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Case Report

Displacement of crystalline lens into the sub-conjunctival space following periocular anesthesia

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Abstract

A 65-year-old female presented with loss of vision and a mass in her right eye after periocular anaesthesia for cataract surgery in a camp. She was found to have a nasal subconjunctival mass, which was confirmed to contain the crystalline lens after surgical exploration, along with a superior perilimbal suspected scleral rupture. There was accompanying vitreous haemorrhage, retinal detachment and subretinal haemorrhage that was managed by pars plana vitrectomy. Post operatively, she achieved a best corrected visual acuity of 20/80 that was maintained till 6 months follow up. Globe rupture and subconjunctival lens extrusion in the setting of inadvertent globe penetration during periocular anesthesia is a rare complication. In the absence of medical records pertaining to the primary event, this clinical presentation posed a diagnostic challenge. Timely and appropriate management led to an acceptable visual and anatomical outcome in this unfortunate and devastating scenario.

Keywords: Ocular explosion, Periocular anesthesia, Peribulbar anesthesia, Retrobulbar anesthesia, Subconjunctival crystalline lens, Globe penetration, Phacocele

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Introduction

Subconjunctival dislocation of the crystalline lens, referred to as phacocele or lenticele, is a well-recognized but rare entity that comprises 13% of all lens luxations.[1] It occurs following blunt trauma and is accompanied by a scleral rupture which may occur at the impact site (direct rupture) or in an area remote from the impact site (indirect rupture).[2] This report describes a patient with a nasal phacocele, vitreous and subretinal haemorrhage and retinal detachment (RD) following periocular anesthesia for cataract surgery. The possible sequence of events culminating in this clinical presentation and the subsequent management are discussed.

Case report

A 65-year-old female presented with visual loss and a mass in her right eye since one month. She gave history of periocular injection for cataract surgery elsewhere in a camp; no records were available. She recalled a sharp excruciating pain during administration of the injection. She was informed that the cataract surgery was cancelled and referred to a higher centre. Her left eye had poor vision since several years. There was no history of trauma and she was not a known myope. There was no history suggestive of a collagen vascular disease.

On examination, best corrected visual acuity (BCVA) was hand motions with accurate projection of rays in the right eye and nil perception of light in her left eye. Slit lamp

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examination of the right eye showed a firm, well delineated, non compressible, translucent subconjunctival mass extending from the nasal limbus to the medial canthus (Fig. 1a). There was linear pigmentation 2 mm away from and concentric to the superior limbus (Fig. 1a, black arrows). The anterior chamber had streak hyphema inferiorly. The pupil was updrawn and the eye was noted to be aphakic. Intraocular pressure (IOP) using applanation tonometry was 10 mmHg. The view of the fundus was obscured by vitreous haemorrhage. Examination of the left eye revealed a shallow anterior chamber, non reactive pupil, total cataract and IOP of 48 nnHg.

An ultrasound B scan of the right eye demonstrated total RD in addition to confirming vitreous haemorrhage. No lens spike could be elicited. The left eye ultrasound revealed anechoic vitreous cavity with marked cupping at the optic nerve head. Ultrasound biomicroscopy (UBM) of the mass showed a well demarcated structure within the subconjunctival cyst with surrounding hyperechoic material (Fig. 1b) hinting towards presence of the nucleus. There was no uveoscleral discontinuity. Careful re-examination of the mass showed a corresponding circular shadow in the upper part (Fig. 1a, blue arrows).

The patient was advised surgical exploration of the mass in the first stage followed by management of the vitreous haemorrhage and RD. With the patient under local anesthesia, a conjunctival incision was given at the nasal limbus and whitish contents were seen peeping out (Fig. 2a). Upon minimal pressure, the entire nucleus and cortical matter emerged out (Fig. 2b). The underlying sclera was unremarkable (Fig. 2c). The conjunctiva was sutured using 8–0 vicryl. A week later, she underwent 23 gauge pars plana vitrectomy under guarded visual prognosis. After clearing the vitreous haemorrhage, she was noted to have total RD with subretinal haemorrhage and a retinal break along the inferotemporal arcade (Fig. 2d, black arrow). A drainage retinotomy was made superiorly and the subretinal blood was evacuated from the region of the fovea with the help of perfluorocarbon liquid. Retinal attachment was achieved, endolaser done in the periphery and silicon oil endotamponade given.

