Intraocular pressure after triamcinolone acetonide assisted anterior vitrectomy in patients with posterior capsular rent during cataract surgery

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Abstract

Aim of the Study: To study the postoperative intraocular pressure (IOP) and best corrected visual acuity (BCVA)after triamcinolone acetonide assisted anterior vitrectomy in patients who had posterior capsular rent during cataract surgery Materials and Methods: A prospective study was done in thirty patients(18 females and 12 males) who underwent triamcinolone assisted anterior vitrectomy during complicated cataract surgery. Slit lamp biomicroscopic examination, visual acquity, and IOP measurements were done at baseline (preoperatively) and 24hour, one week and permonthly until six months postoperatively. All surgeries were done under peribulbaranaesthesia. Phacoemulsification was done in all patients. Clear corneal tunnel in twenty five patients and sclera tunnel in five patients who had very hard cataract (nuclear scelerosis grade - V) were made. Results: The mean preoperative IOP was 17.0±2.0 mm Hg, and mean postoperative IOP was 18±3.0 at follow up time (p<0.05). The mean preoperative BCVA was 0.6 log MAR, and mean postoperative BCVA was 0.20 log MAR at six months (p < 0.001). Retinal detachment, endophthalmitis were not observed. Conclusion: Triamcinolone acetonide when used for anterior vitrectomy during complicated cataract surgery had no effect on IOP at six months.

Key Words: Anterior vitrectomy, Cataract surgery, Triamcinolone acetonide, Intraocular pressure.

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INTRODUCTION

Triamcinolone acetonide (TA) is a corticosteroid that has been used for a variety of intraocular treatments, since a long time to treat many ophthalmic diseases.^{1,2} It is a depot corticosteriod with low water solubility, which contributes to its prolonged action. In the treatment of cystoid macular oedema it is used intravitreally and in severe vernal conjunctivitis it is used subtarsally. In cases of posterior capsule rupture with vitreous prolapse during cataract surgery thorough anterior vitrectomy is required to prevent complications like raised intraocular pressure, cystoids macular oedema, endothelial damage, retinal detachment, updrawn pupil and endophthalmitis.^{3,4} As the vitreous is transparent triamcinolone acetonide is used to enhance the visualization of vitreous in the anterior chamber of eye during surgery thereby, helping in effective anterior vitrectomy.⁵ Preservative free TA can be used in anterior segment surgery to help manage vitreous loss during cataract surgery and also it has been widely used for staining the vitreous in pars plana vitrectomy.⁶⁻⁸ A lot of studies have reported an increased rate of glaucoma after the use of TA for intraocular treatments.⁹⁻¹¹ Furthermore, loss of vitreous rate is1.92% in cataract surgery¹² and it is animportant complication for surgeons and patients. Herein, we report the sixmonth follow-up results of intraocular pressure (IOP) of

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thirty patients who underwent TA-assisted anterior vitrectomy secondary to posterior capsule rupture and vitreous loss.

MATERIALS AND METHODS

This prospective study was carried out at Kamineni Academy of Medical Sciences and Research Centre, Hyderabad and Shri Netralaya eye hospital, Hyderabad. This study included 30 eyes of 30 (18 female, 12 male) patients who underwent phacoemulsification, TA assisted anterior vitrectomy plus intraocular lens implantation surgery. The mean age of the patients was 65 ± 5.4 years (range, 38-79 years). Patients who had preoperative ocular hypertension, glaucoma, maculopathy, retinopathy and history of amblyopia were excluded from the study. Institutional ethics committee clearance was obtained prior to the surgery. A written and informed consent was obtained from all patients before cataract surgery. Best corrected visual acuity was measured using Snellen's visual acuity chart. Detailed slit lamp and dilated fundus examination and IOP recording with Goldman applanation tonometry was done in all patients. All patients were operated by the same surgeon with more than five years of experience. Patients were dilated with mydriatic- cycloplegic drops and non-steroidal antiinflammatory drops were used to maintain the dilatation. Peribulbar block with 3ml of 2% xylocaine and 5 ml of bupivacaine with 150 units /ml of hyaluronidase was given in all patients. Povidone-iodine5% was instilled into the conjunctival sac. Clear corneal tunnel (2.8mm) was made in twenty five patients and scleral tunnel was made in five patients who had hard cataracts (nuclear sclerosis grade - V. Two clear corneal side ports were made 160- 180 degree apart with MVR knife After the anterior chamber was filled with an air bubble in all patients trypan blue dve (0.1%) was injected intracamerally to stain the anterior capsule. Continuous curvilinear capsulorhexis of size 5 to 5.5mm was done in all cases. After doing hydrodissection and nuclear rotation phacoemulsification was started. Twenty two patients had posterior capsular rent during phacoemulsification which was recognized early and converted to small incision cataract surgery. Rest 8 patients had posterior capsular rent during irrigation and aspiration. Anterior chamber was filled with viscoelastic solution(hydroxyl propyl methylcellulose). Vitreous present in the tunnel was swiped back to anterior chamber. For the anterior vitrectomy, we used 40 mg/mL of commercially available TA (Kenalog; Bristol Myers Squibb, Ux bridge, UK) diluted with 1 ml of balanced salt solution to a final concentration of 20 mg/mL (working solution), to stain the vitreous, this solution was injected into the anterior chamber. After staining of vitreous by

TA, vitrectomy was performed with the same system used for phacoemulsification. All cortical matter was removed by dry vitrectomy. All patients had intraocular lens implanted within the capsular bag or ciliary sulcus depending on the size of the posterior capsule rent. Single piece foldable IOL was put in five patients in the capsular bag who were having small posterior capsular rent after extending the tunnel to 3.2mm.Three piece foldable IOL were put in ciliary sulcus in rest twenty five patients who had large posterior capsule rent Then the viscoelastic agents were removed from the eye, as much as possible, using irrigation-aspirationand any residual TA was also washed out. At the end of the surgery tunnel was sutured with one 10-0 nylon suture. Side port was hydrated with BSS. Pad and Bandage was put for 24 hours. Patients having nuclear drop were not included in this study. Postoperatively, patients were put on topical antibioticmoxifloxacilin eye drops four times daily for two weeks and prednisolone eve drop 6x5 x4x3 x2x1 tapered over 6 weeks. Patients were followed on the postoperative day 1, day 7 and one monthly interval for six months. BCVA, slit lamp examination and IOP recording with Goldmannapplanation tonometry was done in all patients during follow- ups.

