



Dropped nucleus postintra vitreal injection with intact anterior capsule: a case report

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Introduction and importance: The aim was to describe a case of inadvertent posteriorly dislocated lens nucleus after intravitreal injection (IVI) for diabetic retinopathy, highlighting the importance of adherence to the standard protocol of IVI.

Case presentation: A 58-year-old female with uncontrolled type 2 diabetes mellitus presented with decreased vision bilaterally. At presentation, the anterior segment of both eyes showed nuclear sclerosis +2. Fundus examination of the left eye was not visible due to diffuse vitreous hemorrhage, for which an intravitreal ranibizumab injection was given. She presented for follow-up 3 weeks later; an aphakic left eye was discovered during the examination. A dropped nucleus was diagnosed, and the patient underwent an uneventful pars plana vitrectomy with removal of the dropped nucleus and implantation of a sulcus three-piece intraocular lens. Postoperatively, the vision had improved from hand motion to 6/18. Clinical discussion: this case presentation reports an unusual complication of a dropped lens nucleus after IVI. It highlights the possibility of inadvertent lens trauma in such a procedure and the importance of proper adherence to standards to avoid such a complication.

Conclusion: This rare complication highlights the importance of carefully following IVI guidelines in the hands of experienced ophthalmologists and the need for meticulous supervision for ophthalmology residents because it is not a risk-free procedure.

Keywords: case report, diabetic retinopathy, dropped nucleus, intravitreal injection, vitreous hemorrhage

Introduction

Recently, the use of antivascular endothelial growth factor intravitreal injections (IVIs) in the management of retinal diseases has been dramatically increased by many ophthalmologists^[1]. It has been considered vital in managing a broad range of ocular diseases, such as diabetic macular edema, wet age-related macular degeneration, and macular edema associated with retinal vein occlusion. Despite antivascular endothelial growth factor agents' generally acceptable safety profile, the procedure itself is associated with few ocular and systemic side effects^[2,3]. The most devastating complication was endophthalmitis, which occurred in around 1 in 5000 patients^[4]. Other studies reported adverse events, including elevated intraocular pressure, noninfectious uveitis, rhegmatogenous retinal detachment, vitreous hemorrhage (VH), choroidal detachment, and subconjunctival hemorrhage^[5]. This report describes a rare case of posterior lens nucleus dislocation and traumatic cataract following IVI. To the

HIGHLIGHTS

- Intravitreal injection procedures are common, and complications may occur.
- Pay careful attention to the intravitreal injection procedure steps to avoid damaging the lens.
- Training medical personnel on adhering to injection guidelines.
- Explanation of the procedure and proper anesthesia to optimize patient outcome.

best of the knowledge, this is the second reported case of this rare complication.

This case report complies with the guidelines for human studies in accordance with the World Medical Association Declaration of Helsinki. The patient presented in this case report provided written informed consent to publish this case (including publication of images). This case report has been exempted from approval by the Institutional Review Board (IRB) at the Hashemite University. This case report has been reported in line with the SCARE Criteria^[6].

Presentation of case

A 58-year-old female patient with an 18-year history of uncontrolled type 2 diabetes mellitus on Metformin 850 mg tid and an HbA1c of 9.6 presented with a 2-week history of decreased vision in both eyes (OU). She had been previously treated with pan-retinal photocoagulation, after which she had a stable ophthalmic course. No previous history of IVIs exists. She is a known case of ischemic heart disease on Aspirin 325 QD. No drug or food allergy declared by patient. Family and social history were

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irrelevant to her case. On examination, the best-corrected visual acuity (BCVA) was 3/60 for the right eye (OD) and hand motion for the left eye (OS). The anterior segment of both eyes showed nuclear sclerosis +2, and intraocular pressure was 15 mm Hg OD and 16 mm Hg OS. Fundus examination OD showed trace VH and retinal laser marks, while OS examination was not possible due to diffuse VH. We explained the findings to the patient and suggested either waiting for 1 month or proceeding with IVI ranibizumab. Diagnostic B-scan ophthalmic ultrasonography was performed and showed a flat retina in the left eye. The patient declined to take IVI at our office. Then, the patient was lost to follow-up without receiving any treatment.

