Original Article

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Factors Affecting Visual Outcome in Phacolytic Glaucoma

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Abstract

Introduction: The occurrence of phacolytic glaucoma is not an infrequent event in India. This problem is especially common in rural India owing to the delay in getting the cataract removed.

Aim: To clinically evaluate the presenting features, management, factors affecting the visual outcome and post-operative control of intraocular pressure (IOP) in phacolytic glaucoma.

Materials and Methods: 50 patients with phacolytic glaucoma who presented to Ophthalmology Department, Sri Ramachandra Medical College during March 2010 - September 2011 were included in the study. All the patients underwent extracapsular cataract extraction.

Results: Phacolytic glaucoma occurs mainly in the age group of 50-70 years with a female preponderance. 46% of patients presented with hand movements, 40% with perception and projection of light, 14% with a defective projection of light. The mean pre-operative IOP was 44 mmHg. Iritis (34%) was the most common post-operative complication followed by hyphema (2%). A best corrected visual acuity of 6/12 or better was attained in 66% of patients. Out of 14% of patients presenting with a defective projection of light, only 2% had poor visual recovery (<6/60) due to glaucomatous disc damage. 66% of patients who presented within 10 days of onset of acute symptoms had a good visual outcome of 6/12 or better. All patients (100%) who presented after 10 days of onset of symptoms attained a final visual acuity of 6/18 or worse. There is good post-operative control of IOP in all the cases with a mean post-operative IOP of 14 mmHg.

Conclusion: The post-operative visual prognosis is good in phacolytic glaucoma. There is good post-operative control of IOP in all cases. Defective projection of light does not indicate a poor visual prognosis and is not a contraindication for cataract surgery. There is a definite correlation between duration of symptoms and final visual acuity.

Key words: Extra capsular cataract extraction, Phacolytic glaucoma, Visual outcome

INTRODUCTION

Cataractous lenses manifest a number of changes such as protein modification, lipid disturbances, and lens electrolyte imbalance.[1] There is increased the formation of heavy molecular weight (HMW) protein aggregates characterized by linkage of the polypeptide chains through disulfide bonds formed as a result of oxidation of thiol groups on the protein.[2] This leads to an increase in the water insoluble fraction of protein. The lens fibers are broken down into coarse angular fragments and then into smooth eosinophilic globules (Morgagnian globules). As degeneration proceeds, proteins coagulate, lipids, crystals of cholesterol, tyrosine, leucine, and deposits of calcium carbonate and phosphate are formed.[2] Subsequent events depend largely on the state of the capsule. (1) If the capsule becomes impermeable by thickening and proliferation of the epithelium, water, and solutes are retained, and the nucleus is found floating in richly proteinaceous, milky fluid containing the coagulated end products of cortical degradation (Morgagnian cataract).[1] (2) If the capsule remains permeable, the imbibed water and soluble products of degeneration diffuse away and the lens shrinks. The leaking lens protein is ingested

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by macrophages which block the trabecular meshwork leading to secondary open angle glaucoma (phacolytic glaucoma).[1] The pathogenesis in phacolytic glaucoma is the release of soluble lens protein into the aqueous through microscopic defects in the lens capsule. However, theories vary as to how this protein leads to elevated intraocular pressure (IOP). It has been postulated that macrophages laden with phagocytized lens protein block the trabecular meshwork to produce elevated IOP. This theory has been supported by the demonstration of macrophages in the aqueous and trabecular meshwork of eyes with phacolytic glaucoma.[2] An alternative theory is that HMW soluble protein from the lens directly obstructs the aqueous outflow.[2] HMW protein is known to increase in the cataractous lens and has been demonstrated in the aqueous of eyes with phacolytic glaucoma in quantities sufficient to obstruct aqueous outflow.[2]

Aim of Study

The study aims to clinically evaluate the presenting features, management, and visual prognosis of phacolytic glaucoma. The study also aims to study the risk factors which determine the final visual outcome and the post-operative control of IOP.

