Clinical Case Report

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Spontaneous resolution of isolated neurogenic blepharoptosis after blunt trauma

A case report and literature review

Tae Gi Kim, MD, PhD, Jae Ho Shin, MD, PhD*

Abstract

Rationale: Complete isolated neurogenic blepharoptosis caused by blunt trauma is a sporadically reported rare entity and there is no consensus regarding the optimal treatment. We would like to report a rare case of isolated neurogenic blepharoptosis secondary to eyelid trauma with spontaneous recovery occurring within 4 weeks.

Patient concerns: A previously healthy 47-year-old man presented with blepharoptosis in the right eye after eyelid trauma.

Diagnosis: At presentation, visual acuity in both eyes was 20/20, and intraocular pressure was within the normal limits. Physical examination showed unilateral ptosis; magnetic resonance imaging (MRI) showed hematoma in the right frontal sinus. No intracranial lesions were observed and the pupillary reactions were normal. The remainder of the examination was unremarkable with full ocular motility. He was diagnosed with an isolated neurogenic blepharoptosis.

Intervention and outcomes: He was managed conservatively without any specific treatment. Four weeks later, the patient had normal, symmetric lid height, and levator function was completely restored.

Lessons: Isolated neurogenic blepharoptosis can be caused by blunt trauma, which might cause injury to the terminal branch of the oculomotor nerve. In this case, no special treatment was required, and complete resolution was achieved within 4 weeks.

Abbreviation: MRI = magnetic resonance imaging.

Keywords: head trauma, hematoma, Oculomotor nerve, ptosis, traumatic neurogenic ptosis

1. Introduction

Blepharoptosis, also called ptosis, refers to drooping of the upper eyelid with the eye in primary gaze. Blepharoptosis can be characterized into 2 broad categories: congenital ptosis and acquired ptosis.[1] Depending on the etiology, acquired ptosis can be classified into 5 main types: aponeurotic ptosis, neurogenic ptosis, myogenic ptosis, mechanical ptosis, and traumatic ptosis.[2] Due to trauma, the levator palpebrae superioris (LPS) could be disinserted or the LPS tendon could be transected, with possible oculomotor nerve damage.[3,4] In few cases of ocular motor nerve damage, there is an isolated neurogenic component with injury to the nerve innervating the LPS.[5–11] Since traumatic ptosis can be caused by various types of damage, an individualized assessment is needed to establish the proper treatment approach.

LPS muscle is innervated by the oculomotor nerve, which is also responsible for most ocular movement as well as pupillary constriction. It divides into a superior branch and an inferior branch on, or just before, entering the orbit. The superior branch further divides into a branch that innervates the superior rectus muscle and a branch that innervates the LPS.[12]

Isolated neurogenic blepharoptosis is caused by injury to the terminal branch of the oculomotor nerve which innervates LPS. In contrast, to complete oculomotor nerve palsy, isolated neurogenic blepharoptosis is a rare disorder, presenting with only ptosis, without accompanying signs of loss of function of other extraocular and intraocular muscles.[5–11] Based on a literature review, only 2 cases of complete isolated neurogenic ptosis caused by blunt trauma have been reported previously.[10,11] To the best of our knowledge, there are no reports of isolated neurogenic ptosis caused by blunt trauma which recovered spontaneously without medical or surgical treatment.

We report a rare case of unilateral isolated neurogenic blepharoptosis after blunt trauma in a 47-year-old man which resolved after 4 weeks without specific treatment and review the available literature.

Informed written consent was obtained from the patient for publication of this case report and accompanying images. No ethical approval was obtained because this study is retrospective case report and did not involve a prospective evaluation.

2. Case presentation

2.1. Presenting complaint

A 47-year-old man presented to the clinic complaining of difficulty in opening his right eye after contusion injury to the

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Department of Ophthalmology, Kyung Hee University Hospital at Gangdong, Kyung Hee University, Seoul, Korea.

