

Case Series on Management and Surgical Outcomes in PhacoEmulsification and Intraocular Lens Placement in Eyes with Cataract and Congenital Iris Coloboma

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Abstract: Ocular colobomas are rare malformations and are associated with early cataractous changes. The aim of this study was to analyze the techniques of phacoemulsification and intraocular lens (IOL) implantation in patients with cataract and coloboma of the iris. A retrospective study was used to analyze the degree of iris coloboma and the characteristics of the crystalline lens in ten eyes of eight patients. Patients underwent phacoemulsification and intraocular lens implantation following which the Best Corrected Visual Activity (BCVA) improved. Pupilloplasty was not performed in any of the cases

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I. Introduction

The term coloboma refers to a notch, hole or fissure in any ocular structure. Coloboma in Greek (koloboma) means mutilated or curtailed. The eye develops with simultaneous invagination of the optic vesicle and the optic stalk creating the fetal fissure inferonasally, which then closes, beginning at the equator and proceeding anteriorly and posteriorly during the fifth to seventh week of gestation. Any anomaly of closure of the embryonic fissure will result in a coloboma.

Cataract surgery in eyes with coloboma requires extra care and planning at each stage. Eyes with congenital coloboma develop cataract at relatively young ages and are at greater risk for complications during cataract surgery^[1] ^[2] ^[3] ^[4] ^[5]. Zonular deficiency commonly seen in such cases increases the risk for vitreous loss^[6] ^[7], complicates intraocular lens (IOL) implantation and centration of lens in the capsular bag^[8]. Cataract surgery not done well can result in complications like glaucoma and retinal detachment^[1] ^[2]

II. Materials And Methods

In this case series we have described our experience and surgical techniques on managing 10 cases with iris coloboma and cataract. A retrospective review of patients with iris coloboma and cataract, who underwent cataract surgery at a tertiary eye care centre, between January 2016 and July 2018 were done. Details regarding the age, gender, pre operative visual acuity, grade of cataract, horizontal and vertical corneal dimensions, associated ocular anomalies, complications during surgery, IOL status and post operative visual acuity at 1 month were obtained.

A thorough preoperative work up was done for all cases. Intraocular power calculation was done with optical biometry (Lenstar) and with ultrasound biometry, in some cases. SRK T formula was used for the IOL power calculations.

Phacoemulsification was performed by a single surgeon using Gueder Megatron S4 with megatip design. Phacoemulsification parameters were set usually as, bottle height of 100 cm, 60% phaco energy (continuous/flash mode based on density of cataract), vacuum of 350 mm Hg and Aspiration flow rate at 35 cc/min.

III. Results

The analysis included 10 eyes of 8 patients. The mean age of presentation was 55.9 +/- 7.15 years. All except 3 cases had bilateral iris coloboma and was typical type in 8 eyes and partial in 2 eyes. The most common associations were retinochoroidal coloboma (5 cases), out of which 2 cases had isolated retinochoroidal coloboma, 1 retinochoroidal coloboma with Microcornea, 1 with Retinochoroidal coloboma and glaucoma, 1 with retinochoroidal coloboma, microcornea and nystagmus (Fig. 1). No associations were seen in 5 cases.

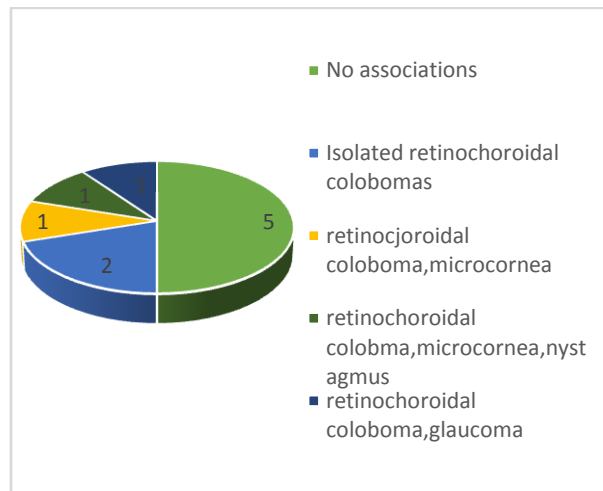


Fig. 1-Associations of iris coloboma

All patients were operated under peribulbar anaesthesia. Under appropriate anaesthesia, temporal clear corneal incisions were created with a 2.8 mm keratome in all cases except case 3 and 5 (Table 1), with microcornea. Here a superiorly placed scleral incision was made 1mm behind the limbus to get an adequate valve effect and to avoid postoperative sectoral corneal edema and DMD. Sclero corneal tunnel was made with crescent knife. One side port incision was made. Continuous curvilinear capsulorhexis was accomplished with 26 gauge bent cystitome needle and capsulorhexis forceps. Gentle multiquadrant hydrodissection was done and nucleus mobility was checked with Sinsky hook. Soft shell technique was used for corneal endothelial protection during phacoemulsification in 1 case with low endothelial count (case 3 – Table 1). Nuclear fragmentation was achieved using direct horizontal chop. CTR (CTR-1210, 10.00/12 mm) was used in all cases except case 2, 3 and 10 (Table 1). CTR placement was done after completion of phacoemulsification and before PCIOL placement.

