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CASE REPORT

Harpoon technique for the management of dropped nucleus

Salih Sertac Azarsiz, Erol Erkan

Department of Ophthalmology, Bakircay University Cigli Training and Research Hospital, Izmir, Türkiye

Abstract

Cataract extraction has various complications but dropped lens material should be properly managed to prevent further complications and visual impairment. We describe a cost-effective technique to deal with dropped nucleus using 26G IV cannula as a harpoon to fixate the lens. After performing complete standard vitrectomy, 26G IV cannula is inserted into the lens material and elevated up to anterior chamber for safe removal with phacoemulsification. Out technique is cost-effective and provides the maximum preventive measures for possible retinal damage and safe removal of the lens material.

Keywords: Lens dislocation; perfluorocarbon liquid; vitrectomy.

Despite recent advancements in cataract extraction techniques, dropped lens fragments or total lens material are still encountered regardless of experience and surgical inventory. According to EUROQUO data; in 1,687,635 reported cataract extractions, 1199 (0.071%) dropped nucleus cases were reported.[1] Retained lens material can impede the high post-operative visual expectations of patients and rise anterior segment surgeon's anxiety about the prognosis of the patient. Timely and wisely management of the situation is vital for both patient and surgeon.

Since microincision vitrectomy became preferred method over classical larger incision surgeries; alternative techniques to manage the dropped nucleus without using fragmatome are sought and reported.[2,3] It is essential to perform a complete vitrectomy with maximum effort to clean vitreous base where unnoticed small breaks or holes may cause consecutive retinal detachments.

Herein, we reported a case of dropped lens material retrieved to anterior chamber using 26G intravenous cannula as a harpoon to fixate the lens material and then phacoemulsified through clear corneal incision.

Case Report

We placed standard 25-gauge trocars in appropriate locations. Before fixating the lens material with 26G intravenous cannula, complete vitrectomy with careful removal of the posterior vitreous around the dropped lens and vitreous base was performed using a Constellation Vision System (Alcon Laboratories, Inc., Fort Worth, TX). It is essential to perform a complete vitrectomy with maximum effort to clean vitreous base where unnoticed small breaks or holes may cause consecutive retinal detachments. Instead of perfluorocarbon liquids (PFCL); hydroxypropyl methylcellulose was used to float the lens material to prevent iatrogenic damage to macula. 26G IV cannula was inserted using the non-dominant hand and used as a harpoon to fixate the lens material.

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Correspondence: Erol Erkan, M.D. Department of Ophthalmology, Bakircay University Cigli Training and Research Hospital, Izmir, Türkiye
Phone: +90 505 386 69 65 **E-mail:** erolerkan@gmail.com
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After the initial contact; with the help of light pipe, IV cannula was further penetrated into the lens material for firm control. As rotating movement of the IV cannula-lens material was seen; we elevated them in a careful manner up to the pupillary zone. The dominant hand was then freed to use the phacoemulsifier through the pre-made clear corneal incision to perform phacoemulsification and lens removal quickly and efficiently. Care should be taken to avoid fragmentation of lens material; if not, dropped bigger pieces could be brought up to the anterior chamber using IV cannula or smaller parts could be managed with cutter inside the vitreous cavity. A 3-piece intraocular lens (IOL) was inserted through the clear corneal incision and sutureless intrascleral fixation of 3-piece IOL was performed (Fig. 1), (see Video, Supplemental Digital Content 1, harpoon technique).

