Brief Report

Pharmacologic pupillary constriction after dilated fundus examination for ectopia lentis to prevent further subluxation

William Plum a,b, Xinyi Chen a, Varshini Varadaraj b, Divya Srikumar a, Shameema Sikder a, Fasika A. Woreta a,b,∗

a Division of Cornea, Cataracts and External Diseases, The Wilmer Eye Institute, Johns Hopkins University School of Medicine, Baltimore, MD, USA
b Dana Center for Preventive Ophthalmology, The Wilmer Eye Institute, Johns Hopkins University School of Medicine, Baltimore, MD, USA

ARTICLE INFO

Keywords:
Ectopia lentis
Lens subluxation
Preoperative management

ABSTRACT

Purpose: To describe two cases of ectopia lentis with different preoperative management strategies following the initial diagnostic dilated exam.

Observations: In both cases, the patients presented with bilateral subluxation of the crystalline lens. Neither patient had a known history of Marfan's disease, homocystinuria or other systemic disorders that affect the body's connective tissue possibly leading to lens subluxation. Patient 1 was sent home after dilated fundus examination with no special precautions. That same night, he developed severe right eye pain and further decreased vision. He was found to have complete dislocation of his right crystalline lens into the anterior chamber with corneal edema and an elevated pressure, requiring an urgent pars plana lensectomy. In our second case of ectopia lentis, patient 2 was examined prior to dilation and noted to have bilateral subluxation of the lens into the vitreous. Twenty minutes after dilation, the crystalline lens was noted to be in the anterior chamber in the right eye. The patient was laid supine for several minutes and once the lens was in the posterior cavity, she was given 1% pilocarpine in both eyes to constrict the pupil to prevent dislocation in the anterior chamber. Patient 2 had an uneventful perioperative period and did not suffer worsening subluxation after her initial visit.

Conclusion and importance: Unlike patient 1, patient 2 did not suffer further subluxation after her initial dilated eye exam, therefore avoiding a more arduous clinical and surgical course. Patients presenting with completely dislocated lenses may benefit from the reversal of pupillary dilation by being placed in the supine position and given reversal drops such as 1% pilocarpine prior to leaving the office. This method may help prevent complications from anterior lens subluxation and pupillary block glaucoma until definitive surgical management.

1. Introduction

Subluxation of the crystalline lens may cause visual impairment of varying severity depending on the degree of subluxation. We report two cases of dislocated crystalline lenses managed with different preoperative strategies. Pharmacologic constriction and supine patient positioning, as described below, used to manage patient 2 may have aided in the prevention of a worsening dislocation following the dilated eye exam. Taking the precaution of pharmacologic constriction and supine positioning potentially averted complications such as the corneal edema and elevated intraocular pressure (IOP) from a subluxation into the anterior chamber (AC), as was observed in patient 1. To our knowledge, it is currently not a common practice to use a pharmacologic agent to constrict the pupil and have these patients lie supine after a complete dilated eye exam in order to prevent forward dislocation of the lens until definitive management.

2. Findings

2.1. Case 1

A 49-year-old man presented to our clinic for evaluation of gradual, progressive painless vision loss in the left eye. Patient stated that three weeks prior, he suffered blunt trauma to his left eye when he was hit by his girlfriend's hand. He also complained of monocular diplopia in the left eye but denied other ocular symptoms. On initial clinical examination, his corrected distance visual acuity (CDVA) was 20/30–1 and 20/40–1 in the right eye and left eye, respectively and with no improvement with pinhole (ph). IOP was 18 mm Hg in both eyes.

Both pupils were equal, round, and reactive with no afferent
The dilated exam was notable for bilateral inferiorly subluxed lenses (Fig. 1). He denied any systemic symptoms or relevant family history. At that initial visit, a plan was made to perform a pars plana vitrectomy and lensectomy along with secondary intraocular lens (IOL) fixation within one week of presentation. Initial work-up included slit lamp photos, anterior segment OCT, diagnostic B-scan, and IOL calculations.

However, prior to the surgery, the patient presented to our Emergency Department (ED) 4 days later with severe pain, sensitivity to light, redness, and substantially reduced vision (hand motion in the right eye, counting fingers at 3 feet in the left eye). He reported that these symptoms began on the night of his initial clinic visit 4 days prior and denied any new trauma in the interim.

Examination of his right eye revealed a 5 mm-dilated pupil unresponsive to light, substantial corneal edema with 3+ Descemet’s folds, and an elevated IOP of 23 mm Hg. Furthermore, the right lens completely subluxed into the AC with central lenticulo-corneal touch (Fig. 2, A). The subluxation in the left eye was also worse as compared to his initial clinic visit, with complete inferior subluxation with only the edge of the lens visible through his undilated pupil (Fig. 2, B). The IOP in his left eye was 18 mm Hg, unchanged from his initial consultation. He underwent urgent pars plana vitrectomy and lensectomy which was challenging secondary to corneal edema and thus the patient was left aphakic.

He returned 2 months later for a second pars plana vitrectomy in the right eye along with a scleral-sutured IOL. At postoperative day 1, his uncorrected distance visual acuity (UDVA) was 20/40 in the right eye and counting fingers at 2 feet (ph 20/400) in the left eye. Both pupils were equal, round, and reactive with no afferent pupillary defect noted. Clinical examination was notable for significant pseudophacodonesis in the right eye and an entirely free lens in the anterior vitreous in the left eye. Of note, she also had bilateral 2+ nuclear sclerosis. Prior to dilation, her left lens was posterior to the iris. However, following dilation, she was noted to have dislocation of the left lens into the AC.

