

STUDY OF INTRA OCULAR PRESSURE MEASUREMENT IN PRIMARY ANGLE CLOSURE GLAUCOMA WITH CATARACT BY COMBINED TRABECULECTOMY WITH CATARACT SURGERY AND CATARACT SURGERY ALONE

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ABSTRACT

Background

The intraocular pressure (IOP) in primary angle closure glaucoma can be lowered by glaucoma filtering surgery such as trabeculectomy. This study was undertaken to compare the effectiveness of cataract surgery combined with trabeculectomy with cataract surgery alone.

MATERIAL AND METHODS

A prospective study was undertaken in 70 patients of primary angle closure glaucoma. A total of 35 patients had undergone cataract surgery along with trabeculectomy and 35 patients underwent cataract surgery alone. All the cases in both the group had undergone standard ophthalmological examination. All 35 patients in first group underwent phacotrabeulectomy, standard phacoemulsification was performed by using 3mm clear corneal incision, after a foldable IOL implantation and removal of viscoelastic material the pupil was contracted intracameral carbachol. In the second group 35 patients underwent phacoemulsification with foldable IOL in the capsular bag were performed. The data was obtained and analysed using appropriate statistical techniques.

Results

Majority of the cases in this study were aged more than 60 years and were females. The IOP decreased at different follow up intervals and was significantly different from cataract surgery

alone group at 6 months and 1 year. The best corrected visual acuity was also better in combined surgery group. The complete success rate of surgery was 77.1% in combined surgery group than cataract surgery alone group. The hypotony was the major complication in combined group and rate complications were higher in cataract surgery alone group.

Conclusion

This study concluded that intraocular pressure and best corrected visual acuity was better in combined group than the cataract surgery alone.

INTRODUCTION

Vision impairment is a significant public health issue and as the elderly population grows, this burden is projected to increase.¹ Glaucoma is thought to impact 60.5 million individuals worldwide by the year 2010 and by the year 2020, that number is expected to rise to 79.6 million.² According to estimate, about 6.7 million people with glaucoma will eventually become blind. A 1:1 ratio of primary open angle glaucoma(POAG) to primary angle closure glaucoma(PACG) is known to affect approximately 8 million Indians.^{3,4}

Primary open angle glaucoma (POAG), which is anticipated to become a major source of ocular morbidity in developing countries, is becoming more prevalent due to the ageing population.^{5,6} The disease mainly manifests as visual field loss with preservation of the central vision till the end stage disease. Irreversible visual field loss is most common feature of the disease since majority of the patients present in the later stage of the disease. Early diagnosis with prompt treatment can halt the progression of the disease and thus preserve the loss of vision.^{7,8}

A number of treatment modalities are available to treat glaucoma which mainly aims in prevention of future visual loss. They include medical, laser and surgical treatment. The evidence available in recent years show that the cataract extraction alone results in lowering the IOP. The IOP in POAG can be lowered by Glaucoma filtering surgery such as trabeculectomy. Cataract extraction along with trabeculectomy can compromise the filters success. A study comparing the trabeculectomy alone with trabeculectomy combined with phacoemulsification had shown that, the combined surgery group require more IOP lowering medications than the trabeculectomy alone group.^{9,10}

But very few studies have compared the effect of cataract with trabeculectomy and cataract alone in this part of the country. Hence this study was undertaken to compare the effect of cataract with trabeculectomy and cataract alone.

MATERIALS AND METHODS

A pre-designed prospective study was conducted at the OPD of Department of Ophthalmology of Basaveshwara Medical college and Hospital, Chitradurga. Patients were randomly selected from the routine OPD over the period of June 2019 to June 2020 and diagnosed as a case of primary angle closure glaucoma with cataract.

Among these, patients having IOP between 22-27mmHg with cataract were subjected randomly to either a combined trabeculectomy and cataract surgery or cataract surgery alone. Clearance from institution ethics committee was obtained before the study was started. An informed consent was obtained from all the patients before including them into the study. A total of 70 patients were divided into 2 equal groups randomly. The glaucomatous cases with uncontrolled IOP with cataract and controlled IOP with medications with mild to moderate disc and visual field changes cases were included into the study. The patients having

glaucoma and cataract with controlled IOP with medications with normal disc and visual field damage and patient with cataract with glaucoma with bacterial, viral or fungal infections were excluded from the study. PL+ but PR inaccurate or inconsistent patients with corneal decompensation were excluded from study.

All the patients underwent systemic evaluation including cardiovascular assessment and Blood pressure measurement. All patients were subjected to complete ophthalmological evaluation at baseline, 1 week, 1month, 3months, 6months and 1year including best corrected visual acuity (BCVA), IOP (mmHg) measured with calibrated Goldmann applanation tonometer and visual field analysis with HFA in 1st month. History regarding glaucoma medication was taken.

