2. Disorders of the Conjunctiva

Q Give an account on the anatomy of the conjunctiva

Answer

A. Gross Anatomy

The conjunctiva is a thin mucous membrane lining the posterior surface of the lids, from which it is reflected on to the anterior aspect of the eyeball as far as the corneo-scleral junction.

At the lid margin the conjunctiva is continuous with the skin and at the corneal margin it becomes structurally continuous with the corneal epithelium. It thus forms a potential space, called the ***conjunctival sac***, which is open externally at the palpebral fissure and only closed when the eyes are shut.

• ***The conjunctiva may be divided for descriptive purposes into regions:***

1. The Palpebral Conjunctiva

This lines the under surface of the eyelids and extends from the intermarginal sulcus of the lid margin up to the fornix. ***It may be subdivided into the following zones :-***

(a) The marginal conjunctiva commences at the grey line of the lid margin and merges into the subtarsal groove.

(b) The tarsal conjunctiva is thin, transparent and vascular. It is closely adherent to the tarsal plate. The Meibomian glands can be seen through the normal tarsal conjunctiva as yellowish streaks.

(c) The orbital conjunctiva lies between the proximal border of the tarsal plate and the fornix. It is in relation to the palpebral muscles of Muller.

2. The Fornix Conjunctiva

It is a continuous circular cul-ck-sac formed by the forward reflection of the palpebral conjunctiva on to the anterior portion of the eyeball. It is only interrupted medially by the plica semilunaris and the caruncle. The conjunctiva of the fornix is richly supplied with blood vessels and contains the accessory lacrimal glands of Krause. It forms a loose fold, thus ensuring freedom of movement to the eyeball.

3. The Bulbar Conjunctiva

This covers the anterior portion of the eyeball as far as the corneo-scleral junction. It is thin and so transparent that the white sclera shows through it. The bulbar conjunctiva is at first loosely adherent to the underlying tissues (namely, the tendons of the recti muscles covered by Tenon's capsule), but 3 mm. from the corneal limbus it becomes firmly adherent and blends with Tenon's capsule.

4. The Plica Semilunaris

This is a semilunar fold of the conjunctiva situated at the inner canthus with its free concave border facing towards the cornea. It corresponds to the third eyelid in the lower vertebrates but in man it is only a vestigial structure.

B. Minute Anatomy

- ***The conjunctiva consists histologically of two layers :—***

1. The epithelial layer.
2. The substantia propria (Stroma).

1. The Epithelium.—It varies in structure according to the region:—

(a) ***The Marginal conjunctiva***—Non-keratinized stratified squamous epithelium.

(b) ***The Tarsal Conjunctiva.***—Two layers of cells consisting of a superficial layer of cylindrical cells and a deep layer of cubical cells.

(c) ***The Fornix Conjunctiva.***—Three layers of cells comprising superficial cylindrical, middle polygonal and deep flatter cells.

(d) ***The Bulbar Conjunctiva.***—The epithelium increases in thickness from the fornix until at the limbus, it becomes non-keratinized squamous epithelium.

(e) ***The Plica Semilunaris.***— 8 -10 layers of epithelial cells with cylindrical cells in the deepest layers.

2. The Substantia Propria (Stroma)—It is the connective tissue underlying the surface epithelium.

- ***The stroma comprises the following layers :—***

(a) ***The Superficial Adenoid Layer.***—This is made up of an extremely fine fibrous network, profusely infiltrated with lymphocytes among which few mast cells and histiocytes may be found.

(b) ***The Deep Fibrous Layer.***—It is a thick meshwork of collagenous and elastic fibres. This layer is absent over the tarsal region.

- **Glands of the conjunctiva:**

(1) Goblet cells (mucous cells): In most parts of the conjunctival **epithelium,** there are large translucent mucus-secreting cells, called the ***goblet cells.*** They are most numerous in the fornices and in the plica semilunaris, but are absent near the lid margin and near the limbus.

(2) Accessory Lacrimal Glands of Krause & Wolfring

Q What are the common organisms normally found in the conjunctival sac?

Answer

Normal conjunctival flora:

The conjunctival sac normally contains non pathogenic organisms which include: Staphylococcus albus, xerosis bacilli, diplococi which simulate pneumococci and saprophylic fungi.

Q What are the common pathogenic organisms of the conjunctiva?

Answer

• Diplococcus, xerosis bacillus and staphylococcus albus are **examples of non-pathogenic bacteria.**

• Koch-Weeks bacillus, gonococcus and staphylococcus aurcus are the **most common pathogenic** micro-organisms in **Egypt.**

• Pneumococcus and Ps. pyocyaneus are the **most dangerous "pathogenic bacteria in ocular infection.**

• **Other pathogenic micro-organisms** include streptococci, B. Proteus, C. Diphtheria, etc.

Q What are natural defensive mechanisms against conjunctival infection

Answer

• ***Defensive Mechanisms against Conjunctival Infection***

A.—*Secretory*.—Micro-organisms are mechanically washed out by the flow of tears. Lysozyme, a "normal constituent of the lacrimal fluid, inhibits the multiplication of most conjunctival micro-organisms.

B. — *Epithelial Barrier*.—Desquamation of the epithelium and its rapid reformation form a barrier against bacteria.

C._*Lymphatic Barrier*.—There is a lot of lymphoid tissue in the conjunctiva.

Q Define neonatal conjunctivitis (ophthalmia neonatorum). Mention the causes and ttt.

Answer

• **Definition:** Conjunctivitis occurring during the first month of life.

• **Causes:** Neonatal conjunctivitis may be chemical, chlamydial, gonococcal, viral, and simple bacterial.

(1) Chemical conjunctivitis

• ***Cause:*** caused by silver nitrate or topical antibiotics used for prophylaxis after birth.

• ***Presentation:*** of this common condition is within the first few hours of instilling the prophylactic eye drops, with mild and transient conjunctival injection.

• ***Treatment:*** is un-necessary (self-limited)

(2) Chlamydial conjunctivitis

• ***Cause:*** caused by transmission of infection from mother's birth canal

• ***Presentation:*** of this common infection is between the 5^{th} and 14^{th} day with a MP discharge and conjunctival injection (no follicular reaction at that time).

• ***Treatment:*** Erythromycin ointment for 3 weeks & oral erythromycin 25 mg/kg twice daily (bid) for 14 days.

(3) Gonococcal conjunctivitis

• ***Cause:*** caused by transmission of infection from mother's birth Canal.

• ***Presentation:*** of this rare infection is between 2nd & 4th day with an acute purulent conjunctivitis and chemosis which may be associated with pseudomembranes

• ***Treatment***

1. Hospitalization
2. Systemic broad-spectrum antibiotic (e.g. ceftriaxone)
3. Topical antibiotic eye drops & ointment.
4. Saline lavage to remove any discharge
5. Both parents should be examined for evidence of genital Infection.

