

Case Report

A Complete Globe Dislocation without Orbital Wall Fracture

Behzod Tashbayev^{a, b} Tor Paaske Utheim^{b, c, d, e, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v}
Panagiotis Tsigkris^a Guy Shanks^f

^aSörmland Eye Clinic, Nyköping, Sweden; ^bThe Norwegian Institute for Eye Health, Oslo, Norway; ^cDepartment of Ophthalmology, Oslo University Hospital, Oslo, Norway; ^dDepartment of Ophthalmology, Stavanger University Hospital, Stavanger, Norway; ^eDepartment of Ophthalmology, Hospital of Southern Norway, Arendal, Norway; ^fDepartment of Ophthalmology, Örebro University Hospital, Örebro, Sweden; ^gDepartment of Medical Biochemistry, Oslo University Hospital, Oslo, Norway; ^hDepartment of Plastic and Reconstructive Surgery, Oslo University Hospital, Oslo, Norway; ⁱDepartment of Ophthalmology, Faculty of Life Course Sciences and Medicine, King's College London, London, UK; ^jDepartment of Ophthalmology, Sørlandet Hospital Arendal, Arendal, Norway; ^kDepartment of Ophthalmology, Stavanger University Hospital, Oslo, Norway; ^lDepartment of Ophthalmology, Vestre Viken Hospital Trust, Drammen, Norway; ^mDepartment of Ophthalmology, Vestfold Hospital Tønsberg, Tønsberg, Norway; ⁿDepartment of Product Design, Oslo Metropolitan University, Oslo, Norway; ^oDepartment of Computer Science, Oslo Metropolitan University, Oslo, Norway; ^pDepartment of Life Sciences and Health, Oslo Metropolitan University, Oslo, Norway; ^qDepartment of Clinical Medicine, Faculty of Medicine, University of Bergen, Bergen, Norway; ^rDepartment of Quality and Health Technology, The Faculty of Health Sciences, University of Stavanger, Stavanger, Norway; ^sDepartment of Oral Biology, Faculty of Dentistry, University of Oslo, Oslo, Norway; ^tNational Centre for Optics, Vision and Eye Care, Department of Optometry, Radiography and Lighting Design, Faculty of Health Sciences, University of South-Eastern Norway, Kongsberg, Norway; ^uDepartment of Health and Nursing Science, The Faculty of Health and Sport Sciences, University of Agder, Grimstad, Norway; ^vThe Norwegian Dry Eye Clinic, Oslo, Norway

Keywords

Optic nerve avulsion · Globe dislocation · Traumatic enucleation

Abstract

Introduction: The complete globe dislocation is a rare type of trauma in clinical practice of ophthalmologists. **Case Presentation:** In this report, we present a case of complete globe dislocation with optic nerve avulsion caused by a fall onto a wooden chair edge. Interesting fact was that despite the complete avulsion of the optic nerve and total luxation of the globe, there was no orbital fracture. The report discusses characteristics of trauma and its surgical management. **Conclusion:** Even though the globe was completely dislocated with avulsion of optic nerve and five extraocular muscles the orbit was intact. Unfortunately, the magnitude of trauma

Correspondence to:
Behzod Tashbayev, bektashbayev@gmail.com

warranted enucleation. The extent of the soft tissue damage and swelling precluded a primary orbital implant. In such cases, relatively early secondary surgery with an orbital implant may help reduce the negative psychological impact.

© 2024 The Author(s).

Published by S. Karger AG, Basel

Introduction

In the realm of ophthalmology, complete globe dislocation is an uncommon form of trauma. This case report highlights an instance of such dislocation with optic nerve avulsion resulting from a fall onto the edge of a wooden chair. Notably, despite the optic nerve being fully avulsed and the globe completely dislocated, no orbital fracture was observed. The report was constructed using the CARE checklist and delves into the specifics of the trauma and its surgical management. The CARE Checklist has been completed by the authors for this case report, attached as online supplementary (for all online suppl. material, see <https://doi.org/10.1159/000542225>).

