Comparative study between treatment of epiphora by external dacryocystorhinostomy and internal dacryocystorhinostomy by using lacrimal intubation set or T tube

THESIS

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Contents

List of Figures

List of Tables

Abstract

Dacryocystorhinostomy (DCR) has been performed on patients with chronic stenosis of the nasolacrimal duct.The objective of this work is to compare the results of external DCR and internal DCR by using silicone stent in some cases and T tube in others. Fifty six patients complaining of epiphora were included in this study in the period from January 2005 to November 2006.They underwent 20 external DCR operations, 20 endoscopic DCR operations using silicone stent and 20 endoscopic DCR operations using T tube (1 patient in group B and 3 patients in group C had bilateral operation). The success rate one year after the operations was 90% for the external group, 80% for endoscopic group using silicone stent and 60% for the endoscopic group using T tube.

Key Words: dacryocystorhinostomy-external-endoscopic-silicone tube –T tube.

Aim of the work

The aim of this work is to compare the results of external Dacryocystorhinostomy (DCR) and internal DCR by using silicone stent in some cases and T tube in others.

Introduction

Epiphora is one of the most prevalent functional disabilities of the ocular system. Besides this functional disability, the need to treat the dacryocystitis which is a life threatening infection before the era of antibiotics, called the attention of physicians from along period of time to this disease. The practice of lacrimal surgery has been done by ophthalmologists, because the ocular problems of lacrimal disease bring these patients to the ophthalmologist. But the surgical treatment is very closely related to the inside of the nose (**Onerci, 2002**).

Dacryocystorhinostomy is an important treatment in the relief of tearing and its success depends on patent system on irrigation (objective) and absence of the symptoms (subjective) and can be used for the treatment of nasolacrimal duct obstruction regardless the aetiology (**Eloy et al., 1995**).

The advent of rigid endoscopes and endoscopic instrumentation has made the endonasal approach a reality. Advantages of the endonasal approach include lack of a cutaneous incision and excellent visualization of the intranasal pathology, which is often the cause of dacryocystorhinostomy failure. Preoperative evaluations, including a detailed medical history, physical examination with office endoscopy as well as postoperative care are important. Surgical technique with detailed knowledge of intranasal anatomy and meticulous attention to hemostasis are critical (**Watkins et al., 2004**).

Endoscopic dacrycystorhinostomy has begun to gain popularity. It has been proposed as an alternative surgery to the external dacrycystorhinostomy in cases of chronic epiphora due to stenosis of the nasolacrimal duct (**Metson, 1995**).

Silicone tube is the most commonly preferred procedure and must be inserted into superior and inferior puncta and then passed through the canaliculi to the opened sac thus it will prevent the obstruction and would improve the surgical results (**Sprekelsen and Barberan, 1996**).

Endoscopic dacrycystorhinostomy using T tube instead of inserting a silicone tube does not require manipulating the canaliculi and it can be an easier and safer method. The horizontal part of the T tube will be inserted into the lacrimal sac through opened hole, and the vertical part of it will be left in the nasal cavity (**Tamura et al., 2003**).

Embyrology of the lacrimal drainage system

The premordium of the lacrimal drainage system starts to develop from the surface ectoderm at the 10-12 mm embyro stage. This ectoderm lies in a groove between the maxillary and paraxial mesoderm and is called the nasolacrimal groove. The ectodermal cells become buried under the maxillary mesoderm and will form the nasolacrimal duct and sac by the 16 mm embryo stage. Then the epithelial cells become separated from the surface ectoderm forming a cord of cells, two buds develop from its upper end and these will be the future canaliculi. Each canaliculius grows towards an eyelid, the upper end near the inner canthus and the lower one more laterally.The region of the ectodermal cord where the upper and lower canaliculi first budded enlarges somewhat and will form the lacrimal sac. Canalization is the process by which the lacrimal drainage system becomes patent and this begins soon after the 50 mm or 4 month embyro stage and progresses towards the nasal opening of the lacrimal duct and may not be complete at birth.The thin membrane that closes the nasal end of the nasolacrimal duct during embyronic life may fail to disappear at or soon after birth and cause obstructive symptoms in 1-4% of new born infants **(Moore, 1982).**

Anatomy of the lacrimal apparatus

1- Secretory system: basic secretors and reflex secretors.
2- Excretory system: puncta, upper and lower canaliculi, lacrimal sac and nasolacrimal duct (Fig.1).