One month later, she came back 3 weeks after having received IVI from a second-year ophthalmology resident in a teaching public hospital. She was complaining of no vision improvement in the left eye. BCVA OS was hand motion. Slit-lamp examination of her left eye revealed anterior chamber cells +1, aphakia with preserved anterior capsule, and a tear in the posterior capsule. This is shown in an intraoperative image (Fig. 1). B-scan ultrasonography at OS has confirmed the presence of a dropped nucleus and the VH that was previously reported. We discussed the findings with the patient, and she agreed to proceed with surgery.

Based on the diagnosis of a dropped nucleus after inadvertent intravitreal ranibizumab injection, the patient underwent an uneventful 23-gauge pars plana vitrectomy under local anesthesia. Surgery aimed at dropped lens removal, VH clearance, core and peripheral vitrectomy, endolaser, and implantation of a three-piece intraocular lens (IOL) in the ciliary sulcus (Fig. 2). Surgery was performed using the Stellaris PC (Bausch&Lomb) vitrectomy machine by an experienced vitreoretinal surgeon (M.A.).

Her postoperative course was uneventful. On the fourth month postoperatively, BCVA had improved to 6/18 with a quiet anterior chamber, a stable IOL, quiescent proliferative diabetic retinopathy, and good retinal perfusion. On the other hand, the right BCVA deteriorated due to dense VH, for which a pars plana

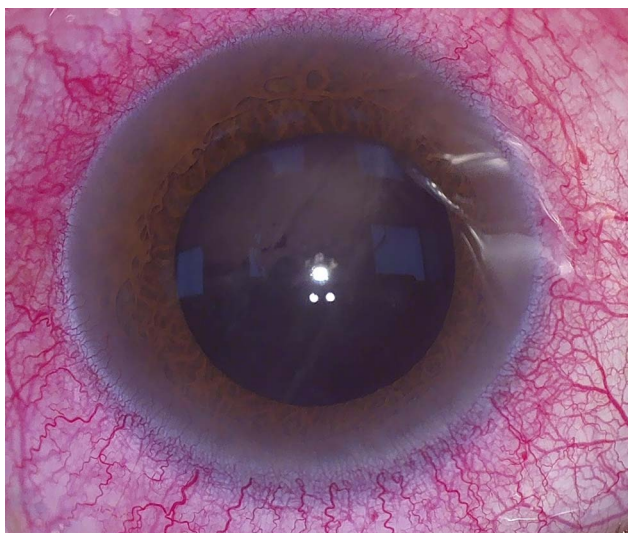


Figure 1. Intraoperative anterior segment image showing an empty capsular bag with an intact anterior capsule and posterior capsule in the vertical ear. The whitish reflex in the background is the dropped nucleus.

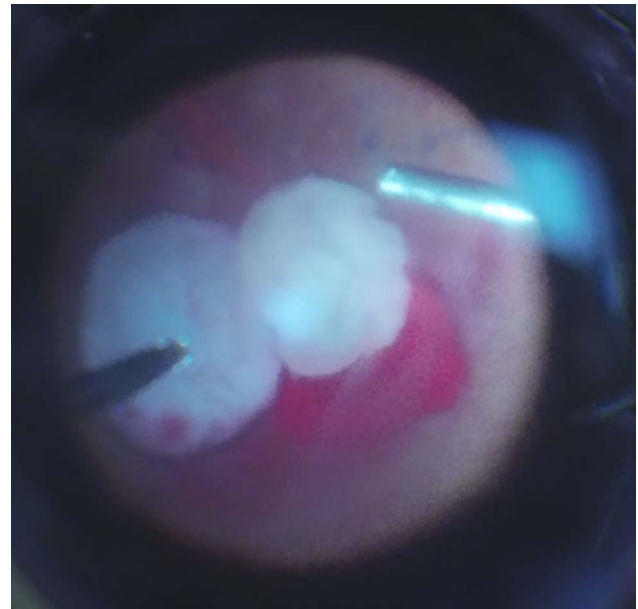


Figure 2. Intraoperative image for the dropped nucleus and epinucleus.

