

# Intravitreal Triamcinolone Acetonide Injection at the Time of Pars Plana Vitrectomy for Retained Lens Material

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**Purpose:** To report the experiences at our institute of pars plana vitrectomy (PPV) in combination with intravitreal triamcinolone acetonide (IVTA) injection in patients with retained lens material after cataract surgery.

**Methods:** The medical records of patients who underwent PPV between January 2005 and December 2006 after complicated cataract surgery in which lens material was dropped into the vitreous cavity were reviewed retrospectively.

**Results:** Five eyes of five patients were treated by vitrectomy and removal of the dislocated lens material and were administered an adjuvant intravitreal injection of 4 mg triamcinolone acetonide at the end of surgery. IVTA administration induced a rapid improvement in vision within six weeks postoperatively. Final visual acuity was 20/32 or better in all patients. Inflammatory cystoid macular edema (CME) that existed preoperatively was promptly improved after IVTA. Intraocular pressure increased transiently in one patient. No procedure-related complications were observed.

**Conclusions:** PPV with additional IVTA was successfully performed in five eyes with retained lens material and resulted in a marked resolution of vitreous inflammation, an improvement in CME and rapid visual recovery. The authors recommend that IVTA administration should be investigated more thoroughly as an adjunct during the management of retained lens material.

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**Key Words:** Cataract, Cystoid macular edema, Dropped nucleus, Retained lens material, Triamcinolone acetonide

The loss of a crystalline lens into the vitreous during cataract surgery is an uncommon but potentially serious complication. Dislocation of nuclear or cortical material into the vitreous can result in corneal edema, secondary glaucoma, vitritis, cystoid macular edema (CME), and retinal detachment, as well as reduced vision.<sup>1</sup>

Although pars plana vitrectomy (PPV) is an established treatment modality for retained lens material, serious late complications have been reported after PPV, e.g., persistent CME, epimacular proliferation and choroidal detachment.<sup>2-4</sup> Intravitreal triamcinolone (IVTA) was introduced for the less invasive treatment of retinal inflammatory and edematous conditions, and this method has become popular for the treatment of macular edema of various etiologies.<sup>5,6</sup>

The authors suggest that IVTA combined with PPV might be helpful for reducing inflammation and macular edema in patients with retained lens material. We also thought that the concurrent use of IVTA and PPV is both convenient and efficient, and that it would reduce the need for postoperative steroid administration. The present study was undertaken to document our experience of the use of IVTA in combination with PPV in patients with retained lens material.

## Materials and Methods

The medical records of patients treated at the retina department of Inha University Hospital from January 2005 to December 2006 who underwent PPV after complicated cataract surgery in which lens material was dropped into the vitreous cavity were retrospectively reviewed. Five eyes of five patients who received PPV and additional IVTA at the same time for the treatment of retained lens material were included in this study. Patients with coexisting macular disease (i.e., advanced age-related macular degeneration, diabetic retinopathy, retinal vein occlusion, and visually significant macular pucker) were excluded.

These five patients were treated by standard three-port PPV, lens fragment removal and adjuvant IVTA under retrobulbar anesthesia. All procedures were performed by the

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same surgeon. Lens fragments were removed using an ultrasound phacoemulsifier and/or a vitreous cutter, and then intraocular lenses (IOL) were properly implanted. Inspection of the retinal periphery with scleral depression and treatment of any peripheral retinal breaks were routinely performed at the conclusion of surgery. Sclerotomy sites were closed with 7-0 polyglactin (Vicryl). IVTA was performed in the same surgical field immediately after the conclusion of vitrectomy. Triamcinolone acetonide was injected into the vitreous inferotemporally (4 mg in 0.1 mL) where the infusion cannula was removed, using a 30-gauge needle. IVTA was used to resolve macular edema and inflammatory response. The procedure was concluded with the subconjunctival injection of antibiotics. No other systemic corticosteroid was subsequently administered.