** Correspondence: Jae Ho Shin, Department of Ophthalmology, Kyung Hee University Hospital at Gangdong, # 892, Dongnam-ro, Gangdong-gu, Seoul, Republic of Korea, 05278, Korea (e-mail: pbloadsky@naver.com).*

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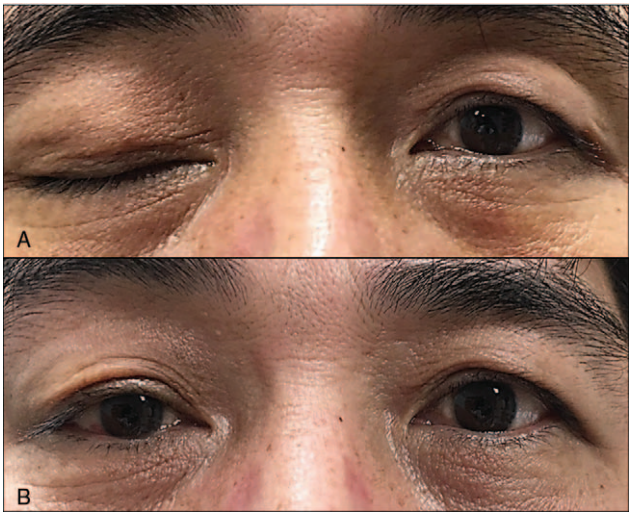

Figure 1. (A) Two days after blunt trauma. There is complete blepharoptosis and minimal eyelid edema in the right eye. (B) At 4 weeks, the blepharoptosis has resolved completely with normal lid position.

right upper eyelid. He was punched in the right eye in a fight with a friend 2 days ago. There was no previous history of ocular or systemic disease, ocular surgery, or contact lens wear.

2.2. Assessment and diagnosis

On examination, the best-corrected distance visual acuity (BCVA) was 20/20 in both eyes. His intraocular pressure (IOP), measured using a non-contact tonometer, was 19 mm Hg in the right eye and 18 mm Hg in the left,. Ophthalmic examination showed complete ptosis in the right eye, and the levator function was 0 mm (Fig. 1). Mild ecchymosis and swelling were observed in the right eyelid. The movement of the extraocular muscles showed no limitation, the pupillary response was normal, and no anisocoria was observed. No other lesion was found in the eye, except for subconjunctival hemorrhage.

A magnetic resonance imaging (MRI) of the brain was performed to rule out oculomotor nerve palsy due to brain lesions. The images showed a hematoma in the right frontal sinus and no intracranial or intraorbital lesion which could have caused ptosis (Fig. 2).

2.3. Intervention and outcomes

The patient was diagnosed with transient traumatic isolated neurogenic ptosis and was followed up without any specific treatment. Two weeks later, the levator function in the right eye improved to 5 mm and was completely restored at 4 weeks (Fig. 1).

3. Discussion

Isolated traumatic neurogenic blepharoptosis has only rarely been reported, and there is no consensus on treatment methods (Table 1). Our patient had undergone a blunt trauma to the upper eyelid. Similar cases associated with traction injury or blow out fracture repair surgery of the orbit have been reported, but complete isolated neurogenic blepharoptosis caused by blunt trauma is rare.[5–11] A PubMed/MEDLINE search revealed only 2 previous reports of blunt trauma associated isolated traumatic neurogenic blepharoptosis; systemic steroids were reportedly administered in both instances.[10,11] To our knowledge, this is the first case where complete recovery was achieved without any specific treatment. Satchi et al[5] reported 1 case of blepharoptosis by blunt trauma, which was treated conservatively without medication. However, in addition to ptosis, under-action of the right superior rectus muscle was also observed in this case, which is unlikely to be the case with isolated neurogenic blepharoptosis.

Isolated traumatic neurogenic blepharoptosis is caused by injury to the terminal branch of the superior division of the oculomotor nerve. The lid swelling is not severe, the levator