vitrectomy was planned. However, the patient was lost to follow-up afterward.

Discussion

Although IVI is a minimally invasive and relatively safe procedure, there are reports of rare adverse events, including inadvertent capsule penetration, IOL displacement, and vitreous prolapse^[5,7,8]. Jonas *et al.*^[8] reported a low incidence of 0.06% of rapidly progressive traumatic cataracts among 5403 IVI. This report presents a case of the dropped nucleus after an ranibizumab IVI secondary to inadvertent intravitreal ranibizumab injection. This rare complication was reported in 2013 following a bevacizumab injection^[9]. It must be noted that the patient moved the eye during the procedure. In the present case, we postulate some possible causes of this complication, including patient movement during the procedure, an inexperienced surgeon, misdirection of the needle angle, or a slightly anterior injection site.

Needle perforation of the lens substance usually directly leads to lens opacity formation, either localized along the tract of perforation or generalized, causing traumatic cataract. In the current case, the cataract was present before IVI, the lens displaced posteriorly with an intact anterior capsule, and there was a tear in the posterior capsule. This can occur secondary to an inadvertent breach of the posterior capsule with extensive eye rubbing by the patient. Another possible explanation is that the inadvertent injection of ranibizumab between the nucleus and the lens capsule led to increased intralenticular pressure and a breached posterior capsule that eventually led to forceful dislocation of the nucleus and epinucleus into the vitreous cavity.

The clinical scenario of this case emphasizes the importance of careful attention while performing IVI to avoid potential lens damage. The exact injection procedure should include explaining the technique in detail to the patient and providing sufficient warning just before the IVI. In addition to ensuring adequate

anesthesia and determining the proper injection site, most surgeons place the needle 3.5 mm from the limbus in pseudophakic and aphakic eyes and 4.0 mm from the limbus in phakic eyes. Moreover, the use of a 27-gauge or 30-gauge short needle, along with maintaining the proper orientation of the hand at a suitable distance from the limbus, either toward the mid-vitreous or toward the posterior pole, is recommended. According to surgeon preference, the procedure can be done under direct vision, under a microscope, or through an indirect ophthalmoscope^[10,11].

Even though this case describes a rare complication that is unlikely to be encountered after IVIs, even with inadvertent lens injury, it highlights to caregivers the importance of adherence to the guidelines of IVI to avoid such aggressive complications and optimize patient outcome. Furthermore, it is also mandatory to explain the procedure to patients and give them clear instructions about the postoperative period and the importance of reporting any adverse events. In our case, one possible explanation for the delay in presentation is that the patient already had poor vision due to VH, which masked the incident of lens complication that followed the injection procedure.

Conclusions

The widespread use of IVI and the possible need for repeated injections in many ocular pathologies raise the necessity for careful attention to the procedure steps to avoid damaging the lens. Training medical personnel responsible for IVI to adhere to injection guidelines is crucial. Proper preparations of the patient, including an explanation of the procedure and proper anesthesia, will ensure optimum cooperation of the patient.

Ethical approval

This study protocol was reviewed, and the need for approval was waived by the Institutional Review Board at the Hashemite University since ethical approval is not required for this study in accordance with local or national guidelines.

Consent

Written informed consent was obtained from the patient for the publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Author Contribution

M.A.-L.: concept, design, data collection and writing the paper.
R.S.: data collection and writing the paper.

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