Posterior chamber IOL (aspheric Technis IOL, Abbott, USA) was implanted in the bag in 9/10 of eyes. The central corneal edema and striate keratopathy were observed in only 2 eyes postoperatively. An inadvertent posterior capsular rent with nucleus drop had occurred in Case 10, which was a mature brown cataract, during phacoemulsification. Pars planovitrectomy and lensectomy was done and an iris claw lens was placed for the case.

Postoperatively, Mean best-corrected visual acuity improved from 0.856 +/- 0.45 logarithm of minimum angle of resolution (LogMAR) to 0.338 +/- 0.53 LogMAR. Although pupilloplasty was not performed, the patients did not complain of significant photophobia or glare. No complications were noted during the 1 month follow-up period.

IV. Discussion

Cataract often develops at a younger age in patients with coloboma [1] [2]. The mean age of presentation was 55.9 +/- 7.15 years in our series. The extent of the ocular structures affected by the coloboma should be determined preoperatively. The degree of posterior segment involvement should be confirmed. Preoperative IOL power assessment is difficult in eyes with coloboma extending to the macula and optic disc due to high variability in axial length measurements. In most of our cases optical biometry was done and IOL power calculations were done using SRK T formula with which we achieved good post-operative BCVA.

In recent years, several authors have reported that capsular tension ring (CTR) implantation has reduced the risk for complications and facilitates cataract surgery in eyes with coloboma [9] [10] [11] [12]. Capsular tension ring (CTR) implantation was done in all our cases, except 2 cases, 1 which had a PCR. The CTR protects against capsular fornix aspiration, consecutive zonular dialysis, irrigation fluid flowing behind the capsule, vitreous herniating into the anterior chamber, IOL decentration and capsular phimosis. Minimal mydriasis or reactive miosis may be a problem during surgery. Though we did not have such issues, conventional approaches to deal with normally positioned small pupils in cataract surgery may be used, such as mechanical stretching, iris retractors or multiple sphincterotomies.

A large-optic IOL is advisable for better visualization of the posterior segment, which is at greater risk of potential retinal detachment, and for optimal centration of the optic relative to the ectopic pupil. Aberration-free or aspheric IOLs may be preferable in these eyes to decrease the effect of lens decentration on vision. Aspheric posterior chamber IOLs (Abbott, USA) were implanted in all except 1 case where iris claw lens had to be placed. A silicone IOL is not advisable, in case a complex retinal detachment occurs that requires the use of silicone oil.

In eyes with coloboma, the closure of iris defects depends on the size of the defect and the patient's degree of preoperative photophobia, particularly prior to the progression of the cataract. Several surgical techniques to repair iris coloboma have been described [13] [14]. Not insisting on closure of iris defects in microphthalmic eyes and avoiding methods with risks for complication may be more appropriate. We did not perform pupilloplasty in any of the cases and considered that the anterior capsule fibrosis would provide an adequate functional and cosmetic result in iris colobomas. Prosthetic contact lenses can be used to overcome symptoms of photophobia and glare [15] post operatively.

V. Conclusion

Cataract surgery in eyes with congenital iris coloboma can have good outcomes with extra care and planning. Capsular tension ring implantation decreases the risk for complications and facilitates cataract surgery in eyes with iris coloboma. Patients do well even without pupilloplasty for the iris coloboma.

Limitations in this case series include measurement of outcomes in only a small sample size and short follow-up period of only 1 month.

