

Zetaplasty and Graft Placement for Correction of Lagophthalmos and Dry Eye Syndrome

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Abstract

Falls from height can cause a variety of injuries, often related to factors such as the height of the fall, substance use and body position, with the head and spine being among the areas most prone to impact. Healing is an essential physiological process for skin recovery, but can be affected by a variety of factors, including the type of injury and individual patient characteristics. Sometimes this process can lead to the formation of retractable scars, which become problematic when they cause functional or aesthetic discomfort. We present the case of a 42-year-old patient who suffered a fall from a pedestrian bridge while under the influence of alcohol. The patient was immediately treated in an emergency department and closure of a cut wound in the right frontal region was performed, which eventually developed skin necrosis in the wound. As a result of the retractile scar on the right eyelid due to closure of the necrotic skin area in the region, she was referred to the plastic and reconstructive surgery service for the presence of lagophthalmos and dry eye syndrome. The surgery included a zetaplasty on the retractable scar of the right eyelid and placement of a full-thickness skin graft of the contralateral eyelid. Eight months after surgery, no signs of eyelid retraction or symptoms of lagophthalmos or dry eye syndrome were detected, indicating a successful recovery with normal eyelid position and mobility.

Keywords: Lagophthalmos • Fall from height • Plastic and reconstructive surgery

Introduction

Falls from height cause various injuries that are conditioned by factors such as the height of the fall, the age and body position of the victim, or the characteristics of the surface on which he/she falls [1]. In addition, addictive substances such as alcohol may be present in approximately 20% of cases with a fatal outcome [2,3]. When a person falls, their body adopts a position that places the center of gravity in the lowest possible position. This results in the head and chest being the parts of the body that are primarily impacted when they come into contact with the surface [4]. It has been reported that even falls from relatively low heights can cause serious and potentially fatal

injuries to various parts of the body including head trauma and cervical spine fractures [5].

Lagophthalmos is understood as a medical condition in which the upper eyelids cannot close over the eye, leading to part of the eye being exposed and unprotected and causing dry eyes, irritation and other problems [6]. Lagophthalmos can arise due to a number of causes, including scarring that causes eyelid retraction. This condition can be treated surgically, using skin grafts, preferably obtained from the opposite eyelid, provided additional skin is available [7].

Case Presentation

We present the case of a 42-year-old female patient who began experiencing her current condition on 15 January 2022 after suffering a fall from a pedestrian bridge while under the influence of alcohol. At the time of the accident, the patient was transported to an emergency department in the city of Tlajomulco in Jalisco, Mexico, was immediately treated and underwent closure of a cut wound in the right frontal region.

Following the care received, she was transferred to the Hospital Regional Dr. Valentin Gómez Farías -ISSSTE in Zapopan, Jalisco; where several significant injuries were diagnosed, including a Modified Jefferson type III atlas fracture, a type II fracture of the left occipital condyle according to the Anderson and Montessano (AM) classification, and fractures to the T4, C7 and T1 vertebrae. The neurosurgical service recommended a conservative approach and applied external immobilisation using a SOMI type collar and a long Taylor brace. The patient was discharged on 21 January 2022.

Over time, the patient developed skin necrosis at the frontal wound. The neuroanesthesiology service evaluated her condition and determined that there were no contraindications for future anaesthetic procedures. The neurosurgery service reported that the cervical fractures had consolidated, however, as a result of the retractable scar on the right eyelid due to the closure of the necrotic skin area in the frontal region, she was referred to the plastic and reconstructive surgery service of the same hospital of origin.

On evaluation on 29 August 2022, the presence of a retractable scar on the right eyelid causing lagophthalmos and dry eye syndrome was confirmed (Figure 1). A surgical procedure was scheduled for 20 October 2022. Surgical planning included a zetaplasty of the retractile scar on the right eyelid and placement of a full-thickness skin graft of the contralateral eyelid (Figure 2A and 2B).



Figure 1. Retractable scar on the right eyelid causing lagophthalmos and dry eye syndrome.

