



EYELID AND LACRIMAL CANALICULUS RUPTURE IN AN ELDERLY PATIENT: A CASE REPORT AND MANAGEMENT APPROACH

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Abstract

Canalicular lacerations resulting from eyelid or periorbital area injuries are considered ophthalmologic emergencies. These injuries can affect individuals of all ages but primarily impact the lower canaliculi. If not promptly addressed, they can lead to canaliculus stenosis and lacrimal dysfunction, characterized by epiphora. In this abstract, we present a case study of an elderly male patient who sustained injuries to the eyelid and lacrimal canaliculus. The management approach involved the insertion of a silicone tube to maintain canalicular patency and the use of a 6-0 nylon suture for eyelid reconstruction. The procedure was carefully executed to prevent complications, resulting in a favorable outcome for the patient. The patient showed no signs of stenosis or lacrimal dysfunction post-operatively. This case underscores the critical importance of timely intervention and demonstrates the efficacy of the surgical technique in managing canalicular lacerations. It highlights the need for swift, precise action in such emergencies to ensure positive outcomes and prevent long-term complications, particularly in elderly patients.

Keywords: *Palpebral rupture, lacrimal canal rupture, silicone tube, ophthalmologic emergency, surgical management*

@Jurnal Ners Prodi Sarjana Keperawatan & Profesi Ners FIK UP 2024

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INTRODUCTION

The eyelid plays a crucial role in the distribution and drainage of the tear film, protecting the eyeball and serving cosmetic functions. The skin of the eyelids is fragile due to the absence of subcutaneous fat. Beneath the skin lies the orbicularis muscle, which closes the eyelids and aids in tear drainage.(Wladis et al., 2019) Palpebral trauma is a relatively common ocular injury. Canalicular lacerations occur in approximately 16% of all eyelid lacerations resulting from ocular trauma. It has been reported that 72% of lower canalicular lacerations are monocular, while bicanalicular lacerations account for 6-24% of all canalicular injuries.(Guo et al., 2020)

Injuries to the lacrimal drainage system, typically in the form of lacrimal canalicular lacerations, are relatively common injuries associated with eyelid trauma. These injuries can result from animal bites, sharp objects or organic material trauma, traffic accidents, and physical violence.(Balaji, 2015; Patel R et al., 2016) These injuries are most commonly encountered in young, healthy males, although they can also occur in children, women, and the elderly. The incidence of lacrimal system injuries has been reported to range from 7-20%.(Sundar, 2018) Elderly patients are more susceptible to falls, which can lead to canalicular injuries.(Wladis et al., 2019)

Canaliculus can undergo stenosis, leading to lacrimal drainage dysfunction with epiphora if not appropriately managed.(Guo et al., 2020; Kumar & Batham, 2020) We report a case of eyelid and lacrimal canalicular injury in an elderly male patient, which was successfully managed without complications.

CASE REPORT

A 65-year-old male patient presented to the Emergency Department with complaints of an eye injury to the right eye sustained from a tree branch in the morning prior to hospital admission. The patient reported pain and blurred vision. On physical examination, vital signs were within normal limits, except for a blood pressure reading of 183/95 mmHg. The patient rated their pain as 5 on the Visual Analog Scale (VAS) at the time of presentation to the Emergency Department. Ocular examination revealed an open wound in the medial epicanthus and inferior eyelid of the right eye,

measuring 3x1 cm, without active bleeding. The patient's left eye had been enucleated previously due to a history of globe rupture. Based on this clinical presentation, the working diagnosis established was a rupture of the eyelid and lacrimal gland of the right eye (OD).



Figure 1. Pre-operative condition of the right eye

The patient was scheduled for eyelid reconstruction and nasolacrimal duct re-canalization surgery the following day. The procedure involved the reconstruction of the nasolacrimal duct using a silicone tube and suturing of the eyelid with 6.0 nylon thread. The closure was completed with an eye patch, and pre-operative Ofloxacin eye drops were administered.