(4) Viral conjunctivitis

• ***Cause:*** caused by transmission of HSV type 2 infection from mother's birth canal

• ***Presentation:*** of this rare infection is between 5th & 7th day with blepharoconjunctivitis which may be associated with keratitis.

• ***Treatment:*** with topical antivirals.

(5) Simple bacterial conjunctivitis

• ***Cause:*** caused by transmission of infection from mother's birth canal or postnatally.

• ***Presentation:*** of this common condition is at any time during the first month of life.

• ***Treatment:*** with topical antibiotics.

Q What are the types of conjunctival discharge. Mention the causes of each

Answer

The discharge is composed of the exudate that has filtered through the conjunctival epithelium from the dilated blood vessels. On the surface of the conjunctiva, variable amounts of epithelial debris, mucus, and tears are added. *The following are the **4 main types** of discharge:*

1. ***Watery*** *discharge* composed of a serous exudates and a variable amount of refluxly secreted tears. It is typical of *viral* and toxic inflammations.
2. ***Mucoid*** *discharge* is typical of vernal keratoconjunctivitis (spring catarrh) and keratoconjunctivitis sicca.
3. ***Mucopurulent*** *discharge* occurs in *mild* bacterial as well as chlamydial infections.
4. ***Purulent*** *discharge* occurs in *severe* acute bacterial infections.

Q What is the difference between conjunctival and ciliary injection. Mention the causes of each

Answer

Conjunctival injection Vs Ciliary injection

• ***Conjunctival injection*** is characterized by conjunctival vascularization which is most prominent at the fornix and fades away towards the limbus. It is associated with conjunctivitis.

• ***Ciliary (circumcorneal) injection*** is characterized by conjunctival vascularization which is most prominent around the limbus. It is associated with cases of keratitis, corneal ulcers, iridocyclitis, and acute congestive glaucoma

Q What are the causes of follicular conjunctivitis?

Answer

Follicles (follicular conjunctivitis)

• ***Follicles*** consist of hyperplasia of the lymphoid tissue within the stroma. Clinically, they appear as multiple, discrete, slightly elevated lesions (similar to small grains of rice).
• *The **four main causes** of follicular conjunctivitis are:*

1. Viral conjunctivitis
2. Chlamydial conjunctivitis
3. Parinaud's oculoglandular syndrome
4. Hypersensitivity to ocular medications

Q What are the causes of papillary conjunctivitis

Answer

Papillae (papillary conjunctivitis)

• ***Papillae*** are composed of hyperplastic conjunctival epithelium thrown into numerous folds or projections, with central vessels and a diffuse infiltrate of chronic inflammatory cells, including lymphocytes, plasma cells, and eosinophils.
• The papillary reaction is more non-specific and of less diagnostic value than a follicular response.

• *The **four main causes** of papillary conjunctivitis are:*

1. Chronic blepharitis
2. Vernal keratoconjunctivitis or spring catarrh
3. Bacterial conjunctivitis
4. Contact lens-related complications

Q What are the causes of pre-auricular lymphadenopathy

Answer

• lymphatic drainage of the conjunctiva is to the preauricular and submandibular lymph nodes

• ***Lymphadenopathy is associated with**:*

1. Viral conjunctivitis
2. Chlamydial conjunctivitis
3. Severe gonococcal conjunctivitis

Q What is the difference between true and false membranes

Answer

Pseudomembranes or true membranes

(a) *Pseudomembranes* consist of coagulated exudates adherent to the inflamed conjunctival epithelium.

• *Characteristically,* they can be easily peeled off leaving the epithelium ***intact***.

• *The **four main causes** of pseudomembranes are:*

1. Severe adenoviral conjunctivitis
2. Gonococcal conjunctivitis
3. ligneous conjunctivitis
4. Autoimmune conjunctivitis

(b) *True membranes* are firmly adherent to the conjunctival epithelium and attempts to remove the membrane is accompanied by tearing of the epithelium and bleeding.

• ***The main causes*** of true membranes are infective conjunctivitis caused by ß-haemolytic streptococci and diphtheria.

Q Give an account on acute simple bacterial (MP) conjunctivitis. Causes, clinical picture and ttt

Answer

Acute Catarrhal (Or Mucopurulent) Conjunctivits

• **Definition**

It is a mild form of conjunctivitis caused by low virulence strains of micro-organisms. It is characterized by hyperaemia of the conjunctiva associated with mucous discharge which sticks the lids together on waking up in the morning.

• **Aetiology (Causative organisms)**

Mucopurulent conjunctivitis is contagious and transmitted directly by the discharge. ***The most common causative micro-organisms are:—***

1. *Koch- Weeks Bacillus* (Haemophylis aegypticus)—This is the **commonest causative organism in Egypt**. The conjunctivitis occurs at the middle of March and reaches its maximum in May and June. It may appear in an epidemic form, especially in children, during September and October.

2. *Staphylococcus Aureus*.—It is the causative micro-organism in **mild forms** of mucopurulent conjunctivitis. It is common in spring and summer.

3. *Pneumococcus*.—It is an **uncommon causative organism in Egypt.**
4. *Morax-Axenfeld Diplobacillus*.—*It* is characterized by hyperemia of the conjunctiva mostly **at the angles (canthi)** accompanied by itching and irritation. There is also some maceration of the lids **at the canthi.**

►**N.B.**

• **Staphylococcus** is among the **most common** organisms and may cause associated conditions such as **blepharitis** and eczema or impetigo of the skin, corneal erosions or superficial punctate erosions.

• **Characters of pneumococcal conjunctivitis:**

1. More common in **winter** being preceded or followed by nasal catarrh.
2. More often in **children** than adults.
3. Marked oedema of conjunctiva (chemosis).
4. **Petechial Hemorrhages.**
5. **Pseudo membrane** formation (formed of fibrin and inflammatory cells).
6. The conjunctivitis subsides without sequelae after 7-10 days.
7. **Iritis** due to diffusion of toxin.
8. Abrasions of cornea becomes infected leading to **hypopyon ulcer.**
9. The organism is **sensitive to penicillin** but not to sulpha in contrast to koch-weeks. conjunctivitis.

• **Clinical Picture**

a) Symptoms.

- The incubation period varies from 24-48 hours.
- The patient ***complains of***:
    a. Discomfort, burning and foreign body sensation.
    c. Mucopurulent discharge
    d. Photophobia if the cornea is involved.

b) Signs.

- ***The* lids**: are slightly swollen (edema) and may stick together by dried up mucopurulent discharge, particularly in the morning.
- **The Conjunctiva**:
    a. The tarsal conjunctiva is swollen and velvety due to the presence of vascularized papillae.
    b. The bulbar conjunctiva is markedly hyperaemic

• **Fate and complications:**

a) Usually **resolves completely** in 10-14 days
b) **Complications** are **rare**
    i. **Corneal ulceration** may occur.
    ii. **Iritis** only in **pneumococcal** cases.