Table 1-clinical details of patients operated

Case no	Age/sex	Eye	Cataract grade	Associations	Pre op BCVA	Intraop complication	CTR	IOL status	Post op BCVA (1 month)	Post op complication (1 week)
1	61/M	LE	NS2	Nil	6/18	Inferior rhexis extension	+	PCIOL in bag	6/6	Nil
2	62/F	LE	NS2+PSC	Nil	6/12	Nil	+	PCIOL in bag	6/6	Nil
3	42/M	RE	NS3	Microcornea, nystagmus, retinochoroidal coloboma	3/60	Nil	-	PCIOL in bag	3/60	SK
4	61/M	RE	NS2-3	Retinochoroidal coloboma, Glaucoma	6/24	Nil	+	PCIOL in bag	6/6	Nil
5	65/M	RE	NMC	Microcornea, retinochoroidal coloboma	6/60	Nil	+	PCIOL in bag	6/12	Nil
6	55/F	RE	NS3-4	Retinochoroidal coloboma	6/60	Nil	+	PCIOL in bag	6/6	Nil
7	55/F	LE	NS2	Retinochoroidal coloboma	6/24	Nil	+	PCIOL in bag	6/6	Nil
8	57/F	RE	NS3	Nil	6/60	Nil	+	PCIOL in bag	6/6	Nil
9	57/F	LE	NS2	Nil	6/18	Nil	+	PCIOL in bag	6/6	Nil
10	44/F	RE	BC	Nil	3/60	PCR, dropped nucleus	-	Iris claw lens	6/9	Corneal edema

NS-Nuclear sclerosis, NMC-Near mature cataract, BC-Brown cataract, SK-Striate keratopathy, BCVA-Best corrected visual acuity (in snellen equivalent), PCR-Posterior capsular rent, PCIOL-Posterior chamber intraocular lens

References

- [1]. Onwochei BC, Simon JW, Bateman JB, Couture KC, Mir E. Ocular colobomata. *Surv Ophthalmol* 2000; 45:175-194
- [2]. Bavbek T, _Og_ ut MS, Kazokoglu H. Congenital lens coloboma and associated pathologies. *Doc Ophthalmol* 1993; 83:313-322
- [3]. Ramasubramanian A, Sukhija JS, Ram J, Das P, Radotra BD. Bilateral asymmetrical isolated lens coloboma with persistent pupillary membrane. *J Cataract Refract Surg* 2007; 33:2153-2155
- [4]. Nordlund ML, Sugar A, Moroi SE. Phacoemulsification and intraocular lens placement in eyes with cataract and congenital coloboma: visual acuity and complications. *J Cataract Refract Surg* 2000; 26:1035-1040
- [5]. Chaurasia S, Ramappa M, Sangwan VS. Cataract surgery in eyes with congenital iridolenticular choroidal coloboma. *Br J Ophthalmol* 2012; 96:138-140
- [6]. Goel R, Kamal S, Khurana B, Kumar S, Malik KPS, Bodh SA, Singh M. Manual small incision cataract surgery for subluxated cataract with lens coloboma. *Contact Lens Anterior Eye* 2012; 35:89-91
- [7]. Hernandez-Camarena JC, Ayup-Arguijo E, Chavez-Mondragon E, Ramirez-Miranda A. Surgical management and Scheimpflug analysis of an atypical lens coloboma. *Case Rep Ophthalmol* 2012; 3:317-320.
- [8]. Mizuno H, Yamada J, Nishiura M, Takahashi H, Hino Y, Miyatani H. Capsular tension ring use in a patient with congenital coloboma of the lens. *J Cataract Refract Surg* 2004; 30:503-506
- [9]. Mizuno H, Yamada J, Nishiura M, Takahashi H, Hino Y, Miyatani H. Capsular tension ring use in a patient with congenital coloboma of the lens. *J Cataract Refract Surg* 2004; 30:503-506
- [10]. Hernandez-Camarena JC, Ayup-Arguijo E, Chavez-Mondragon E, Ramirez-Miranda A. Surgical management and Scheimpflug analysis of an atypical lens coloboma. *Case Rep Ophthalmol* 2012; 3:317-320

- [11]. Kim J-H, Kang M-H, Kang S-M, Song B-J. A modified iris repair technique and capsular tension ring insertion in a patient with coloboma with cataracts. *Korean J Ophthalmol* 2006;20:246–249.
- [12]. Hasane K, Ahmed IKK. Capsular tension rings: update on endocapsular support devices. *Ophthalmol Clin N Am* 2006;19(4):507–519
- [13]. Burk SE, Da Mata AP, Snyder ME, Cionni RJ, Cohen JS, Osher RH. Prosthetic iris implantation for congenital, traumatic, or functional iris deficiencies. *J Cataract Refract Surg* 2001; 27:1732–1740
- [14]. Cionni RJ, Karatza EC, Osher RH, Shah M. Surgical technique for congenital iris coloboma repair. *J Cataract Refract Surg* 2006; 32:1913–1916
- [15]. Olali C, Mohammed M, Ahmed S, Gupta M. Contact lens for failed pupilloplasty. *J Cataract Refract Surg* 2008; 34:1995–1996