Figure 2. Post-reconstruction eye condition.

The pre- and post-operative treatment regimen included Ofloxacin eye ointment, methylprednisolone injections 2x8 mg, ketorolac injections 3x30 mg, and tranexamic acid injections 3x250 mg. The patient underwent a 3-day hospital stay and was discharged in good condition.

A post-operative follow-up at 1 week after the procedure revealed satisfactory healing with no complications. Suture removal was performed 10 days after surgery, and removal of the silica tube was carried out 14 days after the operation.



Figure 3. Post-operative eye condition on the first day

DISCUSSION

Eyelid trauma is a relatively common ocular injury. Eyelid lacerations should always prompt a thorough search for associated injuries to the eyeball, orbital penetration, or involvement of other adnexal structures (such as the lacrimal gland, canaliculi, puncta). Canalicular lacerations occur in approximately 16% of all eyelid lacerations resulting from ocular trauma. In accordance with this theory, the patient in this case experienced eyelid trauma concurrent with lacrimal canalicular trauma.(Guo et al., 2020)

Lacrimal system lacerations are relatively common; however, direct injuries to the lacrimal ducts are reported in only 16% to 54% of cases.(Shah et al., 2016) Lacrimal system trauma can be classified based on the anatomical structures involved or the mechanism of injury. From an anatomical perspective, such trauma can further be categorized into bony or soft tissue injuries. Injuries may involve the lacrimal puncta at the eyelid margin, vertical or horizontal canaliculi components, typically the lower canaliculus or the common canaliculus (most frequently affected), the lacrimal sac, and the nasolacrimal canal and duct, with the latter being the second most commonly affected.(Sundar, 2018) Wulc et al. classified canalicular lacerations into direct trauma (penetrating trauma with foreign objects such as glass, metal, or organic material) and indirect trauma, such as blunt trauma, facial blows, or diffuse injuries resulting from impacts, as might occur in motor vehicle accidents or falls. In this patient, the damage was caused by direct trauma from an organic object, a tree branch. (Guo et al., 2020; Wladis et al., 2019)

Canalicular lacerations are identified through direct observation of the laceration at the medial punctum or by examination (usually with a Bowman probe or irrigation cannula) of the canalicular system. Depending on the mechanism

of injury, it is important to carefully rule out the presence of foreign bodies.(Knoop & Palma, 2021) Canalicular lacerations may not always be readily visible in appearance but should always be suspected in cases of eyelid injury involving the medial or medial epicanthus, as seen in this patient. The absence of suspicion for a foreign body is justified because the patient did not experience severe pain and did not report a foreign body sensation, which does not align with clinical signs of a foreign body presence.(Wladis et al., 2019)

The goal of repairing lacerations is to achieve hemostasis and optimal cosmetic outcomes without increasing the risk of infection.(Forsch et al., 2017) The management of eyelid lacerations requires the identification of concomitant eye injuries and the differentiation between simple and complex lacerations; this differentiation depends on the nature and location of the injury. Before proceeding with eyelid repair, it is crucial to assess the extent of the injury by examining conditions such as corneal abrasions, foreign bodies, hyphema, and open globe injuries.(Wladis et al., 2019)

Canalicular damage often occurs in eyelid lacerations resulting from dog bites due to penetrating trauma or shear force. Superficial lacerations greater than 25% of the eyelid can be reconstructed using 6-0 sutures made of silk, nylon, or plain gut. Repair should be performed within 12 - 36 hours of the initial injury to achieve optimal outcomes.(Forsch et al., 2017; Tomy, 2018; Wladis et al., 2019) In this patient, the repair was performed using 6-0 silk sutures.

