
UNIT 23 INFECTIONS OF OCULAR ADNEXA

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23.0 OBJECTIVES

After going through this unit, you should be able to understand:

- the normal lacrimal passage and its various parts;
- the causes of watering of eyes;
- the dryness of eyes and its causes;
- the diseases of lacrimal sac; and
- the treatment for conditions like obstruction of lacrymal duct.

23.1 INTRODUCTION

Mother with a new born child is frequently seen in an eye clinic with usual complaints of watering of eyes. Watering of eye, if not treated, would lead to secondary infection of conjunctiva. The commonest cause of this watering of eye is the blockage of punctum. Local antibiotic drops, regular massage and proper hygienic care can help to treat the condition. Blockage of lacrimal sac and duct in adults is also a common disease. Chronic infections involving other parts of eye and nose can lead to infection and blockage of the duct and the sac. Hot compresses, local antibiotic drops, massage, probing and syringing is the methodology of treatment. Chronic and infected or unrelieved conditions may require surgical intervention including removal of sac and reconstruction of the duct.

23.2 LACRIMAL PASSAGE

The lacrimal passage consists of Lacrimal puncta. Canaliculi, Lacrimal sac, Naso-lacrimal duct.

1) Lacrimal Puncta

These are two small openings, each of which is situated on a small elevation known as lacrimal papilla, about 6 mm from the inner canthus on each lid margin. The puncta are visible only when the lids are slightly everted.

2) Canaliculi

These are two in number. They start from the puncta as narrow tubular passages to end in the lacrimal sac. Each canaliculus consists of a short vertical portion about 1 to 2 mm long and a long horizontal portion, the length of which is 6-7 mm. They are lined by stratified squamous epithelium. The two canaliculi may open into the lacrimal sac separately or they may join to form a common canaliculus (sinus of Mair) before opening into the sac.

3) Lacrimal Sac

It is about 13 mm long vertically and 5 to 6 mm wide, situated in the lacrimal fossa formed by the lacrimal bone and the frontal process of the maxilla. The two canaliculi open on the lateral wall of the sac and inferiorly the sac is continuous with the naso-lacrimal duct. The sac is covered by the lacrimal fascia, which is derived by splitting of the periosteum of the lacrimal fossa. Anterior to the lacrimal fascia is the medial palpebral ligament and the fibres of the orbicularis muscle, which originate from the posterior lacrimal crest, are situated partly behind the sac and are known as Horner's muscle. The portion of the sac, which is above the opening point of the canaliculi is known as the fundus. It lies slightly above the medial palpebral ligament. But the main portion of the sac lies behind and below the medial palpebral ligament.

4) Naso-lacrimal Duct

It is the continuation downwards of the sac to the inferior meatus of the nose. It may be divided into two parts:

- a) An intra-osseous part, situated within the bony naso-lacrimal canal, which is about 12 mm long.
- b) An intra-mental part extending beyond the termination of the bony canal and situated within the mucous membrane of the lateral wall of the nose. This is about 5 mm long.

The histology of the wall of the duct is the same as that of the sac, although the substantia propria is much thinner.

23.3 WATERING OF EYES

Two terms are used in connection with watering of the eye – epiphora and lacrimation. Epiphora denotes watering due to obstruction to outflow of tears and Lacrimation means watering due to excessive secretion of tears.

Causes of Watering of Eyes**a) *Obstruction to Outflow of Tears***

- 1) Stenosis of the punctum particularly the lower one – congenital or acquired.
- 2) Eversion of the lower punctum—due to laxity of the orbicularis muscle as in senility, facial paralysis and ectropion.
- 3) Obstruction in the lower canaliculus due to calculus or infection.
Obstruction in the sac due to tumour of the sac or following removal of the sac.

- 4) Obstruction in the naso-lacrimal duct, e.g., chronic dacryocystitis, nasal polyp and maxillary antrum tumour pressing on the duct.
- b) **Excessive Secretion of Tears**
 - 1) Reflex causes:
 - a) Due to sensory stimulation of the structures of the eyeball, e.g., corneal foreign body, corneal ulcer, keratitis, or exposure to cold, wind, dust, smoke or irritant gases.
 - b) Due to stimulation of the optic nerve, e.g., exposure to very bright light.
 - c) Due to stimulation of the sensory nerves of the eye muscles.
 - d) Due to stimulation of the nasal mucous membrane as in nasal catarrh.
 - 2) Action of parasympathomimetic drugs like pilocarpine and physostigmine.
 - a) Diseases of the lacrimal gland as in early stage of Mikulicz's syndrome characterized by symmetrical enlargement of the lacrimal and salivary glands.
 - b) Central causes – emotional and psychological effects.

