication. So Indicated for **Small BCC which does not involve the medial canthal area in patients who are either unsuitable for or refuse surgery.**

4-Cryotherapy:

May be considered for **small superficial BCC.**

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