• **Prophylaxis:**

1. The patient's fomites should not be used and must be boiled.
2. Combat of flies is essential.
3. If it is unilateral, protection of the other eye is essential.
4. Protective measures by doctor and nurses during the examination of these cases.

• **Treatment:**

A. Local:

1- Frequent **washing** of the discharge using saline or boric acid lotion 4%.

2- Worm compresses

3- **Topical** broad-spectrum antibiotics (antibiotic eye drops during the day and ointment at bedtime).

N.B.: Eye ointment at night is useful as:

a) It prevents sticking of lids together and thus avoiding the pain associated with their separation in the morning.

b) It allows free exit for the discharge.

B. Additional lines:

1. **No bandage,** since it helps multiplication of the organisms (temperature), and it accumulates the discharge.
2. If **photophobia** is marked, dark glasses should be ordered.

Q Discuss acute gonococcal (purulent) conjunctivitis (aetiology, clinical picture, complications, and ttt)

Answer

• **Definition:**

It is acute suppurative inflammation of the conjunctiva; characterized by copious amount of purulent discharge, tendency to corneal involvement, marked symptoms e.g. fever, malaise and enlargement of the lymph nodes. It is much more serious condition than M.P.C.

• **It occurs in two** forms:

a) **Purulent conjunctivitis** (Purulent Ophthalmia) in **adults**.

b) **Ophthalmia neonatorum** (Neonatal Conjunctivitis) in **newborns**.

• **Aetiology (Causative organisms):**

a. <u>Neisseria gonorrhea</u> (**Gonococci)** is the commonest organism, responsible for 60-80% of cases.

- **In Egypt**: ***3 distinct clinical forms*** of purulent conjunctivitis are recognized:

1. Sporadic (Venereal) form:

- Affects children with vulvovaginitis and adults with urethritis and cervicitis.
- Hand-to-eye infection occurs.

2. Epidemic (Non venereal) form:

- Non-genital transmission from eye to eye, and through flies and fomites.
- Is the most common type occurring in summer **(July and August)**
- Highly contagious (infective).

3. Ophthalmia neonatorum = Neonatal (Gonococcal) conjunctivits.

b. <u>Other organisms</u> may cause purulrnt conjunctivitis:

1. Strept. Hemolyticus
2. Hemophilus influenza

• **Clinical picture:**

- Incubation period: varies from **3 hours** to **3 days**, according to the virulence of the organism.

- Signs: ***3 clinical stages are known***:

I. <u>Stage of infiltration</u>:

- **Lasts** from **2-3 days**.
- **<u>General toxic symptoms</u>:** fever, malaise.
- **<u>Local signs</u>:**
  - **Lids:**
    - Marked oedema, redness, tenderness.
    - The swollen upper lid may overhang the lower lid.
    - Lid eversion **could not** be done (wooden-hard).
  - **Conjunctiva:**
    - **Palpebral** conjunctiva: is deep red, velvety, rarely pseudo-membrane.
    - **Bulbar** conjunctiva: marked oedema (chemosis), and marked injection, even subconjunctival hemorrhage, and forms a gutter around the cornea.
  - No purulent **discharge**, only watery discharge, but sangguinous discharge may exist.
  - **Preauricular Lymph node** enlarged, tender and may suppurate.

II. <u>Stage of discharge</u> (or blenorrhoea):

- Lasts from **2-3 weeks**.

• **Lids and conjunctiva:**

- Less oedema and redness.
- Less tenderness and decrease of pain.
- Red velvety palpebral conjunctiva.
- Lid eversion can be done.
- Profuse purulent discharge.
- Conjunctival smear shows gonococci (A point of great importance both as regards contagions and treatment).

N.B. *If the conjunctivitis is inadequately treated, the discharge may persist for weeks and the disease may pass into* ***chronic*** *stage.* ***Corneal complications*** *are very common.*

III. <u>Stage of chronicity</u> (or slow healing):

- Lasts from 2-3 months.
- The discharge decreases, may become mucopurulent, but still full of gonococci.

- The palpebral conjunctiva shows marked thickening and papillary hypertrophy which may remain for weeks.

• **Diagnosis:**

1. Clinical picture.
2. Conjunctival smear, culture sensitivity.

• **Complications:**

1. **Corneal ulcers**:

- The most serious complication.
- Common and ***may occur early***:

a. Mechanisms of corneal ulcers:

1. Gonococci can **invade intact corneal epithelium**

2. The endotoxin (liberated by the gonococci), and the proteolytic enzymes (by the dead polymorphs) → severe effect on corneal epithelium.

3. The accumulation of the **puruent discharge (containing toxins and organisms) in the recess or gutter** formed between the chemotic conjunctiva and the cornea (→ ***Central ulcer***).

4. Pressure of the chemotic conjunctiva on the limbal B. Vs. → interferes with corneal nutrition.

5. Pressurre of chemotic conjunctiva on the limbal lymphatics interferes with toxin removal.

b. Types of ulcers:

1. Central and paracentral ulcer
2. Marginal ulcer
3. Ring ulcer (multiple marginal ulcers coalesce)

2. **Perforation** occurs early and frequently (due to the proteolytic enzymes) leading to **dense cicatrisation, leucoma adherent, or anterior staphyloma.**

3. **Toxic iridocyclitis: from diffusion of toxins.**

5. Endophthalmitis & panophthalmitis may result from perforation.

6. Metastatic infection: e.g. Gonorrhoeal arthritis, endocarditis and septicaemia, and other general complications may occur.

• **Prophylaxis:**

1- Protect the healthy eye if the disease is still unilateral **by antibiotic eye drops**

2- **Prevent infection of the eyes of the doctor, nurses** and other attendants (through the discharge) during examination and treatment by wearing **protective goggles.**

3- If spurting of pus occurs during examination, **prophylactic antibiotic eye drops** instillation (for doctors and nurses) is essential.

4- Careful **disinfection of the contaminated fingers.**

5- **Patient's fomites should not be used.**

6- **Combat of flies** and

7- Treatment of associated **urethritis.**

•Treatment

The treatment of purulent conjunctivitis must be ***prompt, quick and effective from the beginning.***

A. Hospitalization.

B. Local Treatment :

1. Frequent wash-out of the discharge as soon as it forms by normal saline or any of the antiseptic lotions, *e.g.* boric acid 2%. This should be continued until the frequency of the accumulation of the discharge gets less.

2. Frequent instillation of broad-spectrum antibiotic eye drops. They should be applied every 5 minutes during the first 2 hours, then every hour for 2-3 days. Ointment is used at bedtime.