All 35 patients in the first group underwent phacotrabeculectomy. Standard phacoemulsification was performed by using 3mm clear corneal incision. 2 angled side ports were made. AC was formed with viscoelastics. Continuous curvilinear capsulorhexis (CCC) was performed using cystitome followed by hydrodissection and hydrodelineation. Phacoemulsification was done by stop and chop technique followed by cortical aspiration. After a foldable IOL implantation and removal of viscoelastic material, the pupil was constricted with intracameral **pilocarpine**. Corneal incision was hydrated or sutured with 1 stitch of 10-0 Nylon depending on the wound condition. For trabeculectomy, a fornix based conjunctival flap (width: 5mm) was raised. A partial thickness (app 50% depth) triangular scleral flap was prepared, measuring approximately 3mm from limbus. A sclerectomy was created using Kelly's punch, followed by a surgical broad based peripheral iridectomy. The scleral flap was closed with 1 interrupted with 10-0 Nylon suture on the apex and 2 releasable sutures on the sides of scleral flap. The fornix based conjunctival flap was closed with continuous suture with 10-0 Nylon.

In second group, 35 patients underwent phacoemulsification. Cataract surgery was performed by using 3mm clear corneal incision. 2 angled side ports were made. AC was formed with viscoelastics. Continuous curvilinear capsulorhexis (CCC) was performed using cystitome followed by hydrodissection and hydrodelineation. Phacoemulsification was done by stop and chop technique followed by cortical aspiration. A foldable IOL implantation was done followed by removal of viscoelastic material. AC was formed by side port hydration.

All patients were given adequate post-operative care involving a topical antibiotic(eye drop Moxifloxacin 0.5%) 4times/day for 1month and a topical corticosteroid (eye drops prednisolone 1%) 6times/day for 1week which was then tapered over a period of 6weeks.

The success was defined as IOP ≥ 6 mmHg and ≤ 21 mmHg without any antiglaucoma medication or further glaucoma surgery. Partial success was defined as IOP < 21 mmHg with topical anti glaucoma medications or additional surgical treatment was needed to control IOP. The pre-operative IOP was determined as the average of 3 measurements before operation.

The data thus obtained was entered in a Microsoft excel sheet and transferred and analyzed using Statistical Package for Social Services(SPSS vs 20). The categorical variables were presented as frequencies and percentages and chi square test was used as test of significance. The quantitative variables were presented as mean and standard deviation and independent sample T test was used as test of significance. A p value of less than 0.05 was considered as statistically significant.

RESULTS

Table 1. distribution of the study group according to sociodemographic characteristics

Age group	Combined surgery	Cataract surgery alone
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	n(%)	n(%)
41-50years	2(5.7)	1(2.9)
51-60years	9(30.0)	3(10.0)
61-70years	11(36.7)	15(50.0)
>70years	8(26.7)	11(36.7)
total	30	30

SEX	Combined surgery n(%)	Cataract surgery alone n(%)
MALE	18(51.4)	16(45.7)
FEMALE	17(48.6)	19(54.3)

Majority of the cases in this study were aged between 61-70 years and were females in this study.

Table 2 : Distribution of the study according to IOP at different follow up intervals

IOP Mean ±SD	Combined surgery n(%)	Cataract surgery alone n(%)	T value	P value
Pre-operative	24.4+/-5.9	23.7+/-5.4	0.465	0.644, NS
Follow up 1 day	22.4+/-5.4	21.9+/-4.9	0.393	0.696, NS
Follow-up – 1week	20.8+/-5.1	20.5+/-4.9	0.285	0.776, NS
Follow-up- 3months	19.6+/-4.7	18.9+/-4.9	0.635	0.528, NS
Follow-up-6months	15.4+/-1.9	17.4+/-3.0	3.38	0.001, Sig

Follow -up – 1 years	10.6+/-3.3	13.2+/-2.1	4.035	0.000, Sig
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The IOP in both combined surgery and cataract surgery alone group decreased gradually over different follow up periods till 1 year. The mean IOP before surgery was 24.4 mm Hg in combined surgery group and 23.7 mmHg in the cataract surgery alone group. The decrease in IOP was much evident in combined surgery group than the cataract surgery alone group. The difference in IOP was statistically significant at 6months and 1 years follow up periods.

Table 3. Distribution of the study according to BCVA

BCVA	Combined surgery n(%)	Cataract surgery alone n(%)	T value	P value
Mean ±SD				
Pre-operative	3.1+/-0.9	3.7±1.6	-1.819	0.073, NS
Follow up- 1month	1.9+/-0.7	2.63+/-0.9	-3.597	0.001, sig

The `BCVA also improved over 1month follow up period. There was statistically difference between the combined surgery group and cataract surgery alone group.