23.4 DISEASES OF THE LACRIMAL GLAND

Acute Dacryo Adenitis is the acute inflammation of the lacrimal gland. It occurs in association with mumps and gonorrhoea. It causes pain in the upper and outer angle of the orbit and watering of the eyes. It is not a common illness.

Treatment

Treatment includes hot compresses, oral antibiotics and incision, if the gland suppurates.

23.5 DISEASES OF THE LACRIMAL SAC

Infection of the lacrimal sac is called Dacryocystitis.

Classification of dacryocystitis:

- 1) Acute Dacryocystitis
- 2) Chronic Dacryocystitis
- 3) Congenital Dacryocystitis

23.5.1 Acute Dacryocystitis

It is the acute suppurative inflammation of the lacrimal sac.

Etiology

It occurs usually as an acute exacerbation of chronic dacryocystitis. Rarely it may start spontaneously without any history of epiphoria.

Causative agent usually is superimposed infection of streptococcus haemolyticus. But pneumococcus and staphylococcus aureus may also take part.

Pathology

The sac becomes filled with frank pus with abundant polymorphonuclear leucocytes. The anterior sac wall gives way and inflammation spreads to the tissues surrounding

the sac, causing pericystitis. Finally an abscess is formed, which is known as lacrimal abscess. It usually bursts on the skin surface below the medial palpebral ligament, forming a lacrimal fistula. As soon as the pus drains out, the inflammation subsides and the sac ultimately becomes shrunken and fibrous.

Symptoms

- a) Severe pain and sensation of heat over the sac area, radiating over the frontal region.
- b) Feverish feeling.
- c) Epiphora.

Clinical Signs

- a) Marked swelling and redness of the skin over the sac area.
- b) Oedema of the skin of the lids and the side of the nose.
- c) Skin over the sac is markedly tender and hot.
- d) No regurgitation through the puncta at this stage, as the canaliculi become blocked due to oedema of the surrounding tissues.
- e) Slight congestion or chemosis of the conjunctiva.
- f) Enlargement of the sub-maxillary lymph glands.
- g) When lacrimal abscess is formed, fluctuation can be elicited.
- h) When the abscess bursts on the skin surface, a fistula is formed and the signs and symptoms of acute inflammation subside.

If the condition is not treated properly and left as it is, the fistula may close later and there may be further attacks of acute dacryocystitis.

Diagnostic Criteria of Acute Dacryocystitis

- a) Swelling and redness of the skin over the sac.
- b) Marked tenderness over the sac.
- c) Oedema of the lids.
- d) History of epiphora.

Complications of Acute Dacryocystitis

- a) Osteomyelitis of the lacrimal bone which may be eroded and an internal lacrimal fistula may be formed opening into the nose.
- b) Orbital cellulitis due to spread of the inflammation into the orbit.
- c) Facial cellulitis due to the spread of inflammation into the face.
- d) Cavernous sinus thrombosis due to spread of infection along the angular vein.

Treatment

A patient presenting with acute dacryocystitis with localized pain and inflammatory signs on the lacrimal sac area, without the formation of an abscess, is treated with hot compresses over the sac area, Injection of antibiotics (crystalline penicillin 500,000 units daily for five days), Oral Sulphonamide – 2 tablets 3 times a day for 5 days, by mouth and Analgesics like aspirin or nimulid.

When the inflammation has localized and fluctuation can be elicited, a vertical incision over the sac is given to drain the pus. Remove the sac when inflammation

has completely subsided. Dacryocystorhinostomy is not suitable after an acute attack, as the sac shrinks and becomes fibrous.

When a lacrimal fistula has formed, excision of the fistulous passage and removal of the sac is advised.

23.5.2 Chronic Dacryocystitis

Etiology

- 1) Age – Usually occurs in adults over middle age.
- 2) Sex – 75 per cent in females.
- 3) Bilaterality – May be unilateral or bilateral.
- 4) Social incidence – Common in the lower middle class group.
- 5) Predisposing factor—Stricture of the naso-lacrimal duct due to narrowness of the bony canal, chronic inflammation of the nasal mucosa, hypertrophied inferior turbinate, extreme deviation of the nasal septum or by the pressure of a nasal polyp.
- 6) Exciting factor—Infection of the stagnated sac contents by bacteria, most commonly by Pneumococcus, but by streptococcus and staphylococcus aureus also.

Pathology

There is stagnation of the sac contents due to stricture of the naso-lacrimal duct. The contents become infected, usually by the pneumococcus and the sac wall becomes chronically inflamed. The epithelium of the sac wall multiplies to form several layers and the adenoid layer becomes infiltrated with plasma cells and large mononuclear cells in addition to the lymphocytes. The vascularity of the wall increases and the sac wall becomes atonic. The contents of the sac which are at first watery, later on become mucoid due to excessive secretion of mucous by the goblet cells and afterwards mucopurulent due to exudation of pus cells.