Visual acquity (VA) in the study was measured using the Snellen VA chart and values were converted to logMAR for statistical analysis.

RESULTS

Data for 30 eyes of 30 patients were recorded. The mean age was 65 ± 5.4 years and follow up time was 6 ± 3.2 months. (Table-1) The mean preoperative BCVA was 0.6 logMAR and mean postoperative BCVA was 0.20 logMAR at 6 months (p< 0.001). The mean preoperative IOP was 17.0 ± 2.0 mm Hg, mean postoperative IOP was 18.0 ± 3.0 mm Hg at 6 months. There was no significant increase in the IOP when compared with baseline values at 6 months (p = 0.05). (Table-2) Two patients had IOP of more than 24.0 mm Hg on the postoperative first day. These patients used topical dorzolamide/timolol, 2 times/day till one month. None of the patients required antiglaucoma drugs after the first postoperative month during follow up period. Retinal detachment, and endophthalmitis were not recorded.

 Table 1: Demographic features of patients

Parameters	(n=30 patients)	
Age in years	65±5.4 (38-79)	
Gender(Female/Male)	18/ 12	
Follow-up (months)	6	

	and IOP		
Parameters	Preop.	Postop.	n
	(n=30 eyes)	(n= 30 eyes)	٣
BCVA (logMAR)	0.62±0, 12	0.20±0.20	<0.001
IOP mm Hg	17± 2.0	18±3.0	<0.05
Retinal detachment	0	0	
Endophthalmitis	0	0	

Table 2: Preoperative and six month postoperative values of BCVA

BCVA: best corrected visual acuity; **IOP:** intraocular pressure; p: the level of statistical significance.

DISCUSSION

Vitreous loss during cataract surgery can cause glaucoma, cystoid macular edema, endopthalmitis, rhegmatogenous retinal detachment, intraocular lens displacment, uveitis, corneal decompensation and fibrous ingrowth.¹³⁻¹⁵ The meticulous removal of all vitreous tissue within the anterior chamber is important to prevent subsequent complications both in adults and paediatric patients.¹⁶⁻¹⁹ Triamcinoloneacetonidegives good visualization of the vitreous. Triamcinolone acetonide is a water insoluble steroid. It inhibits the inflammatory process. A study reported favorable visual acuity outcome in most of the patients underwent cataract surgery complicated by posterior capsule rupture.¹⁴ In the present clinical study, the mean BCVA was 0.20 logMAR and mean IOP was 17.0±2.0 mm Hg at the end of follow up period. Visual acuity was increased in all patients. Praveen *et al*²⁰ have recorded increased IOP in some patients after TA assisted anterior vitrectomy after 3 months. Triamcinolone acetonide when used intravitreally caused elevation of IOP in up to 30% of the patients.^{21,22} The IOP elevation effect of intravitreal TA is delayed and dose dependent. ^[23]In our study, we noticed good staining and visualization of vitreous prolapsed into the anterior chamber and the IOP was more than 24.0 mm Hg in two patients on first postoperative day. Antiglaucomatous drugs were started immediately and continued for one month. None of the patients required surgical intervention for glaucoma after the cataract surgery and anterior vitrectomy. The elevation of IOP on the first postoperative day was likely due to the pharmacokinetic effect of viscoelastic substance. Use of preservative-free triamciloneacetonide enhances visualization of the vitreous gel as the triamcinolone acetonide particles are captured by the vitreous gel. Use of triamcinolone acetonide raises concern regarding its potential side effects like elevated IOP, and endophthalmitis.²⁴ In the present study, none of the patients developed any such complications. Triamcinolone may cause damage to human and rabbit retinal pigment epithelial cells,²⁵ to rabbit corneal endothelial cells²⁶ and to the proliferating cells of retinal origin in vitro at doses normally used in practice.²⁷ Preservative-free triamcilonone, clinical

however, does not seem to cause damage to human retinal pigment epithelial cells. Dixit et al^{19} used intracameral triamcinolone as a vitreous dye in 41 eyes of patients younger than 2 years. Between 12mg and 24 mg of triamcinolone was injected into the anterior chamber during surgery to aid in anterior vitrectomy. All identifiable crystals were removed from the eve at the end of surgery. Post-operative IOP was compared with eyes of control group. No significant variation in IOP was observed. In another study, retrospective assessment of central corneal thickness (CCT) and IOP in children who had congenital cataract surgery with primary intraocular lens (IOL) implantation and intracameral injection of preservative-free triamcinoloneacetonide was done. Neither variable changed significantly one year after surgery.²⁸ Our study showed that intracameral TA is safe for use in anterior vitrectomy in complicated cataract surgery. The main limitations of this study are small sample size and exclusion of eves that had glaucoma or ocular hypertension before surgery. Also the amount of triamcinolone that remained in situ after cataract surgery could not be measured.

CONCLUSION

Use of triamcinolone acetonidefor anterior vitrectomy in patients with complicated cataract surgery does not cause significant changes in intraocular pressure. It can be used safely for anterior vitrectomy.

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