Traumatic Bilateral Globe and Optic Nerve Avulsion: Rare Case Report

Anita Syla Lokaj, Kelmend Spahiu*, Gentian Bajraktari, Mentor Ilazi and Blerta Rama

Department of Ophthalmology, University Center Clinic of Kosova, Kosova

Received: December 03, 2018; Published: December 11, 2018

*Corresponding author: Kelmend Spahiu, Department of Ophthalmology, University Center Clinic of Kosova, Kosova

Abstract

Background: Avulsion of optic nerve is a rare condition and very serious injury. We report a rare case report of bilateral optic nerve avulsion from severe trauma of orbit and face.

Methods: 12-year old boy, admitted to emergency unit after an accident where the tractor falling over him causing severe injuries. Physical examinations revealed unconsciousness, edematous and bruised face with facial lacerations and both globes were luxated anteriorly from the orbital sockets. His visual acuity was no light perception in both eyes, and his pupils were unresponsive to light. Presentation, clinical, surgery and follow up, are described.

Conclusion: ONA with complete globe protrusion is very rare complication of maxillofacial trauma. However, optic nerve avulsion causes nerve damage leading to the permanent visual acuity impairment.

Keywords: Optic Nerve Avulsion, Bilateral Traumatic Globe, Maxillofacial Trauma

Introduction

Optic Nerve Avulsion (ONA) is a condition that usually results from severe trauma of the orbit and face [1]. ONA can be divided as a partial avulsion, where partial visual recovery can be achieved and complete avulsion usually leading to total vision loss [2]. There is a wide range of causes that lead to the globe avulsion and optic nerve avulsion. Globe Avulsion (GA) may occur from finger prickling during sports trauma, from severe facial and orbital fractures after vehicle accidents [3] or after a rare animal attack or physical assault [4,5]. In children, ocular trauma is leading cause of vision loss [6] where ONA can occur following the blunt or penetrating ocular trauma [7]. Some unusual cases like auto-enucleation have been reported in psychiatric literature [9] and more rarely there is a case representing accidentally self-inflicted ONA [10]. Although the spectrum of globe injuries is wide, bilateral ONA following complete globe protrusion is very rare [1]. Herein, we present a case with complete bilateral globe and optic nerve avulsion following tractor accident.

Case Report

We present a case of 12-year old boy, admitted to emergency unit after an accident where the tractor falling over him causing severe injuries. Physical examinations revealed unconsciousness, edematous and bruised face with facial lacerations and both globes were luxated anteriorly from the orbital sockets. His visual acuity was no light perception in both eyes, and his pupils were unresponsive to light. Presentation, clinical, surgery and follow up, are described.

Conclusion: ONA with complete globe protrusion is very rare complication of maxillofacial trauma. However, optic nerve avulsion causes nerve damage leading to the permanent visual acuity impairment.
The patient was observed in the intensive care unit for 2 weeks. The patient was re-evaluated three months after surgery and hypotony of both eyes was evident with initial signs of bulbar atrophy Figure 4.

Discussion

Globe protrusion with ONA, is a rare condition resulting from severe trauma of the maxillofacial area [11]. The globe and the optic nerve are usually resistant to mild and moderate trauma. However, high energy trauma can cause multiple fractures reducing the orbital volume, promoting protrusion of the globe from its socket [11]. Moreover, Morris et al., have described three potential mechanisms:

a) Protrusion of the globe, after an elongated object enters the medial orbit
b) A wedge-shaped object enters the orbit medially, displacing globe anteriorly
c) A penetrating object transects the optic nerve directly [12].

In some reported literature, optic nerve transection is a major cause of globe subluxation [1,13]. If there are also disruptions of extraocular muscles, total luxation of the ocular globe will occur [12]. In our case, it is supposed that multiple fractures of the orbital walls caused transection of the optic nerve and globe protrusion. Although we were not able to explain why the extraocular muscles were detached from globes. To evaluate the extent of orbital, ocular and intracranial injuries before the surgery, brain and orbital imaging are advisable. Although, it has been reported a normal CT images with presence of optic nerve avulsion [14]. In presented case, ONA was detected during exploration of the orbits, because there was no suggestion from the CT before surgery. The primary goal is prevention of the visual impairment. If the optic nerve is partially avulsed, partial recovery of visual function can be achieved [2]. However, in total transected optic nerves with absence of visual function, only cosmetic concerns may become important. In these patients with no visual functions, the management is controversial. Some authors recommend primary enucleation because there is no visual recovery [15], others suggest repositioning of the globe, even if the patient had no light perception, presuming that saving the eye reduces the psychological stress after the abruptly traumatic loss of vision [16]. Although, even if we have the repositioning of the globe there is always a risk of the bulbar atrophy due to ischemia. [17].

