American Journal of Ophthalmology Case Reports 15 (2019) 100496

Contents lists available at ScienceDirect

American Journal of Ophthalmology Case Reports

journal homepage: www.elsevier.com/locate/ajoc

Case report

Exercise band-induced lens dislocations: A case series

Luca M. Rosignoli, Kathleen A. Regan, Matthew J. Gray, Collin R. Ohning, Siva S.R. Iyer*

Department of Ophthalmology, University of Florida, 1600 SW Archer Rd, Gainesville, FL, 32610, USA

ARTICLE INFO

Keywords:
Closed globe injury
Exercise band
Resistance band
Lens dislocation
Ocular hypertension

ABSTRACT

Purpose: We report three cases of lens dislocation due to ocular trauma from a recoiling exercise band.
Observations: Three patients had closed globe injury resulting in lens dislocation. All had previously undergone intraocular surgeries; two patients were within three weeks of pars plana vitrectomy for retinal detachment repair. Findings included vision loss, hyphema, and increased intraocular pressure refractory to medical management. The retina remained attached post-traumatically in all cases. Lens removal or repositioning resulted in improved vision.
Conclusions and Importance: A recoiling exercise band can cause lens dislocation, hyphema, and ocular hypertension that may require surgical intervention. Our report emphasizes the importance of patient counseling in the perioperative period for the prevention of traumatic complications.

1. Introduction

Ocular trauma is the most common cause of lens dislocation,[1] which can be associated with secondary hyphema, glaucoma, retinal tears, and vision loss.[2] In this series, we present three patients with previous ocular surgical history (two pseudophakic, one phakic) who had closed globe injury from an exercise (resistance) band, resulting in lens dislocation.

2. Findings

2.1. Case 1

A 48-year-old phakic female presented after injury to the right eye from an exercise band during home recreational use. Nineteen days prior to this trauma, she had a rhegmatogenous retinal detachment (RRD) in the right eye treated with 25-gauge pars plana vitrectomy (PPV) and radial scleral buckle with gas tamponade (16% C_3F_8). Vision was light perception (LP) and intraocular pressure (IOP) was 40 mmHg with iris bombe, gas bubble behind the iris, and a hyphema. B-scan showed attached retina without dialysis and dislocation of the crystalline lens to the posterior segment (Fig. 1a). IOP was treated with topical medications and systemic acetazolamide. Fourteen days after trauma, she underwent PPV and pars plana lensectomy. Ocular hypertension continued post-operatively, requiring temporary treatment with oral acetazolamide and topical brinzolamide-brimonidine with subsequent IOP normalization. One month after surgery, best corrected visual acuity (BCVA) was 20/20 with an aphakic contact lens. At follow up three months after surgery, IOP was normal without topical therapy.

2.2. Case 2

A 72-year-old pseudophakic male presented after injury with a resistance band to the right eye sustained during an exercise class. Ocular history was remarkable for a recent macula-involving RRD repaired with 25-gauge PPV and gas tamponade (16% C_3F_8) two weeks prior to injury. He also had a history of advanced glaucoma with visual field loss. Vision was LP, and IOP was 49 mmHg. He had a 1 mm hyphema, iridodonesis, anterior chamber cells and aphakia. B-scan showed attached retina without dialysis and an inferiorly-dislocated IOL (Fig. 1b). He began treatment with systemic acetazolamide and topical brimonidine, timolol, and dorzolamide, with improvement in IOP. However, two months after injury, IOP was elevated to 42 despite medical management. PPV and lens explantation were then performed, followed by implantation of a scleral-fixated IOL three months later. BCVA was 20/100 one month following scleral-fixated IOL placement, with persistently poor visual acuity in the setting of advanced glaucoma and a history of a macula-involving RRD. IOP remained well controlled on topical dorzolamide and latanoprost.

2.3. Case 3

A 74-year-old pseudophakic male sustained traumatic injury to the right eye with a recoiling resistance band during home exercise. Ocular

* Corresponding author.
E-mail address: ssr@ufl.edu (S.S.R. Iyer).

https://doi.org/10.1016/j.ajoc.2019.100496
Received 29 July 2018; Received in revised form 19 May 2019; Accepted 11 June 2019
Available online 13 June 2019

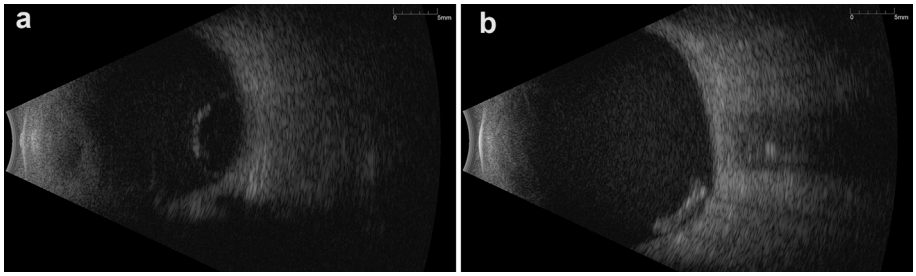

Fig. 1. a B-scan ultrasonography of the involved eye in Case 1 showing a hyperechoic outline of the posteriorly dislocated crystalline lens. **b** B-scan ultrasonography of the involved eye in Case 2 showing an inferior hyperechoic linear structure representing the dislocated intraocular lens/bag complex.

history included primary open angle glaucoma treated with a remote trabeculectomy and topical therapy. Exam showed hand motions vision, IOP of 35 mmHg, a 3 mm hyphema, and vitreous hemorrhage. He was noted to have vitreous prolapse into the anterior chamber (AC) via a dislocated single-piece acrylic lens/bag complex with the superior haptic through the pupil. IOP was managed topically. A 25-gauge PPV with peripheral iridectomy was performed one month following injury, and the IOL was repositioned to the AC, with a plan for IOL exchange in the future. One month after surgery, BCVA was 20/25, and IOP was controlled on baseline topical medications. He developed cystoid macular edema (CME) with associated iritis in the right eye five months after surgery. BCVA had decreased to 20/60, and IOP remained controlled on dorzolamide. He was treated with topical steroid and underwent an IOL exchange with scleral fixation. Postoperatively, BCVA was 20/30 and IOP normal with improved AC inflammation and CME. There has been no evidence of corneal decompensation during the patient's follow-up course.