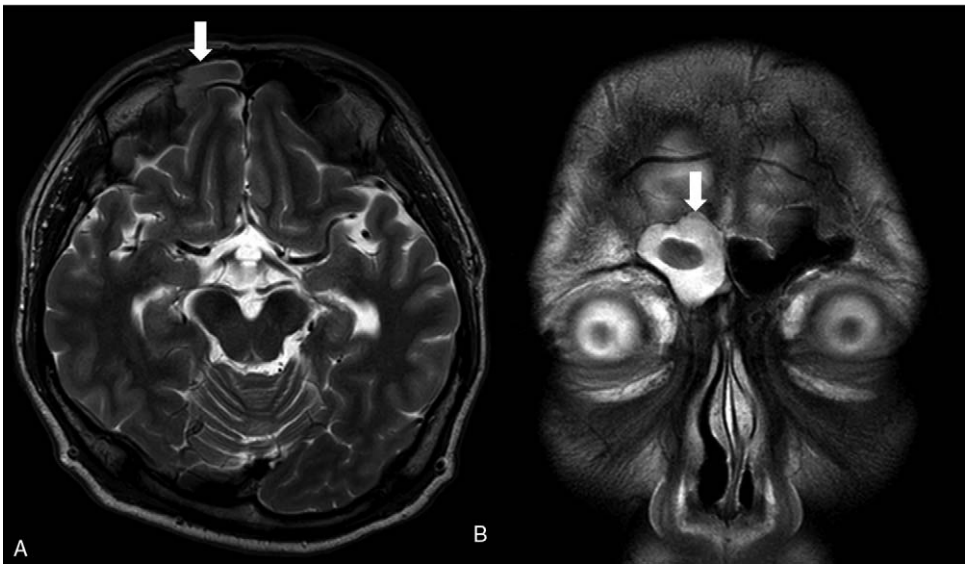

Figure 2. Magnetic resonance imaging with contrast of the brain showing right frontal sinus hematoma (White arrow)(A: a T2-weighted image, axial section, B: a T2-weighted image, coronal section).

Table 1

Summary of published cases of isolated neurogenic blepharoptosis after trauma.

Authors	Year	Number of patients	Age (y)/ Sex	Cause	Clinical symptom and sign	Treatment	Follow-up
Shin et al[10]	2016	1	51/F	Blunt trauma	Ptosis	IV steroids 2 days (prednisolone, 250 mg/day) Oral steroid 5 days (prednisolone, 15 mg/day)	Resolved completely after 7 weeks
Li et al[11]	2015	1	49/F	Blunt trauma	Ptosis + Medial wall fracture	IV hemocoagulase 3 days (2Unit/day) IV Deproteinized Calf Blood Extractives 14 days (1.2 g/day)	Resolved completely after 10 weeks
Satchi et al[5]	2014	3	47/M 66/F 28/M	Traction injury Traction injury Blunt trauma	Ptosis Ptosis Ptosis + Upper gaze limitation	Observation Observation Observation	Ptosis remained after 8 months Follow up loss after 3 months Resolved completely after 6 months
Song et al[9]	2014	1	12/M	Iatrogenic	Ptosis	Oral steroid 5 days (16 mg/day)	Resolved completely after 23 days.
Jung and chi[8]	2008	3	30-41 1 Male 2 Female	Iatrogenic	Ptosis	Oral steroid 4 days (prednisolone 1 mg/kg/day) with gradual tapering off (10 mg for 4 days) and discontinuation.	Resolved completely within 1 month
McCulley et al[7]	2002	3	29-39 2 Male 1 Female	Traction injury	Ptosis	Observation	Resolved completely within 2
Arden and Moore[6]	1989	2	48/M 35/M	Iatrogenic Iatrogenic	Ptosis Ptosis	Observation Observation	Resolved completely after 6 weeks

IV = intravenous.

function is completely lost while the superior rectus muscle function is preserved, and there are no limitations to ocular movement. The mechanism for the neurogenic injury could be by stretching occurring in direct or indirect trauma[7,11] or ischemic injury during orbital wall reconstruction.[8,9] The reason for the recovery in our case could be that the neural damage was not caused by axonal degeneration but by neurapraxia, which is a temporary interruption in the conduction of nerve impulses.

