Original Article

Combined Phaco Trabeculectomy Vs Combined ECCE Trabeculectomy with IOL Implantation

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Purpose: Evaluation and comparison of IOP control and visual outcome after phacotrabeculectomy and conventional combined surgery in cases of co-existing cataract and primary open angle glaucoma.

Material and Methods: This case control prospective study included the review of 50 patients who had undergone combined phacoemulsification with IOL implantation and trabeculectomy (phacotrab group and 50 who had undergone combined ECCE, IOL implantation and trabeculectomy (ECCE trab group), over a period of 12 months. Evaluation was based on IOP control, visual outcome and rate of complications.

Results: Postoperative IOP in both groups fell significantly (P=<0.05) below the preoperative medically controlled IOP. At initial 2 months postoperative IOP was almost similar in bothgroups (mean IOP in phacotrab group was 11 mm Hg vs mean IOP in ECCE trab group as 13 mm Hg i.e P= >.050). At 12 months, the IOP in phacotrab group was lower than ECCE trab group. Postoperative visual recovery was much better and faster in phacotrab group than in ECCE trab group. The frequency of complication was significantly higher in ECCE trab group.

Conclusion: Phacotrabeculectomy provides more effective and sustained IOP control and early visual recovery as compared to ECCE trabeculectomy.

Most common ophthalmic surgical procedure is cataract extraction with IOL implantation which is either done by ECCE or phacoemulsification technique. In eyes with co-existing cataract and primary open angle glaucoma, patient require cataract surgery due to visual disability and glaucoma surgery to control IOP. There is rapid advancement in the management profile of these patients with the advent of microsurgical ophthalmic techiniques[1-3]. Since small incision phacoemulsification has emerged as most ideal and widely accepted technique for cataract surgery, it is justified to apply this qualitatively superior technique to patients with coexisting cataract and glaucoma[4-7]. This study was carried out to evaluate and compare the efficacy of combined phacoemulsification trabeculectomy with IOL implantation and ECCE trabeculectomy with IOL implantation in terms of IOP control and visual outcome.

MATERIAL AND METHODS

Our study included hundred patients of cataract with coexisting primary open angle glaucoma who were found suitable for combined surgery according to selection criteria. All the eyes selected had coexisting cataract and glaucoma and decision to perform combined procedure was based on either inadequate control of IOP medically or a cataract causing significant reduction of visual acuity.

The choice of phacotrabeculectomy or combined ECCE with trabeculectomy was randomized. In each case details regarding the patients age, sex, diagnosis, duration and effect of antiglaucoma treatment were noted. Ophthalmic evaluation also included recording of visual acuity, IOP, anterior segment bimicroscopy, gonioscopy, visual field recording and fundus examination wherever possible. Informed written consent of the procedure was taken. Topical tropicamide 1% drops were administered every 15 min for 3 times starting 1 hour before surgery. The eye was anaesthetized with a peribulbar block with equal amounts of lignocain 2% and bupivacaine 0.5%.

The surgical procedure including wound construction, postoperative medications and examination procedures were standardized for both techniques respectively. In phacotrabeculectomy 4/0 black silk superior rectus bridal sutures was used for maximum exposure of superior limbal and bulbar area. After fornix based conjunctival flap was fashioned superiorly, a 4mm wide partial thickness scleral flap was raised around 12'O clock position 2-3 mm behind limbus and it was extend 1mm into the celar cornea. After entering the cystotome into anterior chamber under the corneoscleral flap, a central continuous tear curvilinear capsulorhexis was performed. Aqueous was replaced with viscoelastic and single stab paracentesis was made at 3'0 clock position when right eye was operated and at 9 0 clock when left eye was operated.

A 3.2 mm keratome entered the anterior chamber through the corneoscleral pocket followed by hydro dissection. Single handed chop and flip phacoemulsification was performed and cortical remnants were aspirated manually with Simcoe cannula. The capsular bag was inflated with viscoelastic and through same 3.2 mm tunnel incision, single piece acrylic foldable IOL was implanted with injector delivery system. The viscoelastic was aspirated out of the eye and the anterior chamber was formed with air before fashioning deep scleral window at limbal area approximately 2x2 mm in size. A peripheral button hole iridectomy was made at 12'O clock and two 10/0 nylon sutures were used to fix the partial thickness flap to scleral bed. The conjunctival flap was closed with interrupted 10/0 nylon sutures. Gentacin 20mg and dexamethasone 4 mg was injected subconjunctively in the inferior fornix.