Table 4. Distribution of the study group according to success of procedure

Success	Combined surgery n(%)	Cataract surgery alone n(%)
Complete	27(77.1)	20(57.1)

Failure	8(22.9)	15(42.9)
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X² value=3.173 df=1 p value, sig=(0.075), NS

The complete success rate in combined surgery group was 77.1% and in cataract surgery alone was 57.1%. however, this difference was not statistically significant between the 2 group.

Table 5. Distribution of the study group according to early complication

Early complication	Combined surgery n(%)	Cataract surgery alone n(%)
Nil	24(68.6)	23(65.7)
Bleb leak	3(8.6)	0
Choroidal detachment	2(5.7)	3(8.6)
Hyphema	0	3(8.6)
Hypotony	5(14.3)	1(2.9)
Shallow AC	1(2.9)	3(8.6)
Uveitis	0	2(5.7)

X² Value = 11.888 df=6 p value, sig=(0.065), NS

Bleb leak, hypotony and choroidal detachment were the common complication in the combined surgery group. Choroidal detachment, hyphema and shallow AC were complication in the cataract surgery alone group. However, the rate of complication were slightly lower in

combined surgery group than the cataract surgery alone groups. But this difference was not statistically significant.

Discussion

This study was mainly undertaken to study the effectiveness of combined cataract surgery and trabeculectomy and cataract surgery alone. This study had shown that most of cases were aged more than 60years and females.

The IOP in both combined surgery group and cataract surgery alone groups decreased gradually over different follow up periods till 1 year and there was significant decline in IOP in cases with cataract surgery combined with trabeculectomy. In a study by Rhiu st al, the pre-operative and final follow up IOP did not differ between the phacoemulsification only and combined phacoemulsification with trabeculectomy groups. The decrease in IOP after surgery was larger in the phacoemulsification combined with trabeculectomy group than phacoemulsification only group.¹¹ A study by Paul et al had shown that, the mean IOP before operation was 13-35mmHg in phacoemulsification group and 12-37mmHg in combined phacotrabeulectomy with MMC group.¹² in a study by Elsayed et al also observed similar decrease in phacotrabeulectomy and phacoemulsification group.¹³ In a study by Pandav et al, here was 22.82% reduction in IOP and 38.6% reduction in medication at a mean follow up of 2.68 years. This study also noted significant drop in IOP from baseline in PACG when compared to PAC subset at final follow up after cataract surgery.¹⁴

The BCVA was much better in cases with cataract surgery combined with trabeculectomy. In the study by Rhiu et al, there was no significant difference in BCVA pre operatively and at the final follow up between the phacoemulsification combined with trabeculectomy group.¹¹ In a study by Paul et al, the preoperative BCVA in phacoemulsification group was 0.4-0.3 and combined phacotrabeulectomy was 0.4-0.2.¹² In a study by Elsayed et al, the visual field defect- improved at first month in 3 groups and then became nearly stable. Post-operative bcva was significantly improved compared with that at baseline in all groups and at all post-operative visit.¹³ In a study by pandav et al, the visual acuity was >6/12 in majority of the eyes while after cataract surgery it was increased to 87 eyes.¹⁴

The success rate was higher in cases with cataract surgery combined with trabeculectomy in comparison with trabeculectomy alone. In a study by Elsayed et al, the phacotrabeulectomy with MMC group had highest success rate (60%) at the end of 6th month which was significantly higher than phacotrabeulectomy and phacoemulsification groups. Treatment failure was seen in 20% of the phacoemulsification groups and 10% of the phacotrabeulectomy group.¹³

The rate of complications were slightly higher in cataract surgery alone group than the combined group. In a study by Rhiu et al, postoperatively hypotony developed in 2 eyes belonging to two patients from the phacoemulsification with trabeculectomy group.¹¹ A study by Paul et al had shown that posterior capsular rupture was the main intra operative complication in phacoemulsification and combined phacotrabeulectomy groups. No post-operative complications were noted in phacoemulsification group but conjunctival wound leak was the main complication in combined phacotrabeulectomy group.¹² In a study by Elsayed et al, early hypotony was observed in 10% of the phacotrabeulectomy group and 15% in phacotrabeulectomy group. Bleb leaks occurred in 20% of the cases in

phacotrabeculectomy group.¹³ In a study by Pandav et al, posterior capsular tear was encountered in 3 out of 110 eyes, which was managed successfully with anterior vitrectomy and implantation of IOL in the sulcus.¹⁴

Conclusion

This study had shown that cataract surgery with combined with trabeculectomy had shown better results and lower complications when compared with cataract surgery alone. The patients with combined surgery had better visual results in comparison with cataract alone.

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