Post operatively, BCVA improved to counting fingers at two meters by two weeks and to 20/200 at three months with +6 D sphere and −10 D cylinder at 90°. The axial length was measured to be 23.25 mm in the right eye. There was gradual decrease in the subretinal hemorrhages around the macula (Fig. 3a and b) with complete resolution at 3 months (Fig. 3c). A fibrotic pigmented scar was seen along the inferotemporal arcade in the area of the retinal break (Fig. 3a and b, black arrows). Silicon oil removal was performed at three months following which BCVA was 20/80 with aphakic glasses. This was maintained till 6 months follow up.

Discussion

Although no medical records of the primary event were available, the following sequence events are hypothesized. Inadvertent globe penetration during periocular anesthesia along with direct intraocular injection of an unknown volume of the local anesthetic could have led to an acute elevation in IOP resulting in scleral rupture. This self-sealing temporary conduit between the intraocular and subconjunctival spaces provided the path for extrusion of the cataractous lens into the subconjunctival space. The presence of vitreous haemorrhage, RD, subretinal haemorrhage and a posterior retinal break inferotemporally provide further evidence of globe penetration.[3] There was no associated myopia or a collagen vascular disorder that could contribute to scleral thinning.

The incidence of ocular penetration during peribulbar and retrobulbar anesthesia has been reported to be <0.1% in eyes with an axial length <26 mm[4] and <1% in those >26 mm.[5] Ocular side effects from this penetration can be attributed to toxicity of the anesthetic or mechanical injury from the needle.[6] Inability to recognize globe penetration resulting in raised IOP induced by the subsequent intraocular injection of the anesthetic solution can result in globe rupture.[6] While globe penetration during periocular anesthesia has been commonly documented, this complication has been rarely reported.

Magnante et al. first described a case of peribulbar anesthetic injection for cataract surgery, that resulted in a scleral laceration and lens extrusion in the superior quadrant.[6] Further, their experimental study attempting to re-create this clinical situation established that the poorly extensible limbal

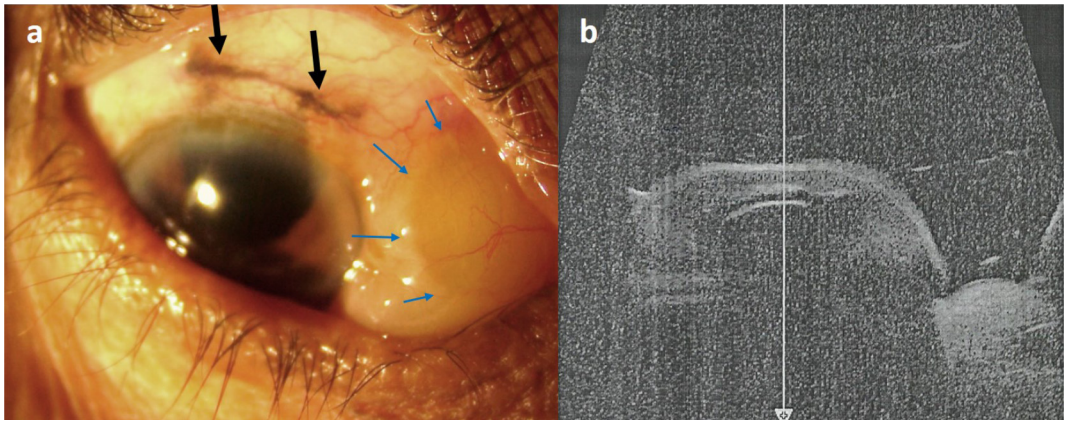

Fig. 1. (a) Clinical photograph of the right eye at presentation showing a translucent subconjunctival mass extending from the nasal limbus to the medial canthus. A circular outline could be made out in the superior part (blue arrows). Linear pigmentation was seen concentric to the superior limbus (black arrows). In addition, there was a superiorly updrawn pupil with aphakia and vitreous haemorrhage. (b) Ultrasound biomicroscopy (UBM) of the subconjunctival mass showed a clearly demarcated structure within the subconjunctival cyst with surrounding hyperechoic material.