During postoperative follow-up, topical antibiotics and steroid eyedrops (fluorometholone 0.1%) were administered for four to five weeks. All participants underwent slit-lamp examination, fundus examination, Goldmann applanation tonometry, and best-corrected visual acuity (BCVA) testing at each visit. Inflammatory activity was judged by the presence of cells in the anterior chamber or the vitreous cavity. Optical coherence tomography (OCT) (Stratus Zeiss Humphrey, San Leandro, CA, USA) was performed six months after IVTA combined with PPV.

## Results

The five participants included by retrospective chart review had the following characteristics: (1) referral after complicated cataract surgery in which lens material had been dropped into the vitreous cavity; (2) over a one-week interval to PPV after complicated cataract surgery; (3) symptomatic vision loss from CME in the involved eye, which was diagnosed either before or during PPV; and (4) the presence of marked postoperative inflammatory response in the involved eye that obscured retinal details.

Pretreatment characteristics and the results of PPV and IVTA are summarized in Table 1. Five participants between the ages of 58-79 years (mean±SD; 71.0±7.906) were followed for at least six months (range: six to eight months). Of these five patients with retained lens material, two patients had dense nuclei. Other preexisting eye conditions included diabetic mellitus and primary open-angle glaucoma. At the time of cataract surgery, three patients underwent anterior vitrectomy combined with phacoemulsification.

Visual acuities at the initial visits ranged from 20/200 to hand movement (HM). One patient had an intraocular pressure of greater than 25 mmHg at the time of referral. All patients showed mild to moderate corneal edema. However, no patient presented with a level of corneal edema that interfered with fundus visibility during vitrectomy. The average time between the complicated cataract operation and PPV was 15.0±5.701 days.

Three patients already had an intraocular lens (IOL) in the

sulcus at the time of referral, thus we reapplied it as it was. The IOL that had dislocated into the vitreous in one patient was retrieved at the time of PPV. In one eye left aphakic before PPV, the state of the capsule was assessed and a posterior chamber intraocular lens (PCIOL) was inserted into the sulcus because adequate capsular support was present. None of the eyes was left aphakic after our study.

An improvement in both inflammation and visual acuity was noted in all cases within one to two weeks after the procedure. By six weeks after treatment, visual acuity in the affected eyes had increased from HM to 20/50, from 20/200 to 20/25, from counting fingers (CF) to 20/32, from CF to 20/40, and from HM to 20/40. Final visual acuity at the last follow-up (mean±SD; 27.2±3.633 weeks) was 20/32 or better in all eyes (range: 20/32 to 20/25). Inflammatory CME that existed preoperatively in these patients quickly improved after IVTA. An OCT scan in one patient revealed a decrease in retinal edema at two weeks postoperatively and no recurrence at six months.

No procedure-related complications were observed in any patient. One patient experienced a transient postoperative elevation in intraocular pressure of 32 mmHg that resolved quickly after instilling topical brimonidine. Late complications, such as persistent CME or retinal detachment, were not encountered.

## Discussion

PPV with additional IVTA was successfully performed in five eyes with retained lens material and resulted in a marked resolution of vitreous inflammation, a prompt improvement in CME and rapid visual recovery. The effect of IVTA plus PPV was as we had hoped, and no extraordinary complications occurred.

There is some basis for recommending IVTA as safe adjunctive option for the treatment of retained lens material. First, the advantages of PPV plus IVTA in our patients were rapid and effective reduction in inflammation and quick improvement of vision. Though visual acuity in many patients with retained lens material might be improved spontaneously after removal of the lens material, prompt visual rehabilitation is preferable because both physicians and patients require rapid visual recovery in these complicated cases. The results of the present study suggest that IVTA provides an effective tool during the treatment of retained lens material because it shortens the duration of inflammation and quickly increases visual acuity.

