Repair of Rhegmatogenous Retinal Detachment Following Globe Perforation by Retrobulbar Anesthesia

Nicolas A. Yannuzzi, MD; Swarup S. Swaminathan, MD; Rehan Hussain, MD; Jayanth Sridhar, MD

The Cutting Edge
Edited by Yoshihiro Yonekawa, MD, and Peter H. Tang, MD, PhD

The authors present a case of retinal detachment (RD) repair after inadvertent perforation from a retrobulbar block needle. One of the key features of this video is the decision to perform a sub-Tenon’s block in which a conjunctival and Tenon’s capsule cutdown is created followed by advancement of a blunt-tipped cannula into the retrobulbar space and injection of the anesthetic. Compared to a peribulbar or retrobulbar block, there is almost no risk of globe perforation or retrobulbar hemorrhage. At the same time, a sub-Tenon’s block offers the same advantages with excellent analgesia and akinesia. The downside is primarily cosmetic, with development of subconjunctival hemorrhage, though it typically resolves within a week. Sometimes, if the cannula is not through Tenon’s capsule or if too much anesthetic is injected, there can be ballooning of the conjunctiva.

Risk factors for perforation with retrobulbar and peribulbar blocks include a long axial length, as seen in high myopes, and associated presence of a posterior staphyloma. Although retrobulbar blocks rarely lead to complications, when they do, they can be devastating. Few cases of scleral perforation after blocks have been published; however, the outcomes tend to vary, though few appear to regain reading vision.

In this case, the steps for surgical repair of the detachment from the multiple needle perforations are excellent. Using triamcinolone to visualize the hyaloid and ensure posterior vitreous separation is crucial, as residual adherent vitreous may act as a scaffold for proliferative vitreoretinopathy (PVR). When separating the hyaloid in the presence of a RD, there is also a risk of incarcerating the retina in the cutter’s mouth, particularly if high suction is used. A bubble of perfluorocarbon liquid once the hyaloid is off the macula can sometimes be helpful in stabilizing the retina to avoid this complication. Also, one can use just enough suction to engage the gel into the mouth of the cutter then come off the foot pedal and just mechanically elevate the hyaloid with very little or no suction. Finally, the traumatic nature of this detachment with associated vitreous and subretinal hemorrhage places this patient at a high risk for PVR. Therefore, the decision to use silicone oil primarily was a good idea beyond the stated benefits of decreased need for postoperative positioning and earlier recovery of some functional vision.

Jason Hsu, MD
Retina Service of Wills Eye Hospital
Thomas Jefferson University Hospital
Mid Atlantic Retina
Philadelphia, PA

ABSTRACT: Globe perforation following retrobulbar or peribulbar anesthetic injection is a rare but dreaded complication that often results in suboptimal visual outcomes. This video describes a 72-year-old woman who sustained a globe perforation during retrobulbar block in the setting of cataract extraction and later developed a retinal detachment. The retina was repaired with pars plana vitrectomy and silicone oil, resulting in a favorable visual outcome. The authors discuss various modes of local anesthesia for vitreo-retinal surgery, risks for globe perforations, and how to approach retinal detachment secondary to needle perforations, which are complex cases at high risk for proliferative vitreoretinopathy.
A woman in her 70s with a history of a dense nuclear sclerotic cataract with best-correct visual acuity (BCVA) of 20/200 underwent retrobulbar block prior to cataract surgery due to language barriers. Intraoperatively, the eye was felt to be soft and the anterior chamber shallow; an intraocular lens was placed into the capsular bag uneventfully. On postoperative Day 1, the vision was measured to be hand motions, and the fundus examination disclosed inferior subretinal hemorrhage, which progressed to vitreous hemorrhage (VH) with a macula-involving retinal detachment (RD) by postoperative Week 1 (Panel A). She was brought back to the operating room the following day for a pars plana vitrectomy (PPV).