3. Atropine drops 1 % should be instilled twice daily (bid) in all cases in which the cornea is involved.

C. *General Treatment:*

1. Systemic antibiotic e.g. Penicillin I.M injection, or broad spectrum antibiotic is administered to enhance the local treatment.

2. Attention should be paid to the general health of the patient.

Gonococcal Ophthalmia Neonatorum.

Clinical picture:

- The same as purulent conjunctivitisin adults, it is always bilateral present between 1-3 days after birth in cases of gonococcal ophthalmia .

- A membrane formation may occur, associated with marked chemosis, lid oedema, redness, and profuse purulent discharge.

Complications:

The same as purulent conjunctivitis in adults **but more serious**, due to

a) Thin cornea → early perforation may occur
b) No tears, i.e. no lysozyme.
c) The organism can invade intact corneal epithelium.

- ***Complications may include:***

1- **Corneal ulcers** are usually central or little below the centre, oval in shape corresponding to the position of eyelid margins on closure of the eye. Perforation of the cornea is common.

2- **Dense corneal scarring** may lead to **nystagmus** due to interference with macular development (which occurs during the first 6 weeks of life).

3- **Anterior polar cataract** is coomon.

4- **Panophthalmitis,** if perforation occurs.

5- **Metastatic stomatitis and arthritis** may occur.

Q Why corneal ulceration and even perforation is very common with gonococcal (purulent) conjunctivitis ?

Answer

Mechanism of corneal ulcers:

a) Gonococci can **invade intact corneal epithelium** causes necrosis but abrasion may facilitate eorneal involvement, as that which may result from lid pressure.

b) The accumulation of the **toxins and organisms in the recess or gutter** formed between the chemotic conjunctiva and the cornea.

c) Pressure of the chemotic conjunctiva in the stage of infiltration on the limbic loops of B. Vs. Leading to malnutrition of the eorneal periphery and **on the limbic lymphatics** interfere with toxin removal.

d) The **proteolytic enzymes** from leucocytes and gonococcal exotoxin.

Q Enumerate the causes of viral conjunctivitis

Answer

1. Adenoviral keratoconjunctivitis (most common)
2. Herpes simplex viral conjunctivitis
3. Acute hemorrhagic conjunctivitis
4. Molluscum contagiosum conjunctivitis

Q What is trachoma?

Answer

- *The word trachoma means **"roughness"***
- Trachoma is an infection caused by serotypes A, B, Ba, and C of chlamydia trachomatis. It is a disease of underprivileged populations with poor conditions of hygiene, poor sanitation and crowded conditions. The common fly is the major vector in the infection.

- It is **characterized** by subepithelial cellular infiltration, follicles, papillae and pannus formation, healing with cicatrization with potential visual disability.

- It is **characterized** by subepithelial cellular infiltration, follicles, papillae and pannus formation, healing with cicatrization with potential visual disability.

Q. Give an account on the aetiology & mode of infection of trachoma

Answer:

• **<u>Aetiology</u>:**

Chlamydia trachomitis shows *the following characters:*

1. It is a large sized **obligate intracellular organism** that are more closely related to bacteria than to viruses.

a- Contain both DNA and RNA.
b- Posses a cell wall.
c- Are susceptible to tetracycline, erythromycin, and sulphonamides.
d- Its size is about 250 millimicron.

2. In the **early acute stage,** characteristic intra-cytoblasmic basophilic inclusion bodies **(Halberstaedter-Prowazek bodies)** are seen when the epithelial scrapings are stained by Geimsa stain.

3. Infection gives no solid immunity because it is poorly antigenic so, **recurrence** is common.

• **Mode of infection:**

- The infection is transmitted through the **conjunctival discharge** which is carried by fingers, towels and flies.

- The infection starts mostly **between 6 months and 2 years.**

- The disease is favored by poverty, ignorance and unhygienic surroundings.

- Infected children with active disease are the chief reservoir of trachomatous infection in the community. Children with trachoma in endemic areas harbor C. Trachomitis in the upper respiratory and gastrointestinal tracts. Thus, transmission may also occur by respiratory droplet spread or fecal contamination.

Q Describe clinical stages of trachoma (McCallan's classification)
Answer

• **Clinical features:** Trachoma infection occurs in the following stages:
(A) *MacCallan Classification*

- ***Stage I (incipient trachoma):*** immature follicles in the upper tarsus
- ***Stage II (established trachoma):*** mature follicles of the upper tarsal conjunctive and Herbert's rosettes at the upper limbus (Fig. 20 & 21).
- ***Stage III (cicatricial trachoma):*** follicles and scarring of upper tarsus
- ***Stage IV (healed trachoma):*** conjunctival scarring without Follicles

Q What is the difference between immature and mature trachoma follicles?

Answer
a) *Immature (T_1) Follicles*:

Are characterized by *the following features:*

1. Size: Minute up to 1 mm
2. Affect the upper palpebral conj. and fornix
3. Yellowish in color
4. Surrounded by dilated capillaries
5. Not raised, nor expressible
6. Scrabing of conj. epithelium shows inclusion bodies

b) Mature follicles *have the following characters:*

1. Size: Large follicles 1-3 mm
2. Affect the upper palpebral conj. and fornix
3. Yellowish in color
4. Raised above the surface of the conj.
5. Expressible → necrotic material
6. Scrabing of epithelium shows inclusion bodies

Q What are the corneal signs of trachoma?

Answer

- ***Corneal Signs of Trachoma***

1. Avascular superficial keratitis

2. Corneal follicles

3. Trachomatous pannus

4. Trachomatous ulcers

(1) Avascular superficial keratitis:

- It occurs typically in the **upper part of cornea,** due to contact with the upper tarsal conjunctiva or due to extension from the fornix, with the numerous **epithelial erosions,** evident only by slit lamp examination after staining with fluorescein.

(2) Corneal follicles

- They form in the upper part of the cornea commonly in association with pannus.
- They are small, greyish in color.
- Are present between the epithelium and Bowman's membrane.
- They are called **(Herbert's rosettes).**
- When heal by fibrosis → leave depressed pits in the upper cornea **(Herbert's pits).**

(3) Trachomatous pannus → see later

(4) Trachomatous ulcers → see later

Q What is pannus?

Answer

- *Definition*: Pannus means vascularization + cellular infiltration of the upper part of the cornea.

- Symptoms of pannus:

Some pain with photophobia, lacrimation and blepharospasm, vision may be affected if the pupillary area is involved.

- ***Signs*: *Clinically*,** It appears as a **faint haze with minute superficial vessels** springing from the vascular loops of the limbus, lying between the epithelium and Bowman's membrane.

Q What is the difference between progressive and regressive pannus?

Answer

- Course of pannus: is as follows:

1. **Progressive pannus:** Cellular infiltration occurs in the upper part of the cornea between epithelium & BM, followed by superficial vascularization i.e. cellular infiltration precedes the vascularization.