Second, we found that IVTA during PPV benefits patients with CME, which is the main macular pathology underlying poor visual acuity in cases with retained lens material. It is generally accepted that complicated cataract surgery increases the risk of CME.<sup>7</sup> CME in cases of retained lens material appears to be related to increased levels of inflammatory mediators released by uveal tissues, and this is known to occur when the anterior hyaloid face is ruptured and/or when

**Table 1.** Baseline characteristics and visual acuity changes of five eyes (five patients) that underwent combined pars plana vitrectomy and intravitreal triamcinolone acetate injection for retained lens material after complicated cataract surgery

Age /Sex	Eye	Preop. cular risk factors	Cataract surgery	Lens status	Clinical features at presentation					Intervention (PPV plus IVTA)					Postoperative status					
					BCVA	IOP	Corneal edema	Anterior chamber	Vitreous opacity	Retina	Interval to PPV (days)	IOL	POD #1 BCVA	POD #1 IOP	Postop. complication	Change in VA			F/U (wks)	
					HM	CF	HM	Cell 4+	Moderate	CME	7	IOL retrieve	CF	10	None	20/80	20/63	20/50	20/32	30
1	72/M	L	DM	Phaco	Dislocated IOL in vitreous	27	Mild	Cell 4+ Lens cortex	Moderate	CME	7	IOL retrieve	CF	10	None	20/80	20/63	20/50	20/32	30
2	79/F	R	Small fissure	Phaco	IOL in sulcus	20/200	Mild	Cell 2+	Moderate	CME	14	IOL as it was	20/200	11	None	20/100	20/63	20/25	20/32	24
3	71/F	L	Mature cataract	Phaco + Anterior vitrectomy	IOL in sulcus	CF	10	Moderate	Severe	CME Vascular sheathing	20	IOL as it was	20/400	32	IOP increase	20/100	20/63	20/32	20/25	32
4	58/M	L	DM POAG	Phaco + Anterior vitrectomy	Aphakia	CF	14	Mild	Moderate	CME	21	IOL fixation in sulcus	20/250	18	None	20/63	20/50	20/40	20/25	24
5	75/M	R	Mature cataract	Phaco + Anterior vitrectomy	IOL in sulcus	HM	17	Moderate	Severe	CME	13	IOL as it was	CF	13	None	20/100	20/63	20/40	20/32	26

BCVA = best corrected visual acuity; CF = counting fingers; CME = cystoid macular edema; DM = diabetes mellitus; F/U = follow up; HM = hand movement; IOL = intraocular lens; IOP = intraocular pressure; IVTA = intravitreal injection of triamcinolone acetate; Phaco = phacoemulsification; PPV = pars plana vitrectomy; PSCO = posterior subcapsular opacity; VA = visual acuity.  
\* VA at last follow-up

lens fragments are retained.<sup>8</sup> Moreover, surgical procedures in patients with an inflamed eye are associated with a higher incidence of CME.<sup>9</sup> Corticosteroids are administered during CME treatment to inhibit the biosynthetic pathways of arachidonic acid and also to stabilize the blood-retinal barrier.<sup>10</sup> We consider that adjuvant IVTA at the time of PPV in cases of retained lens material could have an additional benefit on CME recovery and on the prevention of persistent CME.

Third, combining IVTA injection and PPV is advantageous because it reduces effort and time. IVTA can be conveniently performed at the time of PPV, and this reduces the need for additional treatment after surgery by achieving a therapeutic concentration of intraocular steroids.

Fourth, combined IVTA/PPV was performed safely in our participants. The reported complications of IVTA include: secondary ocular hypertension, a medically uncontrollable high IOP, steroid-induced cataract, and rarely, endophthalmitis. In our patients, we were not concerned about cataract formation because crystalline lenses had already been removed. One patient experienced an IOP increase but stabilized in three days. In fact, IVTA shows a somewhat limited effect in vitrectomized eyes because of a faster clearance of triamcinolone acetonide (TA) in the eye.<sup>11</sup> However, a faster clearance of TA was actually rather advantageous to our cases because it lowered the possibility of complications of IVTA.

We recognize that the present study is limited by its small sample size, non-homogeneous cases, lack of a control group, and relatively short follow-up. However, despite these limitations, we found that additional IVTA during PPV in selected cases is safe and that it can promote visual rehabilitation. More detailed study is required to determine the role of additional IVTA during the management of patients with retained lens material.

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