Lacrimal system

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Applied anatomy

a- Secretory part: lacrimal gland.

b- Execratory part:

1- The puncta, it's the open which are located near the medial end of the upper and lower eyelid and can be inspected by everting of the medial aspect of the lids.

2- The canaliculi, the upper and lower one passes horizontally, each one about 8 mm long. In the majority of individuals the upper and lower canaliculi form the common canaliculus which open in to the lateral wall of the lacrimal sac.

3- The lacrimal sac, which is about 10 mm long and lies in the lacrimal fossa.

4- The nasolacrimal duct, which is about 12 mm long and is the continuation of the lacrimal sac. It passes downwards to open into the inferior nasal meatus below the inferior turbinate. Obstruction of the duct cause distention of the sac and lead to infection called (dacryocystitis).

Applied physiology

Tear film ?

About 70% of tears drain through the lower canaliculus and the remainder drain through the lower canaliculus. The mechanism of drain by capillarity and also possibly by suction with each blinking. Gravity also plays an important role in sac emptying.

Causes of excessive watering

1- Lacrimation: is caused by reflex over production of tears from lacrimal gland by stimulation of the trigeminal nerve by emotional (crying) or irritation of the cornea and conjunctiva. Treatment is usually medical.

2- Epiphora: is caused by mechanical obstruction of lacrimal drainage, which is exacerbated by a cold and windy atmosphere, and is least in warm dry room. Most cases can be relieved by surgery.

Evaluation of the watering eye

1- External examination.

a- The eyelids, for evidence of mal-position.

b- The puncta, for evidence of mal-position, stenosis, obstruction punctual agenesis.

c- The lacrimal sac, should be palpated and compress.

d- Fluorescein disappearance test; is performed by instillation of fluorescein drops in to both eyes. Normally, very little or no dye remains after 2 minutes.

2- Jones dye testing.

Only indicated in patient with suspected partial obstruction of lacrimal drainage. Fluorescein drops are instilled in to the eye. After about 5 minutes, a cotton-tipped bud moisted in 4% cocaine is inserted under inferior turbinate at the nasolacrimal duct opening. The results are either.

a- Positive, if the fluorescein recovered from the nose indicates patency of the drainage.

b- Negative, no dye recovered from the nose indicates obstruction.

3- Contrast dacryocystography.

Injection of radio-opaque contrast medium in to both sides simultaneously of canaliculi followed by capture of magnified images to see where is the obstruction.

Epiphora

Punctual stenosis

Causes: (a) idiopathic stenosis in the elderly, which is the most common, (b) chronic blepharitis (c) herpes simplex lid infection, (d) irradiation of malignant lid tumors, (e) systemic administration of 5-fluorouracil (f) cicatrizing conjunctivitis and trachoma.

Treatment: dilatation of the puncta by nettleship dilator or by surgery (punctoplasty).

Canalicular obstruction

Causes: (a) congenital (b) direct trauma that lead scar (c) chronic dacryocystitis, (d) herpes simplex lid infection, (e) systemic administration of 5-fluorouracil and (f) irradiation.

Treatment: by intubation using silicone tube, if not response do surgery canaliculodacryocystorhinostomy (CDCR).

Nasolacrimal duct obstruct

Causes: (a) congenital (b) idiopathic stenosis is by far the most common (c) naso-orbital trauma and previous nasal and sinus surgery (d) granulomatous disease such as Wegener and sarcoidosis (e) infiltration by nasopharyngeal tumors.

All of these my cause infection of lacrimal sac ----- acute or chronic type dacryocystitis.

Congenital nasolacrimal duct obstruction

Duct obstruction is perhaps better termed delayed canalization since it often resolves spontaneously. The lower end of the nasolacrimal duct is the last portion of the lacrimal drainage system to canalize, complete patency usually occurring soon after birth. Epiphora affects approximately 20% of neonates, but spontaneous resolution occurs in 96% of cases within the first 12 months.

Epiphora and matting of lashes may be constant or intermittent, occurring particularly when the child has a cold or upper respiratory tract infection. Gentle pressure over the lacrimal sac causes reflux of purulent material from the puncta. Acute dacryocystitis is uncommon

Treatment:

a- Massage of the lacrimal sac increases the hydrostatic pressure and may rupture the membranous obstruction.

b- Probing of the lacrimal system should be delayed until the age of 12–18 months because spontaneous canalization is likely. Probing performed within the first 1–2 years of life has a very high success rate (90%).

Congenital Dacryocele?

Dacryocystitis

Infection of the lacrimal sac is usually secondary to obstruction of the nasolacrimal duct. It may be acute or chronic and is most commonly staphylococcal or streptococcal.

Acute dacryocystitis

Symptoms: is with subacute onset of pain in the medial canthal area, associated with Epiphora.

Signs: very tender tense red swelling in the same area and abscess formation may occur.

Treatment: initially, application of local warm compresses, systemic antibiotic (flucloxacillin). Incision and drainage may be considered. Surgery by Dacryocystorihnostomy (DCR) is usually necessary after acute infection has been controlled.

Chronic dacryocystitis

Symptoms: is with Epiphora which may be associated with chronic or recurrent unilateral conjunctivitis

Sings: painless swelling at the inner canthus, although pressure over the sac commonly causing reflux of Mucopurulent material through the canaliculi.

Treatment: DCR.