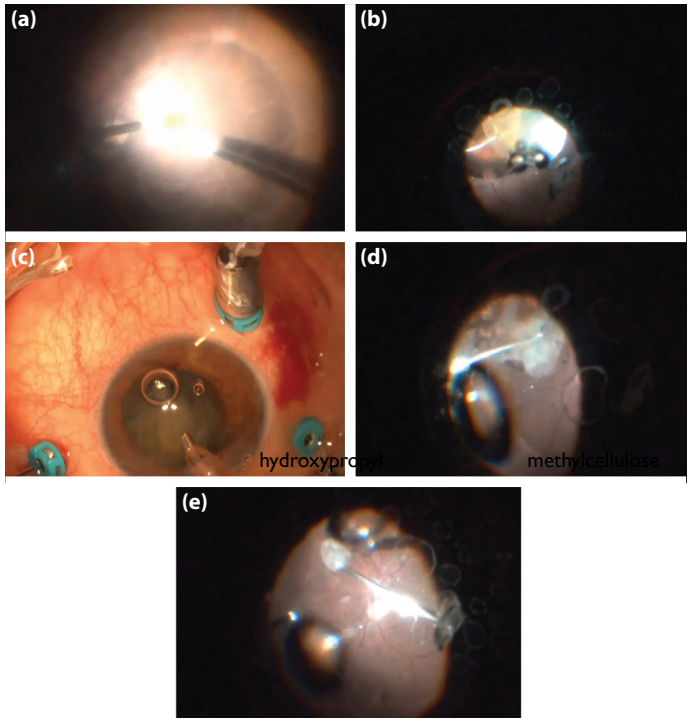

Fig. 1. **(a)** Establishing hydroxypropyl methylcellulose cushion over the macula, **(b)** fixation of nucleus with 26G IV cannula, **(c)** elevating nucleus up to pupillary zone, **(d)** re-fixation of retained bigger nuclear fragments, and **(e)** aspiration of smaller nuclear fragments with cutter.

Patient characteristics and data are shown in Table 1. Our study included four eyes of four patients. Patients' informed consents were obtained for case series. Mean age of the patients was 67, 25. All of the patients were initially operated in our department and cause of dropped nucleus was identical as zonular weakness. Three patients had immediate pars plana vitrectomy on dropped nucleus under peribulbar anesthesia whereas one patient had delayed surgery, on the next day of dropped nucleus. After pars plana vitrectomy, Yamane double-needle intrascleral lens fixation technique was used in all patients with MA60AC lens. We did not encounter any serious complications such as retinal detachment, vitreous hemorrhage, tilting or dislocation of IOL, endophthalmitis, or hypotony. One patient had prominent corneal edema with Descemet folds at post-operative 1st day, but resolved at 1st week follow-up with topical sodium chloride 5% qid.

Conclusion

Tackling the dropped nucleus is a subject of discussion from the early years of phacoemulsification up to date.[4] Early recognition of an impending dropped nucleus is of paramount importance and proper management could be possible without losing the lens down to vitreous cavity.[5,6] Technique that we described above requires no additional instrument apart from a 26G IV cannula and can be applied to cataracts of various grades. In kebab technique described by Aso et al., PFCL use was interpreted as a cause of extra cost.[3] We agree this interpretation in a cost-effective way of perspective but we still advocate a barrier between the lens material and retina is beneficial, as hydroxypropyl methylcellulose in our cases. Hydroxypropyl methylcellulose is cheaper than both PFCL and retina as in ophthalmic viscosurgical device versus vitreous. All in all, advantages of our technique are avoiding use of PFCL for floating the lens or protecting posterior pole and using a single 26G IV cannula which is readily available in any operating room. Inattentive embedment of IV cannula into the dropped nucleus may result in retinal or deeper penetration. Inadvertent damage to retina and other tissues

Table 1. Individual patient data (HM)

Case	Age/Sex	Grade of Nuclear Sclerosis	Immediate surgery	Axial Length	BCVA		IOP	
					Preop	Postop 1 month	Preop	Postop 1 month
1	64/F	5	Yes		HM	1.0	15	12
2	72/M	4	No		0.2	0.9	16	14
3	70/F	4	Yes		0.1	0.9	19	12
4	63/M	3	Yes		0.2	1.0	16	11

HM: Hand motion.

should be avoided with maximum effort in a patient with an existing complication.

Informed Consent: Written informed consent was obtained from the patients for the publication of the case report and the accompanying images.

Peer-review: Externally peer-reviewed.

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