2. **Regressive pannus:** cellular infiltration regresses but the vessels never regress, thus, the vessels are seen extending a short distance infront of the cellular infiltration.

Q What are the clinical types of pannus in trachoma?

Answer

- Clinical Types of pannus:

Is based on the relation between the cellular infiltration and the vascularization:

a) Thin pannus or pannus tenius: Both infiltration and vessels are scanty.

b) Fleshy pannus or pannus carnosus:
In which the infiltration is excessive showing a fleshy mass in the upper part of the cornea with few blood vessels.

c) Vascular pannus or pannus vasculosus: In which the B.vs. creep into the cornea in large numbers while the infiltration is scanty.

d) Cicatrized pannus or pannus siccus:
Is seen in all cases of healed trachoma as a greyish white crescent at the upper limbus showing an irregular serrated edge **(Herbert's pits),** with **obliterated fine B. Vs.**

e) Pannus annulosus: Where the cellular infiltration and vessels come from all round the cornea. Diffuse keratitis, occurs in severely malnourished patients.

Q Mention the DD. of trachomatous pannus?

***- Differential Diagnosis*:**

1. Vernal pannus: corneal complication of spring catarrh.

2. ***Degenerative pannus***: in long standing corneal edema e.g. absolute glaucoma.

3. ***Leprotic pannus***: associated with multiple corneal lepromata + corneal anesthesia

4. ***Phlyctenular pannus***: multiple corneal phlyctens become vascularized and produce the phlyctenular pannus. Differs from trach. Pannus in:

a. Not necessarily superior, may be annular.

b. Less vascular & vessels do not branch dichotomously.

c. Infiltration is nodular & does not end in a horizontal line.

Table 1. DD of Trachomatous Pannus

	Trachomatous Pannus	**Phlyctenular Pannus**
Cause	clamydia Trachomatis	allergic
Site	up	any site
Border	Serrated horizontal	Irregularly rounded
Cells, vessels	Variable	usually thin, very vascular, the vessels may be deep to Bowman's membrane.
Associated signs	Follicles or papillae	Phlyctens, marked irritation, eczema of the face.

Table 2: DD. of Trachomatous Pannus

	Leprotic Pannus	**Degenerative pannus**
Cause	infective (lepra bacilli)	Degenerative
Site	any site	any site
Border	irregular	irregular
Cells, vessels	usually deep, Irregular usually deep infiltration and **few vessels**	fibrous tissue+B.vs. **fibrous tissue predominate.**
Associated signs	Leprotic iritis. corneal anaesthesia, Lionin face	Signs of absolute glaucoma

Q Mention the fate of trachomatous pannus

Answer

- Fate:

1. ***Complete resolution:*** Pannus may resolve completely leaving a clear cornea and obliterated blood vessels, only if treated early with no destruction of Bowman's membrane
2. ***If B.M. is destroyed → Opacity in the upper cornea → (pannus siccus).***

Q What are the types of trachomatous ulcers?

Answer

- ***Trachomatous ulcers are of 3 types:***
    1. ***Ulcers related to pannus*** either at the edge or on the surface of pannus. It is linear and horizontal (typical trach. ulcer).
    2. ***Ulcers unrelated to pannus*** may be central or marginal.
    3. ***Ulcers produced mechanically*** by trichiasis, PTD …etc

Q What are the sequelae (complications) of trachoma?

- ***SEQUELAE (Complications) OF TRACHOMA***

The complications of trachoma can be ***classified into the following 4 categories***:

1. Lid complications
2. Conjunctival complications
3. Corneal complications
4. Lacrimal complications

A) Lid Complications:

1- Ptosis:
Causes:
▪ Early:

a. Increase lid weight due to cellular infiltration of conjunctiva and tarsus **(mechanical ptosis).**
b. Infiltration of Muller's muscle.

▪ Late:

a. Subsequent fibrosis of Muller's muscle → weakness.
b. Hyaline and amyloid degeneration of conjunctiva and tarsus.

2- Rupping lashes or Trichiasis:
Causes:

a. From fibrosis around the hair follicles
b. From growth of new follicles due to chronic hyperemia
c. Associated with entropion

3- Cicatricial entropion: Due to cicatrisation & shrinkage of palpebral conjunctiva, and excessive scarring at the sulcus subtarsalis.

4- Chronic blepharitis.

5. Chronic meibomianitis

6. Chalazia due to fibrosis of ducts of Meibomian glands.

B) Conjunctival Complications:

1- Posterior symblepharon: Where adhesions in the fornices occur with consequent shallowness, when the lower lids pulled down, vertical folds are seen.

2- Xerosis: *Is due to*:

a) Cicatrization of the conjunctiva with atrophy of the goblet cells.
b) Stenosis and obstruction of lacrimal ductules by fibrosis.

3- Hyaline and amyloid degeneration of tarsus and conjunctiva, especially of the upper lid.

4- **Epithelial plaque formation**

C) Corneal Complications

1. Corneal opacities
2. Xerosis
3. Keratomalacia-ex-pano
4. Epithelial plaque

D) Lacrimal Complications:

1- Chronic trachomatous **canaliculitis** with fibrosis → canalicular stenosis → epiphora.
2- Chronic **dacryocystitis** and N.L.D. stenosis → epiphora
3- Chronic **dacryoadenitis**

Q What are the causes of trachomatous ptosis?

Answer

Causes:

- **Early:**
  a. Increase lid weight due to cellular infiltration of conjunctiva and tarsus **(mechanical ptosis).**
  b. Infiltration of Muller's muscle.
- **Late:**
  a. Subsequent fibrosis of Muller's muscle → weakness.
  b. Hyaline and amyloid degeneration of conjunctiva and tarsus.

Q What is the cause of trichiasis in trachoma?

Answer

Causes:

a. From fibrosis around the hair follicles

b. From growth of new follicles due to chronic hyperemia

c. Associated with entropion

Q Describe briefly ttt of trachoma

Answer

- **Treatment of tracoma:**

a) <u>Prophylactic treatment</u>:

1. Combat flies adequate disposal of human and animal waste.
2. Education health programs.
3. Early diagnosis and treatment, by routine examination among school children.
4. Careful washing of hands and disinfection after dealing with patients.
5. Raising the standard of population and avoid overcrowding.
6. The fomites of the patient should not be used and a prophylactic sulphacetamide 10-20% drops should be used for the surroundings.

b) <u>Curative treatment</u>: (Medical & Surgical)

I. <u>*Medical treatment*</u>:

a. <u>Local treatment:</u>

1-Local sodium **sulphacetamide eye drops** 20-30% 4-5 times per day.

2-Local terramycin or erythromycin eye ointment. (more effective than sulphonamides) used for 6 weeks.

3-Atropine eye drops 0.5-1% if cornea is affected.

b. <u>Systemic Treatment</u>:

1- Doxycycline:

Is a long acting derivative of tetracycline which is very effective in curing both genital and ocular infection.