The ECCE trab procedure consisted of a 4/0 black silk superior rectus bridal suture, a superior fornix based conjunctival flap was raised. A partial thickness limbal based scleral flap of 4/4 mm dimentions was made posterior to 12 0 clock limbus and was extended 1mm forward into the clear cornea. Either can opener or a larger continuous tear central culvilinear capsulorhexis anterior capsulotomy was made, with cortical cleavage hydrodissection and relaxing incisions for the latter technique. Corneal scissors opened the corneosclearl incision on either side of partial thickness flap and nucleus was expressed. One 10/0 nylon suture was inserted and tied on each side of corneo scleral flap. After remaining cortex was aspirated manually, the PMMA IOL was implanted in the bag. The viscoelastic which was injected before the IOL implantation, was removed and anterior chamber was formed with the air. A block of deep corneaoscleral tissue, beneath the scleral flap was removed and peripheral iridectomy at 12 o'clock was

made. The partial thickness scleral flap was sutured to the scleral bed with two 10/0 nylon sutures. The conjunctival flap was closed with interrupted 10/0 nylon sutures and inferior fornix sub conjunctival injection of Dexamethasone and gentamycin was given. Postoperatively combination of Dexamethasone and tobramycin was given topically to all the patients at 2 hourly intervals in first week and then tapered off over next 3 weeks. Patients were reviewed regularly over 12 months period and at each visit their visual aquity, IOP (by applanation tonometery) and postoperative complications were recorded. Results were analysed using the Students t-test. Mean values were given with standard deviation.

RESULTS

Our study comprised of 50 patients (50 Eyes) in each group. The demographic and disease profile are given in table 1 showing significant difference of age between two groups and slightly increased female to male ratio. Followup was completed for 1 year.

Intraocular pressure fell significantly after surgery on both groups (P>0.05). In first week IOP was as low as 8-12 mm. Hg in majority of patient in both groups (86% in phacotrab group and 64% in ECCE trab group) (Table 2). In subsequent weeks all the eyes show gradual rise in IOP which finally stabilized around 2-3 months post operately well within the acceptable limit that is between 13-16 mm Hg in majority eyes (table 2). At 12 months good IOP control (i.e 13-16 mm Hg) was noted in 78% cases of phacotrab as compared to 68% in ECCE trab group without any medical or surgical interventions) which show more sustained control of IOP in phacotrabeculectomy group.

Table 1: Demographic and disease profiles of patients in the ECCE trab and phaco trab groups.

	Phaco trab	**ECCE trab (n=50)**	**P. Value**
Age (years)	45-83 (57.06 ±9.12)	61-95 (64.03±12.3)	P < 0.05
Sex (F:M)	1.38:1	1.08:1	P >0.05
Visual acuity preoperative 6/12 or bettern n (%) 6/18 to 6/24 n(%) 6/36 to 6/60 n(%) CF and worse n (%)	 12 (24) 33 (66) 4 (8) 1 (2)	 7 (14) 20 (40) 22(44) 11(22)	>0.05
Preoperative IOP (mm Hg)	23.12 ± 4.55	24.52±7.6	P < 0.05
Cup disc ratio Mean ± SD	0.73±0.15	0.75±0.15	P=1

Table 2: Comparative evaluation of sequential changes in post-operative IOP

Duration	**IOP**									
	8-12mm		**13-16mm**		**17-21mm**		**22-30mm**		**30mm**	
	Phaco trab n(%)	**ECCE trab n(%)**	**Phaco trab n(%)**	**ECCE trab n(%)**	**Phaco trab n(%)**	**ECCE trab n(%)**	**Phaco trab n(%)**	**ECCE trab n(%)**	**Phaco trab n(%)**	**ECCE trab n(%)**
One week	43 (86)	31 (62)	6 (12)	15 (30)	1 (2)	2 (4)	--	1 (2)	--	1 (2)
3-4 week	38 (76)	17 (34)	11 (22)	26 (52)	1 (2)	5 (10)	--	1 (2)	--	1 (2)
2-6 month	--	--	42 (84)	37 (74)	7 (14)	11 (22)	1 (2)	1 (2)	--	1 (2)
6-12 months	--	--	39 (87)	34 (68)	10 (20)	14 (28)	1 (2)	2 (4)	--	--

Table 3: Comparative evaluation of post-operative complication

Complications	Onset duration	(Phacotrab) 50 cases n (%)	(ECCE trab) 50 cases n (%)
Hyphaema	1-3 days	1 (2)	3 (6)
Shallow AC	1-7 days	1 (2)	4 (8)
Uveitis	1-3 weeks	3 (6)	5 (10)
Significant striate Keratitis	1-14 days	2 (4)	5 (10)
High IOP (without medication)	2-6 months	1 (2)	2 (4)
Posterior capsule opacification	6-12 months	2 (4)	5 (10)
Pupil capture with IOL	0-3 months	Nil	3 (6)

Table 4: Best corrected visual acuity (6-12 months)