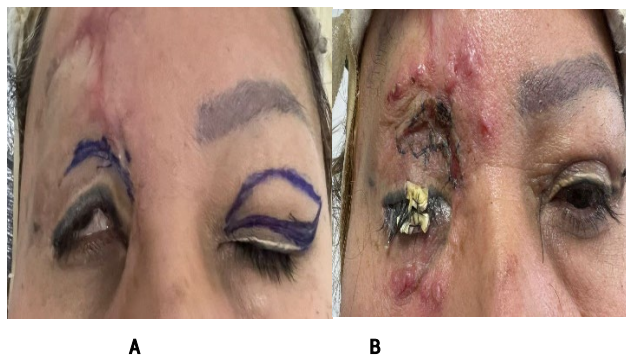


Figure 2A and 2B. Planning and surgery with zetaplasty on right eyelid retractable scar and full thickness skin graft placement of contralateral eyelid.

The wound had a highly satisfactory healing process, resulting in optimal closure of the right upper eyelid. Eight months after the initial surgery, no signs or symptoms of eyelid retraction were observed, indicating normal eyelid mobility and position. No symptoms of lagophthalmos or dry eye syndrome were observed (Figure 3A and 3B).



Figure 3A and 3B. Patient 8 months after surgery.

Discussion

PEH Accidental and non-accidental falls from height under the influence of alcohol are a well-known combination. In a retrospective study related to falls/jumps from height, addictive substances were found in a total of 32% of the cases, ethanol alone was found in 22% of the cases. Most of the jumps were related to suicidal ideation and to a lesser extent occupational and non-occupational accidents [2].

The patient described in this report suffered a fall from a pedestrian bridge while intoxicated. The fall is estimated to be approximately 10 m high (two storeys high) in which she suffered mainly spinal fractures and a cut wound in the right frontal region. These injuries coincide with those reported by other authors, who found that in falls from the first floor, fractures to the spine and head, among others, are present [5,8].

Although injuries to the face are less frequent at greater heights, falls on flat surfaces clearly indicate that the forehead, superciliary arches, nasal bridge and nasal apex, malar area and anterior surface of the chin are the most exposed areas, while the protected areas are the eyelids, eyebrows, medial and upper part of the cheeks, lips and lower part of the chin [8,9]. The scarring described in this case indicates that the cutting wound and therefore the suture was distributed mainly on the forehead and eyebrow causing retractile scarring.

Healing is the result of a series of physiological processes aimed at restoring the integrity of the skin. This process is influenced by the type of injury, treatment and individual factors of each person. [10]. The phases of healing can be interrupted, resulting in defective scars such as retractile scarring. Defects in the anatomical area where a suture is performed or the accumulation of a local haematoma that forms fibrous adhesions in the skin and deep tissue layers can lead to a retractile scar [11].

Retraction is a constant phenomenon in healing, however, it is considered pathological when it causes functional or aesthetic discomfort to the patient. Therefore, it is important to consider retraction when suturing. When the initial reconstruction causes a retractile scar, extensive release of the edges of the areas with tissue loss should

be performed, avoiding closure of the initial scar retraction, especially in the vertical direction, removing fat from the affected area and adjusting its position by Z-plasty or multiple W-plasty procedures [11,12].

The eyelids are mobile structures that perform vital functions for ocular health. The upper eyelid is responsible for traversing the eyeball, ensuring proper tear distribution and protecting the cornea [12]. When, for some reason, the closure of the eyelid is incomplete or abnormal, it is called lagophthalmos [13].

Retractile scarring can result in lagophthalmos called cicatricial, mechanical or retraction lagophthalmos and is a lamellar type defect. The upper and lower eyelids consist of seven structural layers. These are the skin and subcutaneous tissue, the orbicularis oculi, the orbital septum, the orbital fat, the retraction muscles, the tarsal plate and the conjunctiva. Injury to any of these tissues can result in incomplete closure of the eyelid [14].

Most upper eyelid lamellar defects will require the use of a flap or skin graft [15]. The best place to obtain grafts for reconstruction of this section of the eyelid is the opposite upper eyelid. With age, the upper eyelid becomes a suitable area for harvesting local flaps and whole skin grafts [12]. Thus, the procedure described here represents a suitable technique.

Conclusion

Both of the above techniques were performed on the patient, z-plasty to decrease initial scar retraction and graft placement to achieve complete closure of the upper eyelid. The patient's evolution is highly encouraging and shows a successful and uncomplicated recovery from the previous surgery. In addition, the clinical results indicated optimal ocular function and facial aesthetics. This supports the effectiveness of the surgical treatment performed and the aftercare provided.

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