Case Presentation

Paramedics contacted our emergency service regarding a 76-year-old male patient who “had his left eye hanging on his cheek” after the patient had fallen onto an edge of a wooden chair. Upon arrival, approximately 2 h after the accident the patient was conscious (Glasgow Coma Scale 15), with adequate vital signs and did not report any pain. The patient was on antihypertensive and anticoagulant medications due to previously known arterial hypertension and a history of stroke. The history revealed a blunt trauma to the superomedial orbital region, just above the lower tear punctum of the left eye. The object the patient fallen onto is described as a wooden Ikea chair with blunt ears pointing upwards. Ophthalmologic examinations showed a luxation of the left globe onto the zygomatic region of the face, protruding about 3 cm from the lower orbital rim of the left eye, severe periorbital hematoma, and skin laceration of glabellar area (Fig. 1). The upper eyelid was edematous but intact. No active bleeding was noted. The cornea was dry. Light perception was absent; the pupil was fixed and semi-dilated. The globe seemed intact with normal tension on palpation performed directly on the globe. An emergency computed tomography of the brain and orbit was performed to establish the extent of damage and rule out any intracranial involvement. The computed tomography showed avulsion of optic nerve and five extraocular muscles (medial rectus, superior rectus, inferior rectus, superior, and inferior oblique). Only the lateral rectus muscle was intact. No intracranial pathology was found (Fig. 2). A broad-spectrum antibiotic was administered intravenously. The only possible management was enucleation. The management option was explained to the patient who gave consent to surgery. Surgery was performed under general anesthesia. After careful wound exploration, a globe rupture at the insertion of the superior rectus muscle was noted. The eye was enucleated; the rectus muscle sutured to each other, and a conformer was placed next day. It was not possible to position an orbital implant at the primary surgery due to extensive soft tissue damage. After a 3-day follow-up, significant improvement in the periorbital hematoma was observed. A topical antibiotic ointment was prescribed, and subsequent evaluation after 2 weeks revealed clear improvements. The patient was then referred to the oculoplastic department and subsequently to an ocularist. Unfortunately, the patient was lost to further follow-up.

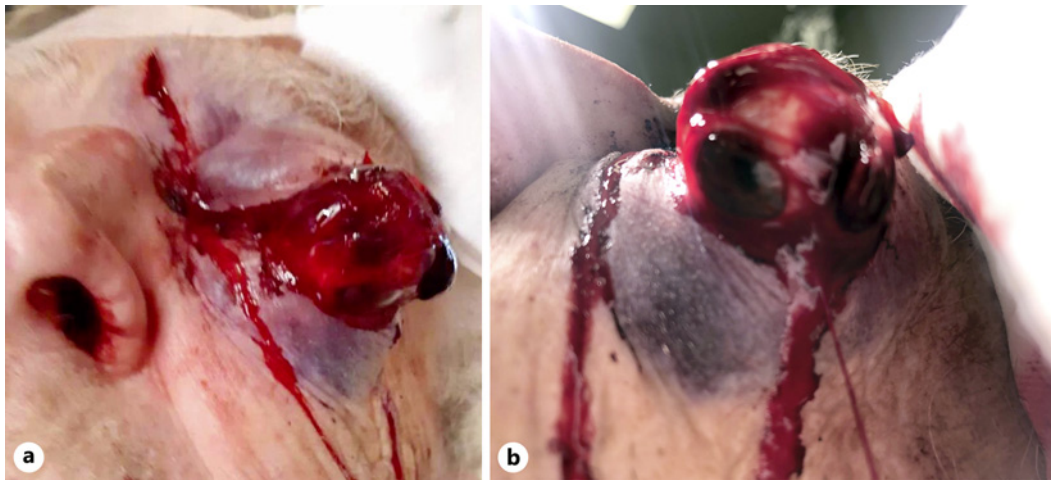


Fig. 1. Frontal view (a, picture to the left); lateral view (b, picture to the right). Evident extreme globe dislocation and periorbital hemorrhage.



Fig. 2. Computed tomography (CT) head and orbit, axial section. Avulsion of the optic nerve (a, image to the left) and medial rectus muscle (b, image to the right) can be seen.

