Canalicular Tear Repair

Ani Sreedhar MS, Teena Ann Varghese MS

The lacrimal drainage system consists of the superior and inferior lacrimal canaliculi, common lacrimal canaliculus, lacrimal sac and nasolacrimal duct. From their origin at the puncta, canaliculi run medially and parallel to the lid margin towards the internal angularis of the eye where they join into a common lacrimal canaliculus that opens into the lacrimal sac. As they run medially they turn deeper, and are posterior to the medial palpebral ligament when they enter the sac. This is useful to remember during repair of the canaliculi.

Canalicular lacerations are breaks (interruptions) in the normal tear duct system. Lesions of the lacrimal drainage system occur in up to 16% of all eyelid injuries. Canalicular lacerations are the most common injury of lacrimal drainage system because of their exposed position in the upper and lower lid.

The canalicular lacerations are commonly associated with trauma to the eyelids. Since the dense fibrous tissue of the tarsus is much stronger than the medial canalicular portion of the eyelid, any tractional force along the eyelid margin can result in medial eyelid avulsion with canalicular involvement. Canalicular tears can involve the upper canaliculus alone lower alone or both simultaneously. It can be lateral tear (within 8mm from the punctum) or medial (more than 8mm from the punctum).

To minimize the risk of scarring and epithelialisation of the wound, which in turn causes excessive tearing, canalicular lacerations should be repaired within two days of the injury.

**Repair Options**

Monocanalicular stent, IV Cannula (no: 24 gauge), Reitling tube.

**Procedure**

First the punctum is dilated, then the medial (portion closest to nose) cut end of canalicular system is identified. The stent is then introduced through punctum. When silicon stent is used, the collar of stent is placed securely in punctum so that the top edge is flushed with the eyelid margin, stent is then cut to appropriate length to bridge the laceration. The length of stent should be cut with excess remaining as a small amount of excess stent should extend to the nasolacrimal sac. The stent is then placed into the medial cut end of canaliculus. The laceration is then re-approximated with fine suture like 6-0 vicryl. The sutures should not pass through the cut ends of the canaliculus. The pericanalicular tissues are meticulously approximated. In cases where IV intubation tubes are used, the technique is essentially the same but the difference is the lateral portion of the tube is sutured to eyelid margin to prevent extrusion.

If the medial canthal tendon is disrupted, it is also repaired to reestablish anatomic position and lid function. Associated lid injuries are promptly repaired. In any patient with suspected orbital or mid face fractures, orbital computed tomography is advised. Even though the patient has nil visual prognosis after globe rupture the lid and canalicular suturing should be meticulous because a good lid contour is essential for fitting a custom artificial eye later.

Patients were reviewed at regular intervals, at 2 weeks, when the sutures are removed, one month when the IV Cannula is removed, 3 months when the monocanalicular stent is removed.

**Our Experience**

A total of 34 patients (38 canaliculi) for whom canalicular tear suturing was done during a period of 3 years were analysed. Primary repair (repair within 5 days of injury) was done in 30 patients, secondary reconstruction in 4 patients (time to repair ranged from 3 months to 25 years). 22 patients (24 canaliculi) were repaired with monocanalicular stent 12 patients with IV Cannula. In our study we found that majority of cases consisted of lower canalicular lacerations. Both upper and lower canaliculi were involved in 4 patients. 2 in the primary and 2 in the secondary group. Of the 2 patients in the secondary group with bicanalicular involvement one lower canaliculus was sutured with minimonoka the other canaliculi with IV Cannula.

The criteria for functional success were absence of symptoms like tearing, blurry vision and sensation of watering of eyes following surgery. Anatomical success was achieved with normal lid contour and absence of ectropion or notching.

Two patients repaired primarily didn’t achieve anatomical or functional integrity; in both of them IV Cannula had been used. All patients repaired with monocanalicular stent primarily achieved anatomical and functional success. Of the 4 patients in the secondary repair group, 2 achieved anatomical and functional success, while 1 patient had good lid margin apposition post op. In 1 patient the cut ends of the canaliculi could not be identified.
Most common cause of injury was RTA, among the associated injuries orbital wall fractures and traumatic optic neuropathy were seen.

Controversy exists on whether to repair a single lacerated canaliculus, especially if only upper canaliculus is involved. Much of the controversy stems from the absence of symptoms that is often observed following traumatic loss of a single canaliculus through neglect or failed attempts at repair. Many authors have contended that the superior canaliculus is of little or no importance in tear drainage. The potential importance of the superior canaliculus was supported by Moore and Linberg, who found subjective symptoms of epiphora, crusting, blurring or discomfort in 56% of experimental superior canalicular obstructions and in 63% of inferior canalicular obstructions. Linberg points out that there is no test that allows one to predict which patient with a canalicular laceration will subsequently be symptomatic. Tearing may be seen more in younger patients; older patients may not have watering even with a single patent canaliculus as they secrete lesser amount of tears.

The current concept is to repair any canalicular lesions since we cannot predict which patients will become symptomatic; early repair with modern surgical techniques has a good success. Considering the above observations, we repaired all cases of canalicular tear irrespective of site involved (upper or lower).

Stents are used in repair of canalicular laceration, in an attempt to maintain proper alignment of an anastomosis and to prevent post laceration stricture. The ideal stent should be inert, soft, and pliable to minimize ocular irritation or tissue erosion, and stable enough to remain in place long enough for pericanalicular inflammatory reaction to subside. Silicon stents meet these qualifications.

There is no need for immediate repair of lacrimal drainage system and delay of up to 48 hrs completely acceptable. Surgical correction will usually be successful if performed within 5 days of injury. Canalicular that is patent functionally after the removal of stent was taken as the criteria for success of surgery. In (98%) there were no symptoms like tearing, blurry vision and sensation of watering of eyes following surgery. This can be compared with other studies where canalicular tear repair was done with monocanalicular stents. Gabber et al report a success rate of 92% following canalicular repair with monocanalicular stent.

The 2 cases that failed belonged to the group where repair was done with IV intubation tube. Re approximation of eyelid margins are found to be better with silicon stent than IV cannula. When silicon stent was used, there were no complications like extrusions and corneal abrasions. The stent could, therefore, be retained for a longer period to allow better anatomical and thereby functional success.

In our study, we found that in all the cases where silicone stent was used, functional integrity could be achieved following surgery and there were no postoperative complications. We did not notice any functional or aesthetically significant scarring of the eyelids with silicone stents. Outcome is better if secondary repair is done with silicon stent as anatomical approximation is better with the same.

Early repair by an experienced team and intubation with silicon stents are crucial in achieving a good success rate after the reconstruction of the lacrimal drainage system. We believe that intubation of the canaliculi is crucial for the prevention of re-stenosis, and no repair of the lacrimal drainage system should be performed without it.

Monocanalicular Stent

Upper And Lower Canalicular Tear
Upper Canaliculi Sutured With Iv Tube And Lower with Monocanalicular Stent

Anatomical Integrity Restored in the Left Upper and Lower Lid

**References**


5. Hawes MJ, Dortzbach RK. Trauma of the lacrimal drainage system. Lacrimal Surgery. 1988; 241-262