Dose:

Either 300 mg weekly for 3 weeks OR. 100 mg twice daily for 1-2 weeks.

It should be taken at meal times to avoid stomach upsets.

2- Tetracycline:

Dose:

250 mg four times daily for 6 weeks.

Should be taken before meals since its absorption is diminished bv food.

Warning: Tetracycline Should not be given for:

- Children under 12 years of age: Because it may cause dental staining and occasionally dental hypoplasia in children.
- Pregnant or lactating women.

These cases should be treated with **erythromycin.**

3- Erythromycin:

Dose:

250 mg four time daily if tetracyclin is inappropriate.

II. *Surgical treatment:*

1. Mature follicles → expression
2. PTDs & PTCs → Picking
3. Hyaline and amyloid degeneration of the conjunctiva with very thickened conj. → combined excision of the tarsus & conjunctiva.

Q How can you diagnose a case of trachoma?

Answer

• **Diagnosis of trachoma:**

A- *Clinical picture* (Mainly):

N.B. depending on the stage of the disease at least two of the following signs must be present.

1- Expressible follicles.

2- Pannus and Herbert's pits with pannus siccus in the upper part of the cornea.

3- Trachomatous Conjunctival fibrosis, Arlet's line and P.T.Ds.

B- *Laboratory* (For research work):

1. Presence of **cytoblasmic basophilic inclusion (Halberstaedter-Prowazek) bodies** in the Conjunctival scrapings stained with Geimsa stain (positive in T_1 & T_2)

2. Immunofluorescent staining of conj. smears

3. Cultivation of TRIC agents on yolk sac of chicken embryo.

4- Enzyme immunosorbent assay.

Q Mention the main diagnostic criteria of trachoma according to WHO.

Answer

• ***Diagnosis of Trachoma according to world health organization (WHO) requires at least two of the following signs:***

1. Superior tarsal follicles.
2. Limbal follicles or Herbert's pits.
3. Typical conjunctival scarring.
4. Vascular pannus.

Q What is the DD of tracoma?

Answer

• **Differential diagnosis:**

1-Follicular Trachoma: From other causes of follicular conjunctivitis.

2-Papillary Trachoma: From spring catarrh

3- Trachomatous Pannus: From phlyctenular, leprotic and degenerative pannus as in the degenerative stage of glaucoma **(see Table).**

Q Give an account on spring catarrh (vernal keratoconjunctivitis): Definition, aetiology, clinical picture, and ttt

Answer

- **Definition:**
  - VKC or spring catarrh is a recurrent, external allergic disorder affecting children with a subacute onset of bilateral itching, lacrimation, and photophobia associated with a mucoid discharge.
  - Remissions & exacerbations are frequent.
  - The symptoms are characteristically worse during spring and summer.

- **Aetiology:**

- It is an allergic disorder of the conjunctiva to **an unknown exogenous allergens,** mediated by **IgE** as indicated by the accompanying oesinophilia (IgE-mediated hypersensitivity). **U.V.R.** and **heat** are contributing factors.

- Family history of atopy, allergic rhinitis, bronchial asthma, eczema, *enviromental allergies, is present in 66% of cases.*

- **Clinical Picture:**

***a. Symptoms**:*

Most marked in spring &summer.

-Itching ***due to pressure on the nerves by exudate & irritation by histamine.***

-Photophobia, blepharospasm, lacrimation

-Yellowish white ropy, stringy, discharge ***which may be pulled from the low fornix or from underneath the upperlid.***

b. Signs:

►*The* ***3 main clinical types*** *of VKC are:*

1. ***Palpebral type***
2. ***Bulbar (limbal) type***
3. ***Mixed type***

(1) Papebral type

- Characterized by initial diffuse papillary hypertrophy most marked on the superior tarsus, followed by
- The papillae then become larger (giant papillae), and have a flat-topped polygonal appearance (***Cobblestone papillae***)

- These conjunctival changes are associated with a sticky exudates **(mucoid discharge)**.

If the upper lid is everted and the papillae are left exposed for 1-2 minutes a milky white film forms on them. *This film is sticky and is rich in eosinophils.*

(2) Bulbar (or limbal) type

- Characterized by hyperaemic, edematous, and thickened conjunctiva at the limbus (***Limbitis***)

- As the disease progresses, thickening of the limbus becomes irregular and associated with appearance of mucoid nodules **(limbal papillae)** and discrete white spots which present at the apices of the papillae and composed predominantly of eosinophis ***(Tranta's dots)***.

(3) Mixed VKC: Characterized by mixed changes of both types (Palpebral & bulbar).

Q What are the corneal Signs & complications of spring catarrh?

• **Corneal changes in VKC:**

1. ***Superior punctate epitheliopathy (****Keratitis superficial vernalis of Tobgy****):*** is the earliest finding (**very common**)

2. ***Macroerosions:*** as a result of continued epithelial loss.

3. ***Plaque:*** the microerosions become coated with exudates leading to plaques (**common**).

4. *Superficial corneal ulcer (rare),* ***usually horizontally*** *oval or shield shaped, shallow, does not spread, usually in the superior half of the cornea.* ***Indolent do*** *not vascularize,* ***heals leaving an*** *oval or ring shaped opacity.*

5. *Opacity like arcus senilis (cupid's bow).*

6. *Myopic astigmatism or keratoconus* ***(due to frequent rubbing of itchy eyes).***

7. ***Subepithelial scarring***: a sign of previous severe corneal involvement (**rare**).

• **Prognosis*:***

Is good, and although recurrences may persist for several years. The disease eventually subsides.

• **Diagnosis: Clinical picture.**

Q Give the DD of spring catarrh

• Differential Diagnosis:

The palpebral form must be ***differentiated*** from papillary trachoma. The bulbar form must be ***differentiated*** from phlycten.

	Papillae of spring catarrh	**Papillae of Trachoma**
Symptom	Itching	Heaviness of lids
Seasonal incidence	Summer	No seasonal incidence
Sex	Males	Equal
Size	Large	Fine

Age	Adolescent	Children
Top	Flat topped	Rounded tops
Colour	Bluish white	Red
Fornix	Always free	Involved
Discharge	Ropy, eosinophils	No eosinophils
Inclusion bodies.	Absent.	Present

- **Treatment:**

Is symptomatic:

a. *General* treatment:

1. Dark glasses
2. cold compresses
3. Antihistaminic drugs especially with severe itching.

b. *Local* treatment:

1. *Topical steroids*: as initial short-term treatment and during severe exacerbations.

2. *Sodium cromoglycate 2% drops (Opticrom):* 4 times/day (qid) for long-term therapy and prophylaxis.

Action: prevent mast cell degranulation induced by antigen antibody reaction, preventing histamine release.