Given our recent experience with case 1 of the consequences of worsening bilateral subluxation, she was laid supine in order for the left lens to be relocated posterior to the iris and given 1% pilocarpine in both eyes to constrict the pupils. The lens was noted to be located behind the iris before the patient was sent home. She was also instructed to lie supine for another 24 h.

A pars plana vitrectomy and pars plana lensectomy with IOL implantation was carried out on the left eye 11 days later. The time period between the last appointment and the surgery was uneventful, without worsening of the subluxation. On postoperative day 1, the UDVA was 20/40–2 (ph 20/25–2) in the left eye.

One month later, the right eye underwent an uncomplicated surgery identical to the one performed in the left eye, with an UDVA of 20/100 (ph 20/30–1) on postoperative day 1. During her last clinic visit more
than 3 months after her initial surgery, her UDVA was 20/25 (ph 20/20) in both eyes. Refracted visual acuities were 20/20 in her right eye (−1.00 sphere) and 20/20 in her left eye (−0.50 sphere +0.50 cylinder x 150°).

3. Discussion

Dislocation of the crystalline lens into the AC may lead to corneal edema, pupillary block glaucoma, or anterior uveitis resulting in more difficult surgical cases and prolonging patient suffering. Peyman et al. reported a series of surgically managed subluxated lenses where postoperative results were directly correlated with the preoperative status of the cornea and anteriorly dislocated lens.5

In the literature, these cases often present initially with lens dislocation in the AC.2,4,6 However, here, one of our patients had a complete dislocation of the crystalline lens only after he underwent a dilated fundus exam in clinic.

In order to prevent the complications associated with a complete ectopia lentis in the AC, we propose the consideration of pharmacological pupillary constriction after the initial visit is complete. While we acknowledge that this was a small series of 2 patients, we encourage laying patients supine and using drops such as 1% pilocarpine as we did in our second case to allow an anteriorly displaced lens to fall back behind the iris or to prevent anterior dislocation.1,7,8 This method may help to avoid the above-mentioned negative effects from a complete dislocation into the AC, such as the severe corneal edema described in case 1. However, it is also worth mentioning that there is a risk, albeit a small one, of retinal detachment after using a constrictive agent after pupillary dilation.9

To the best of our knowledge, no such recommendation is widely acknowledged or discussed. This method is focused on preventing further worsening of vision from a complete lens dislocation into the AC, which led patient 1 to have prolonged corneal edema and two separate surgeries involving a vitrectomy. Pars plana vitrectomies are not without risks10; and when performed under general anesthesia,11 as was deemed necessary for our patient, is accompanied with its own set of risks.

4. Conclusion

In conclusion, we present 2 cases of subluxed crystalline lenses. Our first case highlights the plausibility that a seemingly routine dilation exam preoperatively may increase the chances of further subluxation of the lens leading to a more arduous clinical and surgical course. In our second case, we present the successful preoperative management for ectopia lentis in which 1% pilocarpine was used to constrict the pupils before safely sending the patient home. We recommend the consideration of supine positioning and using a one-time dose of a pharmacological agent to constrict the pupils of patients undergoing a dilated ocular exam due to ectopia lentis.

Patient consent

Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patient.

Funding

No funding or grant support.

Authorship

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

Declaration of competing interest

All authors have no financial disclosures.

Acknowledgements

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ajoc.2020.100694.

References

1. Nelson LB, Maumenee IH. Ectopia lentis. Surv Ophthalmol. 1982;27(3):143–160.
2. Choi D-Y, Kim J-G, Song B-J. Surgical management of crystalline lens dislocation into the anterior chamber with corneal touch and secondary glaucoma. J Cataract Refract Surg. 2004;30(3):718–721.
3. Jaffe NS, Jaffe GF. JMS. Chap 8: in: Cataract Surgery and its Complications. sixth ed. St Louis, MO: Mosby; 1997.
4. Pop R. Spontaneous luxation of the crystalline lens into the anterior chamber (a clinical case report). Ophthalmol. 1992;36(1):61–63.
5. Peyman GA, Raichand M, Goldberg MF, Ritacca D. Management of subluxated and dislocated lenses with the vitrophage. Br J Ophthalmol. 1979;63(11):771–778.
6. Kawashima M, Kawakita T, Shimazaki J. Complete spontaneous crystalline lens dislocation into the anterior chamber with severe corneal endothelial cell loss. Cornea. 2007;26(4):487–489. https://doi.org/10.1097/ICO.0b013e3180303ae7 [doi].
7. Elkington AR, Freedman SS, Jay B, Wright P. Anterior dislocation of the lens in homocystinuria. Br J Ophthalmol. 1973;57(5):325–329.
8. Zeeman WPC. Ectopia lentis congenita. Acta Ophthalmol. 1942;20(1):1–13.
9. Beasley H, Fraunfelder FT. Retinal detachments and topical ocular miotics. Ophthalmology. 1979;86(1):95–98. https://doi.org/10.1016/S0161-6420(79)35529-4.
10. Faulborn J, Conway BP, Machemer R. Surgical complications of pars plana vitreous surgery. Ophthalmology. 1978;85(2):116–125.
11. Harris M, Chung F. Complications of general anesthesia. Clin Plast Surg. 2013;40(4):503–513.