Currently, there are several techniques for lacrimal canalicular reconstruction, including the use of pigtail probes, silicone tubes, or Mini-Monoka tubes.(Shah et al., 2016) The Mini-Monoka® is a monocular stent composed of a silicone rod with a bulb and an ocular at the proximal end, allowing it to secure the structure and prevent displacement. The insertion of a Mini-Monoka® is suitable for conditions such as canalicular lacerations that involve the outer two-thirds of the canaliculus without damaging the canthal ligament.(Balaji, 2015; Guo et al., 2020; Naik et al., 2008; Sendul et al., 2015) Silicone tubes are the most commonly used modality in surgery due to their advantages, including their inert, flexible nature, and widespread availability. This modality was utilized in the case of the patient.(Guo et al., 2020; Sendul et al., 2015)

In the case of the patient, the intervention was performed more than 24 hours after the patient's presentation to the Emergency Department. Typically, the time interval between the traumatic event and surgery is around 24 hours.(Chiang et al., 2017) Research has found that lacerations repaired after 12 hours do not significantly increase the risk of infection compared to repairs done earlier. Factors that may increase the likelihood of infection include wound contamination, laceration length greater than 5 cm, and diabetes mellitus.(Forsch et al., 2017)

Several surgeons recommend the use of prophylactic antibiotics after canalicular trauma. This is considered first-line treatment because it covers a range of organisms that may be involved. Please refer to the medical management mentioned earlier for further information on the medical treatment of canalicular trauma.(Wladis et al., 2019) In the case of the patient, topical ofloxacin antibiotic was administered.

Following lacrimal canalicular reconstruction, follow-up should be conducted until complete healing is achieved. The follow-up schedule is typically set for 1 week after the reconstruction surgery or as needed based on the patient's condition. Sutures at the eyelid margin can be removed around 10-14 days after the surgical intervention. Patients may wear eye protectors while sleeping and are advised to avoid rubbing the eyelids for 2 weeks after the surgery. The monocular silicone stent can be removed approximately 8-12 weeks after reconstruction.(Rho et al., 2023; Wladis et al., 2019) The continued management of this patient followed the theoretical course as previously explained, and the patient experienced a satisfactory healing process without complications.

Injuries to the lacrimal drainage system can lead to scar tissue formation and stenosis, resulting in lacrimal drainage dysfunction with epiphora if not properly managed.(Guo et al., 2020; Kumar & Batham, 2020; Patel R et al., 2016) The majority of patients undergoing canalicular laceration repair achieve both anatomical and functional success. Functional success is defined as the absence of epiphora after the surgery and proper drainage function of the lacrimal system.(Rishor-Olney & Hinson, 2023) Rarely, patients may require a second surgery to address epiphora that may result from the failure of canalicular laceration repair.(Cohen & Burkat, 2019) Entropion, ectropion, and generally poor eyelid position often

require further surgical intervention. Patients may also experience ptosis, which can be addressed through surgery, depending on the degree of ptosis and its impact on the patient's quality of life.(Rishor-Olney & Hinson, 2023; Wladis et al., 2019)

CONCLUSION

The case described in our discussion involved a 65-year-old male patient who presented to the Emergency Department with a complaint of an eye injury to the right eye following an incident with a tree branch. The patient reported experiencing pain and blurred vision. On physical examination, most vital signs were within normal limits, except for elevated blood pressure. The patient rated their pain using the Visual Analog Scale (VAS). Examination of the eye revealed an open wound in the medial epicanthus and inferior eyelid of the right eye. Notably, the left eye had previously undergone enucleation due to a history of globe rupture. The management of this patient included surgical intervention for the repair of eyelid and lacrimal canalicular injuries. The reconstruction procedure involved the use of a silicone tube and suturing with 6-0 silk thread. Topical Ofloxacin antibiotic treatment was administered. Follow-up after surgery was conducted, with subsequent suture removal and tube removal at appropriate intervals. This case highlights the importance of prompt and appropriate management in patients with eyelid and lacrimal canalicular injuries, especially in situations where there is a risk of complications. The patient's successful recovery without complications underscores the effectiveness of the chosen treatment approach and the importance of careful evaluation and follow-up care in such cases.

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