Symptoms

The commonest symptom is epiphora. There may be pain, redness or swelling over the sac area.

Clinical Signs

The clinical signs in chronic dacryocystitis include persistent watering of the eye, mild conjunctival hyperaemia at the inner canthus of the affected side, with very little or no regurgitation of any fluid matter through the punctum on pressure on the sac.

On syringing the sac, fluid regurgitates through the upper punctum, mixed with flakes of mucous. Little or no local swelling or tenderness may be there over the sac area.

Clinical signs may be described in 3 stages:

- 1) In catarrhal stage (early stage): When there is only watering from the eyes.
- 2) In mucocele stage (next stage): In addition to watering, there is swelling over the sac area below the medial palpebral ligament, which is not tender. On pressure over the sac, mucoid material regurgitates through the punctum. Sometimes both the canaliculi may be blocked when there is no regurgitation on pressure and the condition is known as encysted mucocele. Conjunctival hyperaemia at the inner canthus remains the same as in catarrhal stage.

- 3) In the pyocele stage or suppurative stage (final stage): Conjunctival hyperaemia at the inner canthus becomes more pronounced. Similar swelling appears over the sac area below the medial palpebral ligament, which is not tender. Also there is no redness of the skin over the swelling. On pressure over the sac there is regurgitation of muco-purulent matter through the punctum. Watering of the eye remains as before.

N.B. Sometimes if the stricture of the naso-lacrimal duct is not complete, in the mucocele or pyocele stage the sac contents on pressure may evacuate into the nose.

Diagnostic Criteria

- a) History of epiphora.
- b) Eye looks watery.
- c) Slight swelling over the sac area.
- d) Regurgitation of watery, mucoid or muco-purulent matter through the punctum, on pressure over the sac.

Complications

Acute dacryocystitis can lead to development of chronic conjunctivitis or a corneal ulcer, which is known as hypopyon ulcer or *ulcus serpens of cornea*. The causative agent usually is *Pneumococcus*, derived from the sac.

Treatment

Probing of the naso-lacrimal duct and syringing of the sac may be tried in the early stage to open up the ducts. Syringing should be done with an antibiotic added to distilled water to control the infection (syringing with penicillin solution 50, 000 units in one cc distilled water). But this method invariably fails as the patency of the duct cannot be restored. Removal of the sac by dacryocystectomy operation is advised. As the sac is a local source of infection, it must be removed to avoid development of corneal ulcer. The operation is easy but the end result is troublesome, as there is life-long epiphora. Nasal drainage or dacryocystorhinostomy operation is another operation in which the medial wall of the sac is anastomosed with the mucous membrane of the middle meatus of the nose. If successful, the condition is cured and there is neither epiphora nor regurgitation.

23.5.3 Congenital Dacryocystitis

Congenital Dacryocystitis is the inflammation of the lacrimal sac in the new born. This condition arises due to failure in canalization of the naso-lacrimal duct, the lumen being blocked by epithelial debris. The condition may be bilateral.

Clinical Signs

It starts with epiphoria and purulent discharge at the inner canthus, usually six weeks after birth. By pressure on the sac there is regurgitation of mucopurulent material. The purulent matter is at first sterile but very soon becomes infected. Acute attacks are extremely rare.

Treatment

As soon as the condition is detected, probing of the naso-lacrimal duct cures the condition. It is unwise to wait beyond the age of 2 months. Delay in treatment causes complete cicatricial obliteration of the duct.

Check Your Progress

Write True/False:

- 1) Stenosis of punctum is a common cause of watering of eyes. (T/F)
- 2) Epiphoria means watering due to excessive secretions of tears. (T/F)
- 3) Vitamin A deficiency can lead to dryness of eyes. (T/F)
- 4) Dacryocystitis is an inflammation of the lacrimal sac. (T/F)
- 5) Dacryocystitis can be due to infection of the nose. (T/F)

23.6 LET US SUM UP

The present unit on diseases of ocular adnexa has attempted to explain the diseases of duct and sac. Watering of eyes is one of the common eye illnesses seen among new borns. Mothers need to be properly guided about proper care of eyes, better hygienic conditions and external massage of the lacrimal duct. Syringing and probing of these young ones is usually avoided unless mandatory. Conditions of blocked lacrimal duct due to their infection is seen in adults. These conditions, if remain untreated for long, may lead to chronic dacryocystitis, which may require surgical intervention.

23.7 ANSWERS TO CHECK YOUR PROGRESS

- 1) T
- 2) F
- 3) T
- 4) T
- 5) T

23.8 FURTHER READINGS

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