CASE REPORT

Management of globe perforation during cataract surgery

Niteshkumar Agrawal, MB BS, MS, Chimnay Nakhwa, MB BS, MS, FRCS(Glasgow), Shruti Jhawar, MB BS, DNB, Gauri Khare, MB BS, DNB

We describe a case involving globe perforation after phacoemulsification in an eye with high axial myopia. Retinal and vitreous hemorrhages were seen. A retinal break was noted in the inferotemporal quadrant on indirect ophthalmoscopy. Barrage laser photocoagulation of the retinal break was done immediately, and antibiotic steroid eyedrops were started. The patient was followed until the hemorrhages cleared, after which cataract surgery was performed. The final corrected distance visual acuity was 6/9. In this case, the perforation was noted early and appropriate management was performed immediately. Early diagnosis and intervention are warranted in cases of iatrogenic globe perforation.

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Globe perforation during peribulbar block is a complication that is rarely reported in the era of topical anesthesia. Certain predisposing factors for globe perforation are high axial length (AL), posterior staphyloma, previous extraocular surgery, deep-set eyes, uncooperative patient, and anesthesia given by someone other than an ophthalmologist.

During inadvertent globe perforation, the damage occurs because of penetration of the globe or toxicity of the drug injected. If the globe is penetrated, the patient might present with a varied constellation of symptoms, such as retinal break (in almost 100%), vitreous hemorrhage (11% to 100%), retinal detachment (42% to 61%), retinal hemorrhage (subretinal, intraretinal, preretinal) (5% to 52%), hyphema (10% to 22%), hypotony (10% to 21%), and retinal whitening in cases of delayed presentation (7% to 15%).

The management of perforation depends on the clinical presentation of the patient and can vary from observation to laser photocoagulation to pars plana vitrectomy with or without tamponading agents. The time of intervention is critical and has a significant impact on the anatomic and visual outcomes in a patient planned for cataract surgery.

CASE REPORT

A 67-year-old woman presented with diminution of vision in the left eye for 1 year. The corrected distance visual acuity (CDVA) was 6/18 in the right eye and 1/60 in the left eye, and the intraocular pressure (IOP) was 19 mm Hg. The retina was attached, and the IOP was 19 mm Hg. The retina was attached, and the IOP was 19 mm Hg. Fundus examination showed a resolving vitreous and retinal hemorrhage with laser marks around the retinal break.

At the 4-week examination, the CDVA in the left eye was 2/60 and the IOP was 19 mm Hg. The retina was attached, and the break was well surrounded by barrage laser. Cataract surgery under topical anesthesia was performed 4 days later.

On the first day after cataract surgery, the CDVA in the left eye was 6/18 and the IOP was 19 mm Hg. On the third day, the patient was advised to keep 2 pillows under her head, avoid bending or heavy weight lifting, and maintain a regular follow-up schedule.

Glaucoma, cataract extraction, and retinal detachment surgery were performed on the left eye under combined topical and retrobulbar anesthesia. The final corrected distance visual acuity was 6/9. The rest of the ocular examination was normal.

Phacoeomulsification with foldable intraocular lens (IOL) implantation under local anesthesia (according to patient choice and comfort) was planned for the left eye. The AL in the left eye was 29.79 mm. Preoperatively, lidocaine hydrochloride 2.0%, with adrenaline (1:200000) with bupivacaine 0.5% and hyaluronic acid was prepared for the peribulbar block. When injection of the block was started, subtle resistance was felt and the block was discontinued; the conjunctiva ballooned, and the patient reported mild pain. Globe perforation was suspected, and therefore the needle was removed immediately without injecting the anesthetic drug.

Subconjunctival ballooning (Figure 1) was noted inferotemporally. Indirect ophthalmoscopy was done at this stage, and an area of retinal hemorrhage was noted with a retinal break in the inferotemporal quadrant of the retina (Figure 2). Barrage laser photocoagulation around the break was done immediately (Figure 3). Antibiotic and steroid eyedrops and cycloplegics were started. The patient was advised to keep 2 pillows under her head, avoid bending or heavy weight lifting, and maintain a regular follow-up schedule.

On the first day postoperatively, there was dispersed hemorrhage in the posterior segment. The rest of the ocular examination was within normal limits. The patient was seen after 1 week and then 2 weeks later. The CDVA was maintained at 1 m in the left eye with an IOP of 12 mm Hg. Fundus examination showed a resolving vitreous and retinal hemorrhage with laser marks around the retinal break.

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CDVA was 6/12 and the IOP was 18 mm Hg. The anterior segment showed a posterior chamber IOL (PC IOL) in situ, with an attached retina at all visits. After 3 weeks, the CDVA was 6/9 and the IOP was 18 mm Hg. The anterior segment showed a PC IOL in situ and an attached retina with a well lasered retinal break (Figures 4 and 5).

DISCUSSION

Inadvertent globe perforation can occur during peribulbar, retrobulbar, and subconjunctival injections; strabismus surgery; and botulinum toxin injections for strabismus. It has also been reported during chalazion surgery. Globe rupture can cause a hemorrhage inside the globe. Complications related to periocular injections associated with globe rupture, including innocuous subconjunctival hemorrhage to intracranial diffusion, have been described. Inadvertent globe perforation by a regional eye block has a reported incidence of 0.9 in 10,000 cases of retrobulbar anesthesia and 1 in 16,000 cases of peribulbar anesthesia.

The risk factors for perforation are myopia, previous buckle surgery, and multiple injections. Myopia presents a dual risk due to a thinned sclera and an elongated eye. Buckling surgeries cause adhesions between the globe and orbital tissues. When there is globe penetration, the damage is usually restricted to a retinal break. The most common locations for breaks are inferotemporal (2% to 60%), superior/superonasal (16% to 50%), superotemporal (0% to 12%), or within arcades (0% to 15%). Laser photocoagulation or cryopexy has been advocated for treatment of breaks when they are visible and not obscured by vitreous hemorrhage. The laser treatment is easier in posterior lesions, whereas cryopexy is easier in peripheral lesions. Early vitrectomy with silicone oil or gas tamponade has been advocated in dense vitreous hemorrhage and/or retinal detachment. Early vitrectomy helps to clear the media adequately while treating the retinal breaks under direct visualization.

Vigilance and prompt treatment are generally the keys to managing complications arising from the administration of local anesthetic regional blocks in eye surgeries. Informed consent should be obtained from all patients before the administration of local anesthesia regional orbital blocks. Immediately following the administration of peribulbar or retrobulbar blocks, the fundus should be checked with an indirect ophthalmoscope to ensure the retinal vessels are patent and the sclera has not been penetrated inadvertently. The presence of hypotony or change in the red reflex could indicate the presence of a globe penetration.

Modification of techniques to decrease complications and the incidence of accidental punctures have been developed to improve the effectiveness of the block. In the modern peribulbar block, a 23-gauge 25.0 mm needle with the bevel...
facing the globe is inserted through the skin in the inferotemporal quadrant as far laterally as possible, just above the junction of inferior and lateral orbital walls. At this extreme corner, it is easier to stay far away from the globe to prevent needle injury to the inferior rectus muscle or the neurovascular bundle. The site of injection and the needle size are important for each case.

In our case, the patient was highly myopic, which is a significant predisposing factor for globe perforation. The perforation was noted early, and further surgery was deferred. Appropriate management was performed immediately. We emphasize the importance of early identification of this complication and prompt management.

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Figure 5. Laser scar seen inferotemporally in the left eye at the final visit.