3. Local antihistaminics & vasoconstrictors as antistine drops or prisoline eye drops.

4. **For Resistant Cases:**

- **Beta rays** —> fibrosis and flattening of papillae
- **Combined excision of tarsus and conjunctiva.**
- **Cryotherapy** of the papillae and nodules.
- **Immunosuppressive druds e.g. Cyclosporine 2% eye drops.**

Q Give an account on Phlyctenular keratoconjunctivitis: Definition, aetiology, clinical picture, and ttt

Answer

Phlvctenular Kerato-Conjunctivitis

- **Definition:**

It is a kerato-conjunctivitis due to an allergy to an **endogenous** antigen. Recurrence is common if the cause is not removed.

The characteristic lesion is the **phlycten**.

- **Aetiology:**

The endogenous toxin may be:

1- Tuberculo-protein from T.B. focus.

2- Intestinal parasites.

3- Septic foci as tonsils and adenoids.

4- Secondary to staphylococcal blepharo conjunctivitis.

• **Clinical picture:**

- The disease is most frequent in **malnourished children** from 5-12 years, rare in adults.
- The first attack often follows measles, rhinitis or facial eczema.
- It is **recurrent** especially with any disease which lowers the body resistance.

(A) Symptoms:

- Discomfort, lacrimation, foreign body sensation.
- If cornea is involved → photophobia and blepharospasm.

(B) Signs:

a) Conjunctival signs:

The characteristic lesion is **the phlycten,** which may affect any part of the conjunctiva or the cornea but the most common sites are the limbus and the bulbar conjunctiva.

• ***The phlycten is:***

1- A rounded nodule of 1-3 mm. In size (one or more may be present).

2- Greyish or yellowish in colour resembling pustules, elevated above the surface.

3- Surrounded by a small area of congestion. But it is frequently complicated by Staphylococcal mucopurulent conjunctivitis, in which case the whole conjunctiva is intensely red with discharge.

4- The epithelium is first intact but later **ulceration** occurs and secondary infection takes place (staph).

5- Healing occurs rapidly without any scar.

B. Corneal signs:

1. Corneal phlycten

2. Phlyctenular Ulcers

3. Phlyctenular pannus

1. Corneal phlycten is greyish in colour, may occur deep or superficial to **B.M.** It may ulcerate —> phlyctenular ulcer or become vascularised -> phlyctenular pannus.

2. Phlyctenular Ulcers

a. Limbal ulcer: single or multiple limbal ulcers, which may fuse to form a **ring ulcer**.

b. Fasicular ulcer: Is a superficial ulcer which creeps over the cornea towards the centre and is supplied by **a leash of B.Vs.** When it heals its

track leaves an opacity maximum where it stops. It spreads in a **serpiginous** manner.

3. Phlyctenular pannus:

It is vascularisation and infiltration. **It differs from trachomatous pannus** in the following:

1- Affects any part of limbus.

2- Thin and very vascular, with marked irritation

3- Vessels are straight and lies deeper to B.M.

4- Infiltration does not end in a straight line.

c) Other signs

1. Lids:

- Eczema of lids and face, fissures at outer canthus.
- Ectropion

2. Conjunctiva: M.P.C. due to 2ndry infection. (Staph aureus).

Q What are the corneal signs of phlycten?

Answer → *see before*

Q Describe the DD. of phlyctenular conjunctivitis

Answer

• **Differential Diagnosis:**

(1) The phlycten from:

1. Inflammed pinguecula
2. Episcleritis
3. Limbal spring catarrh

(2) Pannus from other types of pannus e.g. trachomatous pannus

(3) Limbal corneal involvement from acne rosacea or limbal corneal ulcer (***dd. by associated clinical picture***).

Table : Differential Diagnosis

(1)	PHLYCTEN	PINGUECULA
Age	young	old
Shape	Round	Triangular
Color	Grey or yellowish	Yellow

Site	Anywhere	Nasal side
Suppuration	Occurs	Never
Ulceration	Occurs	Never
Vascularization	Positive	Negative
(2)	**PHLYCTEN**	**EPISCLERITIS**
Age	Children	old
Level	Superficial	deep
Color	Grey or yeloowish	Dusky red = purple
Movement	Moves with conjunctiva	Fixed to sclera. Conjunctiva moves over it
Tenderness	Not tender	Tender
Ulceration	Ulceration occurs	Never ulcerates
Suppuration	Occurs	Never
Adrenaline test	Vasoconstriction of the localized superficial B.vs occur	Not affected due to (deep B.vs)
Prognosis	Good	May be serious
(3)	**PHLYCTEN**	**LIMBAL SPRING CATARRH**
Seasonal incidence	Negative	Positive
Itching	Negative	Positive
Lesion	Nodular	Gelatinous masses (papillae)
Ulceration	Positive	Negative
Suppuration	Positive	Negative
Discharge	No eosinophils	Markedly positive

Lid	Rarely affected	Usually affected

Q Differentiate between trachomatous and spring catarrh papillae

Answer → see before

Q Give an account on pinguecula

Answer

Pinguecula:

Definition:

Yellow-white flat or slightly elevated conjunctival lesion, usually in the interpalpebral fissure adjacent to limbus, but not involoving the cornea.

Aetiology: ***Elastotic degeneration*** of deep conjunctival layers, possibly related to chronic sun exposure (ultraviolet rays) and common in old age.

Differential diagnosis: Phlycten (see before), if surrounded by congestion.

Treatment: No treatment. If cosmetically bad it can be excised.

Q Write short notes on pterygium

Answer

Pterygium:

Definition:

It is a triangular encroachment of the conjunctiva on to the cornea. It is very common in Fgypt usually associated or preceded by pingueculae.

Aetiology: It is **unknown** but it is related to:

Chronic irritation by dust, wind, fumes etc.

U.V.R. in the sun is probably the most important factor. It is common in dry sunny climates.

Degenerative:

a) It is not known if it is a primary degeneration of the conj. Or the cornea. The latter is more accepted.

b) It is not known if pinguecula is the precursor for pterygium or not.

Pathology:

It consists of:

1. Single layer of conjunctival epithelium but may be thick.
2. Fibro-vascular tissue - (ft. and B.vs.) elastoid degeneration of stromal collagen.
3. Superficial layers of corneal strorna and Bowman's membrane are destroyed.

Clinical picture:

Signs:

Site: On the nasal side, less commonly on the temporal side. It is always bilateral.

Shape: ***It is triangular and consists of:***

Head or apex: Is blunt and lies over the cornea and may grow to reach the pupillary area (affects vision), preceded by numerous opacities lying deeply in the neighbouring part of the cornea. A pigmented iron line **(stocker's line)** may be seen in advance of a pterygium on the cornea.

Neck: The part that overlies the limbus.

Body: Lies over the sclcra. It is loosely adherent to the sclera. the area of adherence being smaller than its breadth so that there are folds at the upper and lower borders. In recurrent cases much fibrosis exists with symblepharon.