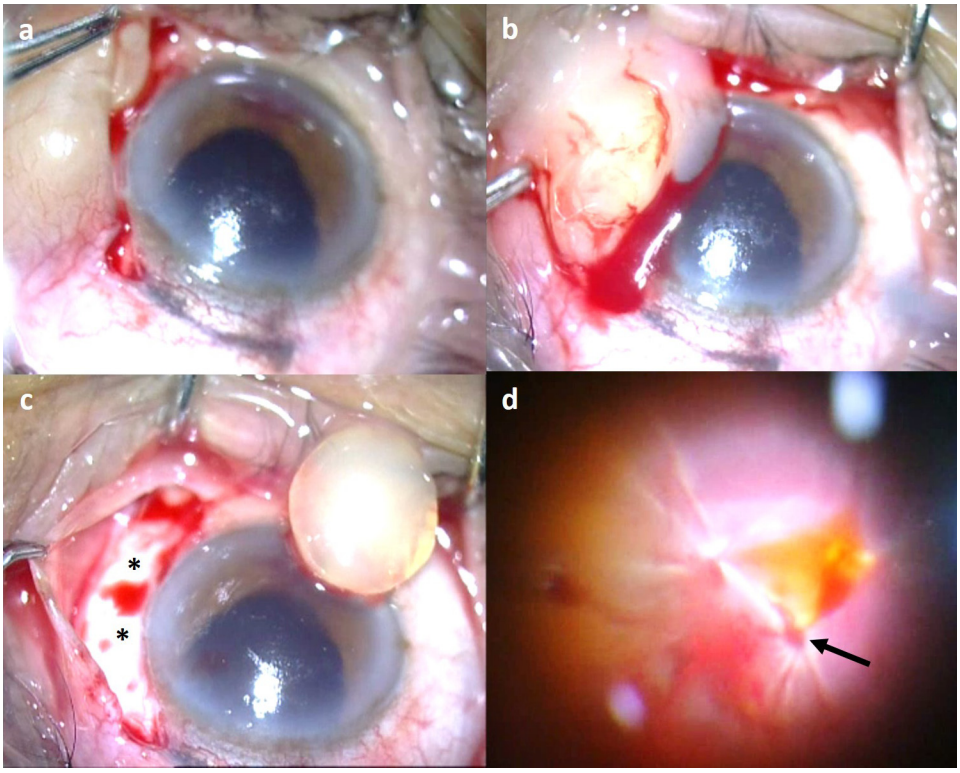

Fig. 2. (a) Surgical exploration of the mass was carried out under local anesthesia. A conjunctival incision was given at the nasal limbus and the contents of the mass began to emerge. (b) The entire nucleus along with fluffy cortical matter prolapsed out on minimal pressure confirming that the mass contained the crystalline lens. (c) The underlying sclera was unremarkable (asterisks). The conjunctiva was sutured with 8–0 vicryl. (d) Pars plana vitrectomy was performed a week later. Intra-operative photograph taken after clearing the vitreous haemorrhage shows total retinal detachment, subretinal haemorrhage and a retinal break located inferiorly to the macula (black arrow).