Secretory system

The tear is a fluid sandwich which has an inner mucoid layer, an intermediate aqueous layer and an outer oily layer.
The intermediate aqueous layer is derived from two types of glands – those concerned with the constant supply of tears (basic secretion) and those responsible for the additional supply of tears on demand (reflex secretion) **(Miller, 1984).**

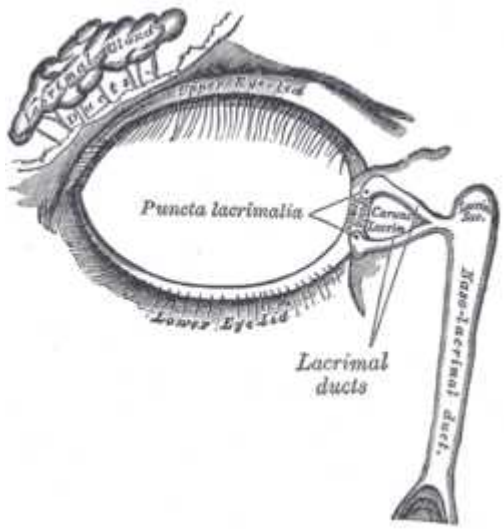

Fig. (1): Lacrimal apparatus of the right eye. The lacrimal gland is to the upper right. The right side of the picture is towards the nose. (from **Munk et al., 1990**)

(1) The intermediate aqueous layer:

Derived from two types of glands:

A. **Accessory lacrimal glands (basic secretors):**

These are the glands responsible for the constant basic secretion of tears. They are small in size but greater in number. More than 20 of these are found in the upper conjunctival fornix and between 6-8 in the lower fornix. They are located in the substantia propria of the conjunctiva.
Another small group, described by Wolfring and bearing his name, is found near the upper border of the tarsal plate **(Miller, 1984).**

B. **The lacrimal gland (the reflex secretors):**

The reflex secretors may be stimulated by emotional factors or by any irritation of the fifth cranial nerve, such as occurs in keratitis, rhinitis, sinusitis, or irritation of the eye and the nose by foreign bodies (**Blitzer et al., 1985**).

The lacrimal gland consists of two parts:

1. The orbital part: is the main part of the gland and is situated in a shallow bony fossa in the anterolateral part of the roof of the orbit.

2. The palpebral part: is a small part which can be seen if the upper lid is everted. About 10-20 ducts arise from the orbital part of the gland and after traversing the palpebral part open in the lateral part of the upper fornix.

Removal of the palpebral part of the gland will stop all the secretions of the gland. Xerosis however does not occur because the accessory lacrimal glands and other basic receptors are sufficient to moisten the conjunctiva (**Wolff, 1976).**

(2) The inner mucoid layer (goblet cells secretion):

The mucin secreted by the goblet cells forms the deepest layer of the tear film. These goblet cells are present in the conjunctival surface of the upper tarsal margin as well as along the lower margin **(Miller, 1984).**

(3) The outer oily layer (meibomian glands secretion):

The external oily layer of the tear film is produced by the meibomian glands situated in the tarsal plates of the upper and lower lids. About 28 in the upper and 18 in the lower lie side by side along the tarsus at right angles to the lid margin.The glands of Zeis found at the margin of the eyelids, and the glands of Moll found at the roots of the eyelashes, maintain structure of the tear film by decreasing evaporation and preventing the fluid of the lacrimal glands from over-flowing the lid margins (**Werb, 1983**).

Nerve supply of the lacrimal apparatus:

The lacrimal reflex is initiated through the ophthalmic division of the 5th nerve by stimulation of external ocular structures, skin or nasal mucosa.
Impulses are directed, by way of the trigeminal ganglion to the lacrimal nucleus just above the superior salivary nucleus in the pons.The efferent reflex pathway passes from the lacrimal nucleus through the geniculate ganglion.These centrifugal fibers join the greater superficial petrosal nerve via the nervus intermedius of the facial nerve, pass through the pterygoid canal as the vidian nerve, and synapse in the sphenopalatine ganglion **(Muller et al., 1978).**

The efferent parasympathetic impulses are then transmitted via postganglionic fibers in the zygomatic nerve (a branch of the maxillary division of the 5th nerve). The efferent fibers terminate in the lacrimal gland.The principal stimulus for tear secretion is mediated through this parasympathetic route. Blocking the sphenopalatine ganglion will depress tear secretion.
The sympathetic fibers are derived from the postganglionic cervical sympathetic fibers which are associated with the carotid plexus **(Muller et al., 1978).**