Visual acuity	Phaco trab n (%)	ECCE trab n (%)
6/6-6/9	33 (66)	20 (40)
6/12-6/18	14 (28)	26 (52)
6/24-6/60	2 (4)	2 (4)
CF or worse	1 (2)	2 (4)

Table 5: Summary of results from other studies

	Chia and Goldberg		Wishart and Austin		Stewart et al		Present study	
	Phaco-trab	ECCE-trab	Phaco-trab	ECCE-trab	Phaco-trab	ECCE-trab	Phaco-trab	ECCE-trab
Post op IOP	13.3 ± 4.3	15.3 ± 4.5	17.4	16.8	15.1 ± 3.00	12.8 ± 3.6	11 ± 3.1	13 ± 3.9
Post op astigmatism	1.46 ± 1.01	2.07 ± 1.46	1.48	2.90				
Post Op. VA	Better at each visit		Better at each visit		Better at each visit		Better at each visit	
Complication rate		More		More		More		More

Although bothgroups exhibited significant visual improvement from baseline, more rapid improvement and stabilization of best corrected visual aquity was noted in phacotrabeculectomy group (table 3). At 2-3 months postoperatively in the phacotrabeculectomy group, the best corrected VA of 6/12 or better was achieved in (66%) cases as compared to (40%) cases in ECCE trab group which was statistically significant. At 12 months this patern was maintained. Best corrected VA of 6/24 or better was achieved in more than 80% cases of both groups. Poor visual outcome of 6/36 or worse was seen in 4% cases of phacotrab group and 8% of ECCE trab group which was attributed to preop advanced glaucomatous damage, failure to control ongoing glaucomatous damage and or development of posterior capsular opacification which was significantly more in ECCE trab group.

Intra operative complications included iris chew in one case (2%) of phacotrabeculectomy and hyphaema in 2 cases (4%) in ECCE trabeculectomy group. The posterior capsule was torn in one eye in phacotrabeculectomy group (2%) and in three eyes in ECCE trab group (6%). Vitreous loss was encountered in one of these 3 cases (2%). A posterior

chamber lens was used in all cases within the sulcus fixation. Early postoperative complications were hyphaema striate keratopathy and shallow anterior chamber ranging between 2-10% cases in each group. Shallow anterior chamber in one case (2%) of phaco trab group was due to excessive filtration with bleb leakage which was managed by applying an additional suture. Delayed postoperative complications included posterior capsular opacification which was significantly higher in ECCE trab group (10%) as compared to phacotrab group (4%) managed with yag laser capsulotomy.

DISCUSSION

Trabeculectomy when combined with cataract extraction and IOL implantation has been found effective and safe (1-14). The patients potentially benefit in terms of IOP control, arrest of progressive glaucomatous damage and useful visual rehabilitation, also avoiding the risk of subsequent cataract extraction precipitating drainage failure or subsequent trabeculectomy in a site scarred by cataract surgery with its poorer success. The combined procecure also protects the patients from potentially dangerous IOP spikes in glaucomatous eyes post cataract surgery[15-16]. The argument against combined prodedures is increased ocular manipulation leading to increase inflammation and increased risk of bleb failure and poor visual recovery. Large incision for ECCE trabelectomy is associated with significant astigmatism with its very prolonged stabilization curve in terms of visual recovery as compared to small incision for phacoemulsifitation trabeculectomy. Phacotrabeculectomy has also provided superior qualitative and quantitative control of IOP in terms of range and duration of IOP control[2] as compared to ECCE trabeculectomy even after 12 months post-operatively. It was proved from the fact that IOP remained between 8-12 mm Hg in majority of cases after phacotrabeculectomy as compared to 12-16mm Hg in ECCE trabeculectomy one month postopera-tively and this pattern was maintained even at 12 months. Also severity and incidence of uncontrolled glaucoma after the combined procedure was less in phacotrab group as compared to ECCE trab group as one case in phaco trab group which had IOP between 22-30 mm Hg at 6-12 months. Two patients in ECCE trab group has IOP close to or more than 30 mm Hg. One of these patients required release of scleral suture and one patient required redo trabeculectomy when IOP was not controlled medically.

Visual recorvery was also superior in terms of faster qualitative and quautitative gain after phacotra-bulectomy mainly due to least surgical trauma and ocular disruption (Table-3).

Phaco traubeculectomy and ECCE trabeculectomy were found to be effective and comparable in terms of incidence of intra operative and peri-operative complications (Table 4).

Summarized results from various studies comparing these two combined procedures are shown in (Table-5), showing comparable outcome in our study in term of IOP control, visual recovery and complication rates.

In conclusion both phaco trab and ECCE trab are safe and effective procedures but phaco trab has benefit of smaller incision, less ocular disruption and inflammation with faster visual recovery and better bleb survival with more effective IOP control.

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