Traumatic globe luxation is a rare injury, and the most common cause is road traffic accidents [1, 2]. It has highest prevalence among teenagers and younger adults (10–29 years) with male propensity (4.7:1) [1, 3, 4]. Based on clinical presentation it can be classified as partial (intact optic nerve and extraocular muscles), complete (avulsion of optic nerve and extraocular muscles), unilateral or bilateral [5, 6]. Globe luxation is usually accompanied with orbital bone fracture but it also may present as isolated globe dislocation. The globe can be dislocated anteriorly [7–9], into the maxillary sinus [10–12] or even into the anterior cranial fossa [13–15]. Anterior globe dislocation occurs when usually a blunt object hits superomedial orbital region.

It is believed the force from the object increases intraorbital pressure by pushing the eyelid posteriorly inducing anterior globe dislocation [8, 16]. In this case, due to blunt trauma to the superomedial region of the left orbital region, a complete anterior globe dislocation took place.

The extent of extraocular muscle involvement is determined by the mechanism of injury, in this case, blunt trauma to the superomedial orbital region. The most susceptible muscle for avulsion is the medial rectus followed by the inferior and the superior rectus. The oblique muscles are generally least affected [17].

The optic nerve avulsion often occurs at the lamina cribrosa. Postoperative examination by an ophthalmic pathologist showed this to be the case in this patient. This is explained due to lack of myelin sheath and surrounding supportive tissue at lamina cribrosa [18].

Globe dislocation is a critical situation requiring urgent attention. The approach to managing this condition varies based on the severity of the injury. Like in all traumatic incidents, the primary focus should be on preserving the globe and the tissues surrounding the eye and orbit whenever feasible. This remains true even if there is a loss of vision, with consideration given to future cosmetic interventions such as prosthetic management during follow-up. Initially, efforts may involve repositioning the dislocated globe into its proper place within the orbit, followed by surgical exploration and repair of any torn extraocular muscles [7, 8, 19]. In cases of severe injury, such as extensive globe dislocation involving the avulsion of the optic nerve and multiple extraocular muscles, enucleation might be considered. Depending on the condition of the tissues within the socket, an orbital implant may be recommended either as a primary procedure or as a subsequent intervention [3, 8, 19].

Conclusion

In such severe blunt trauma to the eye, usually there is an impact on orbital walls, most frequently damaging the ethmoid and maxillary bones, the globe dislocating into paranasal sinuses. In our case, even though the globe was completely dislocated with avulsion of optic nerve and five extraocular muscles the orbit was intact. Unfortunately, the magnitude of trauma warranted enucleation. The extent of the soft tissue damage and swelling precluded a primary orbital implant. In such cases, relatively early secondary surgery with an orbital implant may help reduce the negative psychological impact.

Statement of Ethics

Ethical approval is not required for this study in accordance with local or national guidelines. Written informed consent was obtained from the patient for publication of the details of their medical case and any accompanying images. The CARE Checklist has been completed by the authors for this case report, attached as online supplementary material.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Funding Sources

This study was not supported by any sponsor or funder.

Author Contributions

Behzod Tashbayev: admitting physician, data preparation, and writing the article. Tor Paaske Utheim: supervision, choice of the journal, and final preparations. Panagiotis Tsigkris: admitting physician, data preparation, and writing the article. Guys Shanks: main surgeon, supervision, and writing the article, editing, and finalizing.

Data Availability Statement

All data generated or analyzed during this study are included in this article and its online supplementary material files. Further inquiries can be directed to the corresponding author.