3. Discussion

To the best of our knowledge, this is the first report of lens dislocation induced by blunt trauma with an exercise band. Previous reports on exercise band-induced injury included hyphema,[3] retinal dialysis, and retinal detachment.[4] Bungee cord injuries have also been reported, with a similar elastic force but typically with metallic or plastic hooks[5] that may cause more damage than the exercise band design. Open globe injuries resulting in enucleation have been reported after bungee cord injury.[6] Safety glasses appear to be protective against bungee cord injury, while prescription eyeglasses may shatter and even worsen trauma.[5]

Antero-posterior force from the recoiling band may induce an equatorial expansion of the globe that disrupts the zonular fibers, resulting in lens displacement.[2] PPV may also increase the risk of lens dislocation because of zonular damage during surgery.[7] Ophthalmic ultrasound[8] and computed tomography (CT)[9] may be diagnostically helpful in cases of poor visibility from hyphema or corneal edema. Management of the lens may be individualized; in this report patients were treated with an aphakic contact lens or a scleral-fixated IOL with good results. The patient in case three had a single-piece acrylic lens that was temporarily repositioned into the AC. While not designed for AC placement and not tolerated in the long term by our patient, in select cases, these lenses may function well in this position for short-term management.[10]

All our patients developed ocular hypertension following trauma. Elevated IOP can accompany lens dislocations, acutely because of secondary angle closure[2] or hyphema, with blockage of trabecular meshwork by blood and debris.[11] Chronically, traumatic angle recession may result in IOP elevations.[5] While gonioscopy was not performed on these patients, these factors may have contributed to the intraocular hypertension noted in our patients. Furthermore, in cases 1 and 2, the trauma followed a 25-gauge PPV with 16% C_3F_8 tamponade by 2–3 weeks. Cases 2 and 3 had known glaucoma at presentation that required continuation of topical therapy throughout the majority of the post-operative period. Prior to his IOL exchange in case 3, the presence of the IOL in the anterior chamber prompted a low-grade inflammatory reaction that worsened his pre-existing pressure control.

Two of the patients were in the immediate post-operative period from PPV for RRD. Although the counsel for patients on post-operative activity restrictions can vary greatly, patients who would like to continue physical activity should be made aware of possible ocular risks and abstain from exercise band use or wear eye protection.

4. Conclusions

Lens dislocation may be a complication of ocular trauma from an exercise band. These patients may have ocular hypertension requiring medical and surgical intervention. This study also emphasizes the importance of patient counseling regarding physical activity in the post-operative period.

5. Patient consent

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written informed consent for imaging and publication of personal identifying information was obtained from all individual participants included in the study. Institutional Review Board approval was obtained at the University of Florida.

Funding

This study was supported in part by an unrestricted grant from Research to Prevent Blindness.

Conflicts of interest

The following authors have no financial disclosures: LMR, KAR, MJG, CRO, SSRI.

Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

Acknowledgements

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ajoc.2019.100496.

References

1. Jarrett II WH. Dislocation of the lens. A study of 166 hospitalized cases. *Arch Ophthalmol.* 1967;78(3):289–296.
2. Netland KE, Martinez J, LaCour 3rd OJ, Netland PA. Traumatic anterior lens dislocation: a case report. *J Emerg Med.* 1999;17(4):637–639.
3. Ducharme J, To KW. Exercise band-induced hyphema. *Arch Ophthalmol.* 1995;113(2):142.
4. Joondeph SA, Joondeph BC. Retinal detachment due to CrossFit training injury. *Case Rep Ophthalmol Med.* 2013:2013189837.
5. Hollander DA, Aldave AJ. Ocular bungee cord injuries. *Curr Opin Ophthalmol.* 2002;13(3):167–170.
6. Aldave AJ, Gertner GS, Davis GH, Regillo CD, Jeffers JB. Bungee cord-associated ocular trauma. *Ophthalmology.* 2001;108(4):788–792.
7. Koike T, Baba T, Nizawa T, Oshitari T, Yamamoto S. Characteristics of patients with spontaneous dislocation of in-the-bag intraocular lens after pars plana vitrectomy. *Jpn J Ophthalmol.* 2017;61(3):267–270.
8. Lee S, Hayward A, Bellamkonda VR. Traumatic lens dislocation. *Int J Emerg Med.* 2015;8(16) 816-015-0064-5. eCollection 2015.
9. Wang HE, Ger DS, Gould SW. Diagnosis of traumatic lens dislocations. *J Emerg Med.* 2000;19(1):73–74.
10. Charles S, Bell DJ. Repositioning dislocated intraocular lenses into the anterior chamber. *Retina.* 2008;28(7):1015–1017.
11. Bansal S, Gunasekeran DV, Ang B, et al. Controversies in the pathophysiology and management of hyphema. *Surv Ophthalmol.* 2016;61(3):297–308.