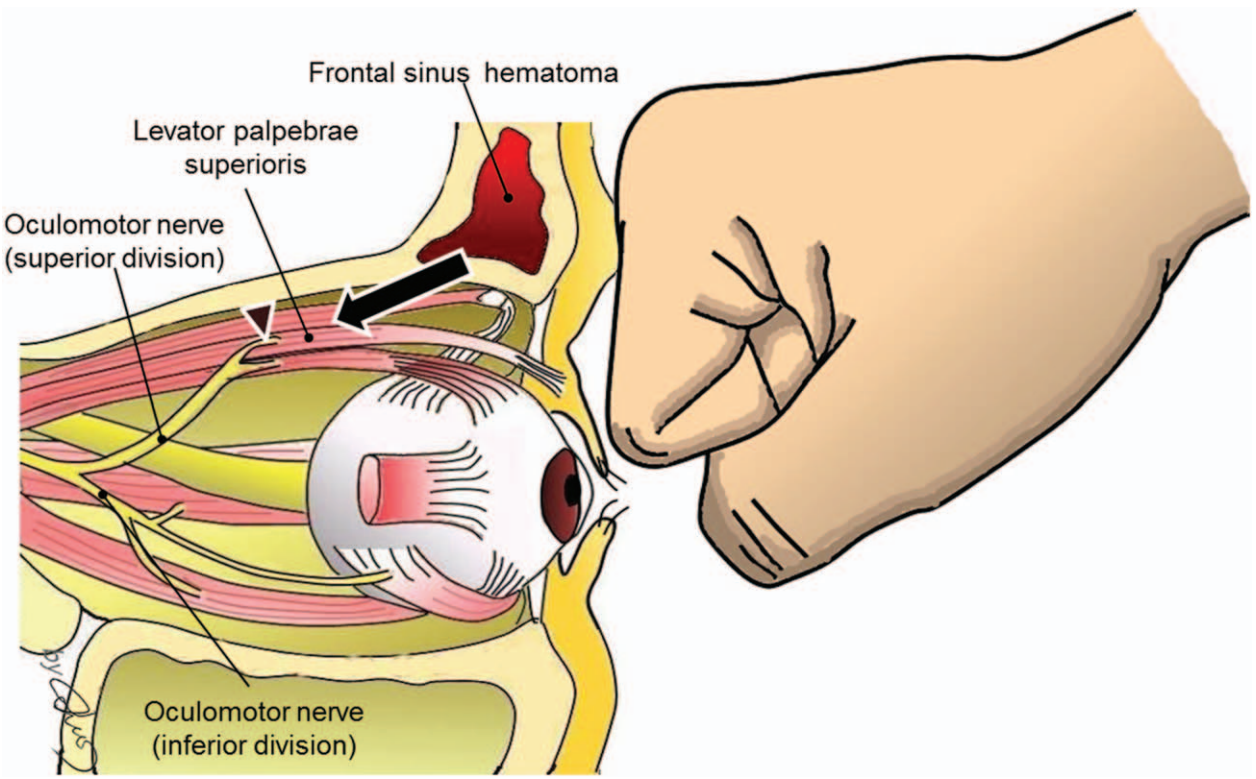

Figure 3. Schematic illustration of the mechanism and structures involved in isolated neurogenic blepharoptosis in this case. Blunt trauma to the eyelid caused a frontal sinus hematoma and the superior branch of the oculomotor nerve which innervates the levator palpebrae superioris (arrowhead) was injured, resulting in isolated neurogenic blepharoptosis.

Traumatic blepharoptosis can also be caused by direct injury to the aponeurosis or the LPS, or by aponeurotic disinsertion or dehiscence. Unlike neurogenic blepharoptosis, recovery in cases of aponeurotic injury is slow.[9]

In the present case, the patient had a frontal sinus hematoma in addition to ptosis. In previous reports, ptosis has been associated with frontal sinus mucocele bulging inferiorly into the roof of the orbital fossa.[13] While it cannot be completely ruled out if the frontal sinus hematoma observed in this case affected ptosis, the fact the hematoma did not invade the superior orbital wall indicates that it was probably a simple result of trauma rather than a cause for ptosis. Figure 3 illustrates the mechanism of isolated blepharoptosis and frontal sinus hematoma in this case.

Several therapies have been employed in the treatment of isolated traumatic neurogenic blepharoptosis, however, given the small number of reported cases, no consensus regarding the optimal therapy has been reached as yet. According to the reported literature, systemic steroids are the most commonly used treatment modality, while in some cases, as in ours, complete recovery was achieved under observation (Table 1). It is generally accepted that spontaneous resolution often occurs in such cases over the course of 6 months without surgical intervention. Therefore, in cases of isolated neurogenic blepharoptosis, it is recommended to expect a spontaneous recovery rather than opting for an early surgical intervention.

4. Conclusion

In conclusion, isolated neurogenic blepharoptosis after blunt trauma is a rare disorder but carries a favorable prognosis where patients can recover with conservative treatment. When isolated blepharoptosis occurs following blunt trauma, aponeurotic injury, LPS injury, and mechanical ptosis due to hematoma and/or swelling are taken into consideration, thus resulting in unnecessary surgical treatment. Although uncommon, as in our case, if only the branch innervating the LPS is injured, blepharoptosis may occur without any other disturbance in ocular motility. In that case, isolated neurogenic blepharoptosis must be considered and it is important to observe the patients before surgical intervention and corticosteroid administration.

Author contributions

Conceptualization: Tae Gi Kim, Jae Ho Shin.
Data curation: Tae Gi Kim, Jae Ho Shin.
Formal analysis: Tae Gi Kim, Jae Ho Shin.
Funding acquisition: Tae Gi Kim.
Investigation: Tae Gi Kim.
Methodology: Tae Gi Kim.
Project administration: Tae Gi Kim.
Software: Tae Gi Kim.
Supervision: Tae Gi Kim.
Writing – original draft: Tae Gi Kim.
Writing – review & editing: Tae Gi Kim.

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