References

- 1 Iida S, Kogo M, Sugiura T, Mima T, Matsuya T. Retrospective analysis of 1502 patients with facial fractures. *Int J Oral Maxillofac Surg*. 2001;30(4):286–90. <https://doi.org/10.1054/ijom.2001.0056>
- 2 Angga KM, Gangadhara S, Rinaldi MD, Niluh PAD Wardhani MD, Rizki RN, et al. Traumatic globe luxation. In: Fatemeh R, Gangadhara S, editor. *Traumatic globe luxation*. American Academy of Ophthalmology; 2023. Available from: www.eyewiki.aao.org
- 3 Amaral MB, Carvalho MF, Ferreira AB, Mesquita RA. Traumatic globe luxation associated with orbital fracture in a child: a case report and literature review. *J Maxillofac Oral Surg*. 2015;14(Suppl 1):323–30. <https://doi.org/10.1007/s12663-013-0539-y>
- 4 Roka N, Roka YB. Traumatic luxation of the eye ball with optic nerve transection following road traffic accident: report of two cases and brief review of literature. *Nepal J Ophthalmol*. 2018;10(20):196–202. <https://doi.org/10.3126/nepjoph.v10i2.20031>
- 5 Lang GK, Bialasiewicz AA, Röhr WD. [Bilateral traumatic eye avulsion]. *Klin Monbl Augenheilkd*. 1991;198(02):112–6. <https://doi.org/10.1055/s-2008-1045940>
- 6 Tok L, Tok OY, Argun TC, Yilmaz O, Gunes A, Unlu EN, et al. Bilateral traumatic globe luxation with optic nerve transection. *Case Rep Ophthalmol*. 2014;5(3):429–34. <https://doi.org/10.1159/000370043>
- 7 Kumari E, Chakraborty S, Ray B. Traumatic globe luxation: a case report. *Indian J Ophthalmol*. 2015;63(8):682–4. <https://doi.org/10.4103/0301-4738.169795>
- 8 Gupta H, Natarajan S, Vaidya S, Gupta S, Shah D, Merchant R, et al. Traumatic eye ball luxation: a stepwise approach to globe salvage. *Saudi J Ophthalmol*. 2017;31(4):260–5. <https://doi.org/10.1016/j.sjopt.2017.06.001>
- 9 Gaur N, Kumari S, Takkar B, Sharma P. Globe luxation, complex eyelid laceration and lost medial rectus: extreme complication of ocular trauma. *BMJ Case Rep*. 2019;12(10):e231394. <https://doi.org/10.1136/bcr-2019-231394>
- 10 Kim S, Baek S. Traumatic dislocation of the globe into the maxillary sinus associated with extraocular muscle injury. *Graefes Arch Clin Exp Ophthalmol*. 2005;243(12):1280–3. <https://doi.org/10.1007/s00417-004-1111-8>
- 11 Ramstead C, McCabe J, Alkahtani M, Leong-Sit J, Morhart M. Traumatic dislocation of the globe into the maxillary sinus. *Can J Ophthalmol*. 2008;43(3):364–6. <https://doi.org/10.3129/i08-045>
- 12 Noman SA, Shindy MI. Immediate surgical management of traumatic dislocation of the eye globe into the maxillary sinus: report of a rare case and literature review. *Craniofacial Trauma Reconstr*. 2017;10(2):151–8. <https://doi.org/10.1055/s-0036-1584393>
- 13 Shams Vahdati S, Sadeghi H. Orbital roof fracture: dislocation of globe into the anterior cranial fossa. *J Acad Emerg Med Case Rep*. 2011;2(1):47–9. <https://doi.org/10.5505/jaemcr.2011.73792>
- 14 Nezami N, Sadighi A, Rahimi-Ardabili B. Magnetic resonance imaging of intact globe superior subluxation into the intracranium. *Indian J Ophthalmol*. 2012;60(1):69–70. <https://doi.org/10.4103/0301-4738.91349>
- 15 Liu H, Hu S, Qin W. Traumatic prolapse of the globe into the anterior cranial fossa: a case report. *BMC Ophthalmol*. 2020;20(1):128. <https://doi.org/10.1186/s12886-020-01403-2>
- 16 Poroy C, Cibik C, Yazici B. Traumatic globe subluxation and intracranial injury caused by bicycle brake handle. *Arch Trauma Res*. 2016;5(3):e33405. <https://doi.org/10.5812/atr.33405>
- 17 Rangarajan V, Tamilmani Y. Traumatic luxation of the globe: a novel simple treatment. *TNOA J Ophthalmic Sci Res*. 2017;55(2):145–7. https://doi.org/10.4103/tjoser.tjoser_17_17
- 18 Pillai S, Mahmood MA, Limaye SR. Complete evulsion of the globe and optic nerve. *Br J Ophthalmol*. 1987;71(1):69–72. <https://doi.org/10.1136/bjo.71.1.69>
- 19 Kiratli H, Tümer B, Bilgiç S. Management of traumatic luxation of the globe. A case report. *Acta Ophthalmol Scand*. 1999;77(3):340–2. <https://doi.org/10.1034/j.1600-0420.1999.770319.x>