Symptoms:

- Little discomfort but the patient presents for disfigurement.
- Against the rule astigmatism is often associated → **drop of vision.**

Complications:

1- If reaches the central part of the cornea → **vision is affected,** due to opacity and astigmatism.

2- Limitation of ocular movement with diplopia, in recurrent cases with marked fibrosis and symblepharon.

Course:

A) Progressive:

a) Thick and fleshy .
b) Vascular.
c) Moving.
d) Preceded by numerous small opacities.

B) Stationary:

a) Thin, membraneous.
b) Less vascular.

N.B. A pterygium never disappears alone.

Q Give the DD of pterygium

Differential Diagnosis: Is from pseudo-pterygium.

	True pterygium	**Pseudopterygium**
Nature	Degenerative condition	A told of conj. in gonococcal, diphtheritic conjunctivitis or burns.
Site	Bilateral more on nasal side	Unilateral- anywhere
Hook	Cannot be passed under the neck	Can he passed under the neck
Course	Progressive or stationary	Always stationary.

Treatment:

1. If small & stationary No operative interference because the excision may be followed by recurrence.

- **The indications for operative interference are:**
  1- Progression.
  2- If it encroaches on the pupillary area.
  3- If cosmetically annoying the patient.

- **The operations used for pterygium are:**
  1- Simple excision: has high incidence of recurrence.
  2- Tucking (McReynold's operation): the principle is to change the direction of growth subconjunctivally.
  3- Excision with bare sclera technique but better to use a conjunctival rotation flap. or autografting.
  4- Excision with application of mucus or conjunctival graft, amniotic **membrane graft or a corneal graft,** if the cornea is markedly involved. The graft operation is especially used in recurrent cases.
  5- Recently excision with application of mitomycin (antifibroblastic agent) especially recurrent cases.
  6- Excision followed by laser for blood vessels.

Q What is the difference between true and false pterygium (pseudopterygium)

Answer → see before

Q Give an account on xerosis or (xerophthalmia)

Answer

Definition: It is a degenerative condition characterized by dryness of conjunctiva and cornea .

Aetiology:

Xerosis occurs if the accessory lacrimal glands and goblet cells are destroyed. Removal of the lacrimal gland alone does not lead to xerosis.

The causes may be:

- General:

Vitamin A deficiency (xerophthalmia) (night blindness is often present) mainly in boys, more in summer may be associated in the keratomalacia (necrosis of the cornea in marasmic children)

- Local:

a) **Cicatrization**: Trachoma, diphtheria chemical bums, pemphigus, cicatricial ocular pemphigord stcven's Johnsons' syndrome.
b**) Exposure of conjunctiva** as in lagophthalmos, proptosis, & ectropion.
c) Post irradiation.

Clinical picture:

1- Pre-xerotic stage: Conjunctiva appears dry and loses its lustre, wrinkled (especially the temporal bulbar conjunctiva), on abduction of the eye.

2- Xerotic stage:

- The epithelium becomes hornified together with debris and inflammatory cells to produce ***Bitot's spots***.

- **Bitot's Spots**: are triangular white patches on the inner and outer sides of the cornea covered by a foam material. It is due to metaplastic keratinization of conjunctiva which is not wetted by tears. The horny material is casted of in the conj. Sac. Meibomian glands show abnormal activity.
- The conjunctiva ceases to secrete mucus.
- The fatty secretion of Meibomian glands covers the dry surface so that the watery tears fail to moisten the conjunctiva.
- Xerosis bacillus proliferated markedly on the horny material and it has no causal relationship but these bacilli metabolize the debris and produce the foamy appearance.

Cornea:

- Dryness, loss of lusture.
- Keratinization of corneal epithelium
- Cornea: Ulceration, opaciflcation.
- Corneal vasculanzation.

Treatment:

- ***Cases due to vitamin A deficiency*** are treated by Vitamin A and good diet.
- ***Cases due to local causes:***

1- Treat the cause, dark glasses.

2- Moisten the conjunctiva with 1% methyl cellulose drops artificial tears and ocular lubricant ointment at night with no preservatives

3- Bitot's spots: May be scraped with sharp spoon

5- Preservation of tears by lacrimal punctal or canalicular occlusion.

a- Temporary occlusion by punctal plugs or collagen implants in the canaliculi.

b- Permanent occlusion: By electrocauterization or argon laser photocoagulation of the puncta.

6 - Lessen Tear evaporation out doors by tight goggles and by the use of humidifier at home.

7- Mucolytic agents: used if there is excessive mucin e.g acetyl cysteine eye drops 10-20%.

Q What is the difference between Bitot's spots and Tranta's spots?

Answer → see before

Q What is the difference between atropine irritation and atropine toxicity?

Answer

Atropine irritation: is a local hypersensitivity reaction manifested by itching, redness, lid edema and redness up to eczematous dermatitis and follicles of the conjunctiva.

Atropine toxicity: Is a general reaction, common in children especially if atropine is given in the form of eye drops. It is manifested by flushing, hotness of the face, dryness of secretions e.g. saliva, rapid pulse .., etc.

Q Enumerate the causes of subconjunctival hemorrhage

Answer

1. Traumatic: direct or fracture base of the skull (see chapter of eye trauma)
2. Straining e.g. vomiting, cough, convulsions.
3. Compression of chest or abdomen in crowds or accidents
4. Weak vessels e.g. in diabetes, arteriosclerosis
5. Blood diseases e.g. hemophilia, leukemia, anemia, purpura
6. Septicaemia
7. Severe conjunctivitis as in pneumococcal, and gonococcal conjunctivitis
8. Rupture of local vascular anomaly e.g. Telangiectasia, varicosities
9. Rarley, with menstruation in some womwn
10. Idiopathic

Q Give the DD of a red eye

Answer

Differential Diagnosis of Red Eye

Should be answered in a Table form:

1. **Conjunctivitis**
2. **Keratitis & corneal ulcer**
3. **Acute iridocyclitis**
4. **Acute congestive glaucoma**

Q Enumerate the causes of conjunctival edema (chemosis)

Answer

1. **Traumatic**

2. **Inflammatory**: acute infection of the eye and adnexa e.g. conjunctivitis, corneal ulcer, orbital cellulites, endo- & panophthalmitis

3. **Non-inflammatory**:

a. Passive: obstruction of circulation e.g. by orbital tumors, dysthyroid ophthalmopathy, renal or congestive heart failure.

b. Allergy: angioneurotic edema or allergy to local drugs e.g. atropine

Q Enumerate the ocular infections caused by pneumococci

Pneumococcal infections include:

1. MP conjunctivitis
2. Typical hypopyon ulcer
3. Chronic dacryocystitis
4. Endo- and panophthalmitis
5. Optic neuritis