Taking in consideration the possible prognosis of these severe injuries and their management dilemma, it is necessary to have a good management plan which can help to optimize outcomes. Therefore, knowing that there is no treatment for optic nerve avulsion [18] and it can adopt different intraocular courses and outcomes depending the visual acuity after the injury [19], the globe preservation can have great psychological impact and also ease the cosmetic rehabilitation. Goal would be to have satisfactory results as represented in some cases [20].

In our case, both globes were repositioned after repairing the extraocular muscles and performing a lateral cantholysis. Facial bone fractures were repaired with plates and screws. After three months, evaluation revealed that there were signs of bulbar atrophy, due to the ischemia where the blood supply as a survival source could not save soft tissue attachments in this severe injury.
Conclusion

ONA with complete globe protrusion is very rare complication of maxillofacial trauma. However, in every facial trauma the assessment of optic nerve is crucial. Depending on the degree of the visual acuity after the injury there can be different outcomes because of the intraocular morphological changes. However, optic nerve avulsion causes nerve damage leading to the permanent visual acuity impairment. Therefore, the best approach for these patients is organized plan management for globe preservation for few months aiming for the best outcome which can help having better psychological impact and cosmetic rehabilitation before following possible prosthetic eye procedures.

References

1. Bajaj MS, Kedar S, Sethi A, Gupta V (2000) Traumatic globe luxation with optic nerve transection. Orbit Amst Neth 19(3): 165-170.
2. Shneck M, Osbrin T, Marcus M, Lifshitz T (2003) Attempted bilateral manual enucleation (gouging) during a physical assault. Ophthalmology 110(3): 575-577.
3. Tok L, Tok OY, Argun TC, Yilmaz O, Gunes A, et al. (2014) Bilateral traumatic globe luxation with optic nerve transection. Case Rep Ophthalmol 5(3): 429-434.
4. Roki N, Roka YB, Acharya R (2013) Traumatic avulsion and bilateral eye loss: report of two cases. Nepal J Ophthalmol 5(2): 272-274.
5. Hellman JB, Lin LK (2018) Globe luxation and optic nerve avulsion by dog bite. J Emerg Trauma Shock 11(1): p. 60.
6. Strahlman E, Elman M, Daub E, Baker S (1990) Causes of pediatric eye injuries. A population-based study. Arch Ophthalmol 110(4): 603-606.
7. Degirmenci MF, Yalcindag N, Atilla H (2018) Optic Nerve Avulsion and Retinal Detachment After Penetrating Ocular Trauma: Case Report. Turk J Ophthalmol 48(2): 89-91.
8. Lang GK, Bielasiewicz AA, Rohr WD (1991) Bilateral traumatic eye avulsion. Klin Monatsbl Augenheilkd 198(2): 112-116.
9. Castro HM, Alvarez J, Bota RG, Yonkers M, Tao J (2017) A case of attempted bilateral self-enucleation in a patient with bipolar disorder. Ment Illn 9(1): 7141.
10. S Anand, R Harvey, S Sandramouli (2018) Accidental self-inflicted optic nerve head avulsion. Eye 17(5): 646-647.
11. RC Gupta, Priyanka Gupta (2018) Complete globe protrusion post trauma: A Case Report. Journal of Dental and Medical Sci 6(5): 28-29.
12. Morris WR, Osborn PD, Fleming JC (2002) Traumatic evulsion of the globe. Ophthal Plast Reconstr Surg 18(4): 261-267.
13. Song A, Carter KD (2006) Bilateral traumatic globe subluxation. Ophthal Plast Reconstr Surg 22(2): 136-137.
14. Kelahmetoglu O, Simsek T, Beden U, Aydogdu I, Comert HE (2015) Rarely seen complication of motor vehicle accidents: Bilateral globe avulsion. Ulus Travma Acil Cerrahi Derg 21(4): 297-299.
15. Razmjua H, Masjedi M (2009) Traumatic bilateral globe avulsion (case report). J Res Med Sci 14(4): 259-260.
16. Pewira FJ, Bettega RB, Cruz AAV e (2011) Management of globe luxation followed by traumatic liquor fistula: Case report. Arq Bras Oftalmol 74(1): 58-60.
17. Tok L, Tok OY, Argun TC, Yilmaz O, Gunes A (2018) Bilateral traumatic globe luxation with optic nerve transection. Case Rep Ophthalmol 5(3): 429-434.
18. Dul MW (2018) Optic nerve trauma. Optom Clin 3(2): 91-101.
19. Sturm V, Menke MN, Bergmin O, Landau K (2018) Long-term follow-up of children with traumatic optic nerve avulsion. Acta Ophthalmol 88(4): 486-489.
20. Ersan I, Adam M, Oltulu R, Zengin N, Okka M (2018) Traumatic luxation of the globe: A 6-year follow-up. Orbit 35(2): 69-71.