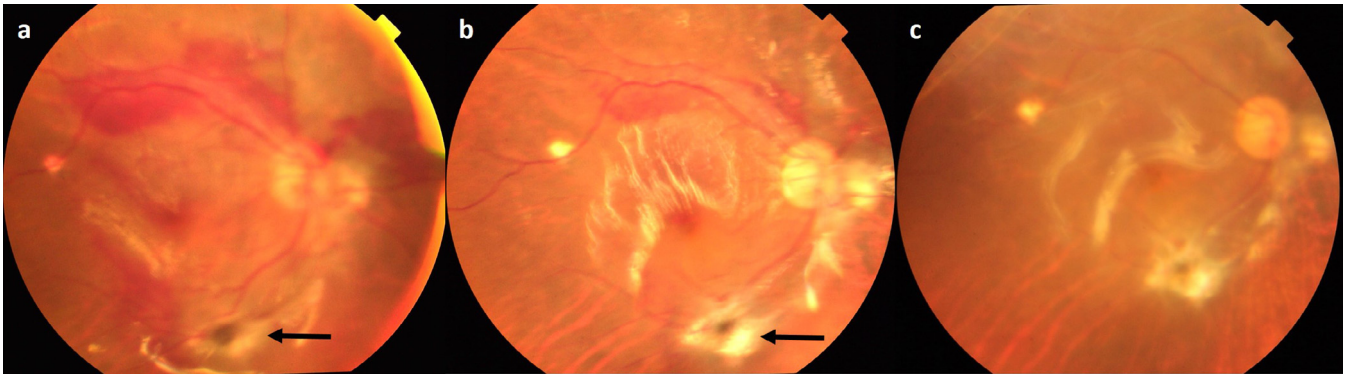

Fig. 3. Serial fundus photographs taken at two weeks (a), one month (b) and 3 months (c) post operatively showing an attached retina with silicon oil in situ. There was gradual resolution of the subretinal hemorrhages around the macula. A pigmented, fibrotic scar persisted at the site of the retinal break (black arrows).

and equatorial tissues are the first to rupture when large volumes of saline were injected intraocularly.[7,8] This catastrophic event was termed ''ocular explosion''. Lens extrusion occurred with three of the perilimbal lacerations (27%) and none of the equatorial ruptures.[6] Following the first report almost two decades ago, there have been only four more reports of lens expulsion into the subconjunctival space as a complication of peribulbar anesthesia.[9–12] In all these cases, the site of scleral dehiscence and location of the lens in the subconjunctival space were in the same area. This case is unusual in that the suspected scleral laceration was superiorly located while the lens was in the nasal subconjunctival space, where the underlying sclera showed no abnormality. A traumatic phacocele has been described in the inferior quadrant with the scleral rupture located medially.[13]

Management of this case involved surgical exploration of the mass as a primary procedure. The nucleus and lens material prolapsed out of the subconjunctival space as soon as an incision was made. The capsule was not intact and there were no surrounding attachments. A crystalline lens lying subconjunctivally is usually absorbed, though calcium deposits can remain. The longest period that the dislocated lens remained intact in this space has been reported to be 90 days.[14] The superior scleral wound was scarred with no vitreous or uveal incarceration, and did not require suturing. The posterior segment surgery was done in the second stage. Due to the

high astigmatism and superior self sealed scleral laceration, a secondary intraocular lens was not planned and visual rehabilitation was done with aphakic glasses as per the patient's choice.

Visual outcomes after ''ocular explosion'' with lens extrusion have been poor owing to RD and proliferative vitreoretinopathy or presumed toxicity from local anesthetic solutions. A BCVA of 6/9 was achieved in a single case, which did not have RD.[12] The above case had a reasonable final BCVA of 20/80 despite the presence of RD and subretinal haemorrhage.

To conclude, almost two decades since the first case of ''ocular explosion'' following peribulbar anesthesia was reported, this case aims to re-create awareness of the devastating sequence of events that may follow inadvertent intraocular injection of a local anesthetic. While topical anesthesia is being increasingly employed for routine cataract surgery, periocular injections continue to be the mainstay of ophthalmic regional anesthesia, especially in high volume settings such as surgical camps. In the absence of any medical records, this clinical presentation can pose as a diagnostic challenge. Timely and appropriate management can salvage some useful vision once this unfortunate complication ensues, however awareness and training of the proper technique of periocular anaesthesia is essential. Intolerable pain during administration of a block should alert to the possibility of globe penetration. Use of a larger syringe with a blunt needle has been recommended to minimize this event. Wiggling the syringe slightly while observing the globe for any movement can also help to recognize globe penetration. Corneal clouding during administration of the block indicates intraocular injection.[8] A thorough knowledge of orbital anatomy, administration of block by trained personnel and prompt recognition of globe penetration can help to minimize the occurrence of this complication.

Conflict of interest

The authors declared that there is no conflict of interest.

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