For our surgery, local anesthesia was achieved with a sub-Tenon’s block after inferior conjunctival cut down (Figure 1B). A posterior vitreous detachment was noted along with a rhegmatogenous RD extending from 1-o’clock to 7:30-o’clock inferior-temporally encroaching into the inferior macula. Subretinal hemorrhage was present along the inferotemporal arcade vessels, along with multiple retinal breaks in a linear fashion extending from nasally adjacent to the optic nerve toward the inferotemporal quadrant (Figure 1C). A total of six retinal breaks were found. A PPV with depressed shaving...
was completed with the assistance of dilute triamcinolone acetonide. A complete fluid-air exchange was performed to drain subretinal hemorrhage and fluid from the most posterior retinal break. Endolaser was then applied to surround each retinal break, and the air was completely exchanged for 1,000 centistoke silicone oil. At postoperative Month 1, the retina was attached under oil, and the decision was later made to remove the oil at postoperative Month 3. Six months following her initial surgery, the retina is still attached with a BCVA of 20/60 (Figure 1D).

Safe delivery of ophthalmic anesthesia is a crucial aspect of ophthalmic surgery. Although many ophthalmologists administer their own regional anesthetics for procedures, a recent survey of vitreoretinal surgeons found that the majority of patients undergoing vitreoretinal surgical cases receive local anesthesia from anesthesiologists.1 This trend was observed in anterior segment surgery, as well.2 A concern is that only a fraction of anesthesiologists receive regional ophthalmic anesthesia training during their residency,3 and this experience is not required for accreditation.4

Regional blocks include a number of potential complications. Adverse events may be systemic, such as seizure and cardiorespiratory arrest, or limited to the globe and ocular adnexa. Ophthalmic complications include those localized to the orbit (retrobulbar hematoma), muscles and cranial nerves (ptosis, diplopia, restrictive strabismus), posterior segment (retinal vein occlusion,5 retinal artery occlusion,6 retinal tear or RD), and optic nerve (traumatic optic neuropathy). The reported incidence of direct globe trauma ranges from 1:10,0007 to 1:40,0008 and is estimated to be 1:140 in eyes with an axial length greater than 26 mm.9

Retrospective case series of eyes with scleral perforation during peribulbar or retrobulbar anesthesia have shown unfavorable results. One study of nine cases over 17 years found that six had ambulatory vision only, one had no light perception, and only two recovered reading ability.10 Another series identified risk factors such as high myopia, previous placement of a scleral buckle, poor cooperation during injection, or an anesthesiologist delivering the block.11 Furthermore, it differentiated early complications (retinal breaks or hemorrhage, VH, RD, and choroidal hemorrhage from late complications (epiretinal membrane, optic atrophy, and recurrent RD, and hypotony). In one large series, the rate of RD following globe perforation was over 50%.12 These complications are frequently associated with VH and subretinal hemorrhage and have a high rate of proliferative vitreoretinopathy (PVR).11

In summary, repair of RD following globe perforation during regional anesthesia placement may be challenging. We recommend consideration of PPV with silicone oil, as many of these patients are at high risk for developing PVR.

REFERENCES


Nicolas A. Yannuzzi, MD, can be reached at the Department of Ophthalmology, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, 900 NW 17th Street, Miami, FL 33136; email: nicolas.yannuzzi@gmail.com.

Swarup S. Swaminathan, MD, can be reached at the Department of Ophthalmology, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, 900 NW 17th Street, Miami, FL 33136; email: swarups@gmail.com.

Rehan Hussain, MD, can be reached at the Department of Ophthalmology, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, 900 NW 17th Street, Miami, FL 33136; email: rhusain27@gmail.com.

Jason Hsu, MD, can be reached at the Retina Service of Wills Eye Hospital, Thomas Jefferson University, 840 Walnut Street, Suite 1020, Philadelphia, PA, 19107; email: jhsu@midatlanticretina.com.

Jayanth Sridhar, MD, can be reached at the Department of Ophthalmology, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, 900 NW 17th Street, Miami, FL 33136; email: jsridhar19@gmail.com.

Disclosures: Dr. Sridhar has received honoraria from Alcon, Allergan, and Thrombogenics. The remaining authors report no relevant financial disclosures.

doi: 10.3928/23258160-20200326-08