MATERIALS AND METHODS

50 patients with phacolytic glaucoma who presented to the Ophthalmology Outpatient Department of Sri Ramachandra Medical College during the period March 2010 to September 2011 were included in the study. Patients with primary glaucoma, prior ocular hypotensive treatment, and glaucoma due to dislocated lens were excluded from the study. All patients were examined in detail, and glaucoma workup was done. A detailed history, including presenting complaints, duration of symptoms, cataract surgery in the other eye, was taken. All the patients were subjected to a detailed slit lamp examination. Fundus examination, IOP measurement by applanation tonometry and gonioscopy were done in all cases. Phacolytic glaucoma was diagnosed by the presence of corneal edema, deep anterior chamber with a variable content of cells and flare, floating chunks of white lens material and the presence of hypermature morgagnian cataractous lens and IOP above 21 mmHg.[1] Preoperatively, an attempt was made to control the IOP with oral acetazolamide 250 mg 4 times a day, oral glycerol 30 ml 3 times a day, and topical timolol 0.5% eye drops twice a day. In patients who have IOP >30 mmHg, 100 ml of 20% mannitol was given intravenously on the day of surgery. Pre-operative topical betamethasone 0.1% eye drops 6 times a day was used to reduce the inflammation. After obtaining informed consent and explanation of relatively guarded visual prognosis, the patients were operated under local anesthesia. Planned extracapsular cataract extraction (ECCE) was done followed by posterior chamber intraocular lens implantation[3] in all cases except those with aphakia in the other eye or vitreous disturbance during surgery.

Surgical Technique

Fornix-based conjunctival flap was raised. A partial thickness groove was made at the limbus from 10 to 2'o clock position. The anterior chamber was entered with a no 11 bard parker blade. The gradual entry into anterior chamber by a grooved limbal incision helps to avoid sudden decompression.[3] Anterior chamber was then thoroughly irrigated with balanced salt solution to remove the leaked lens material. A capsulotomy was carried out gently with a bent 26 gauge needle. Care was taken during capsulotomy to avoid zonular rupture. Vigorous irrigation of the anterior chamber and instillation of viscoelastics facilitated the completion of capsulotomy. The limbal incision was then extended laterally either way to approximately 120°. The nucleus was expressed out by pressure-counter pressure method. The residual cortical matter was aspirated with a simcoe cannula. After ensuring the posterior capsular integrity, a posterior chamber intraocular lens of appropriate power was implanted in the capsular bag.[3] The corneoscleral incision was closed with 10.0 ethicon interrupted sutures. Post-operative medication for all patients consisted of topical corticosteroids 6 times a day and a short acting cycloplegic twice a day. Topical corticosteroids were gradually tapered off over 6 weeks. On the third post-operative day, patients were subjected to slit lamp examination, and visual acuity was assessed. After 6 weeks, best corrected snellen visual acuity was assessed. The post-operative IOP was also measured by applanation tonometer. Good IOP control was defined as IOP < 21 mmHg without the need for any anti glaucoma medication. Post-operative visual acuity ≥ 6/12 was considered as a good visual outcome.

RESULTS

Age Incidence

30-40 years	2 (4%)
41-50 years	5 (10%)
51-60 years	18 (36%)
61-70 years	18 (36%)
70 years	7 (14%)

Lens Status in Fellow Eye

Immature cataract	15 (30%)
Mature cataract	3 (6%)
Aphakia	3 (6%)
Pseudophakia	29 (58%)

Modes of Clinical Presentation

Deep anterior chamber with flare	50 (100%)
Lens matter in anterior chamber	2 (4%)
Pseudohypopyon	4 (8%)

Pre-operative IOP

<40 mmHg	14 (28%)
40-60 mmHg	32 (64%)
>60 mmHg	4 (8%)

Pre-operative Visual Acuity

Hand movements	23 (46%)
Perception/projection of light	20 (40%)
Defective projection	7 (14%)

Surgical Complications

Vitreous disturbance	1 (2%)
Iritis	17 (34%)
Hyphema	1 (2%)

Best Corrected Visual Acuity (6 Weeks)

≥6/12	33 (66%)
6/18-6/24	11 (22%)
6/36-6/60	5 (10%)
<6/60	1 (2%)

Duration of Symptoms and Visual Outcome

Duration	≥6/12	6/18-6/60	<6/60
≤5 days	28 (56%)	3 (6%)	0
6-10 days	5 (10%)	9 (18%)	0
>10 days	0	4 (8%)	1 (2%)

DISCUSSION

Age Incidence

The majority of the patients (72%) were between 50 and 70 years of age. Earlier studies[4] have also indicated that phacolytic glaucoma occurred more commonly with increasing age probably due to the aggregation of high molecular weight protein over time.

Sex Incidence

There were 22 (44%) males and 28 (56%) females in the study. It is possible that phacolytic glaucoma is more common in females because of socio-economic constraints, but the fact that the prevalence of cataract itself is more common in females than in males should be considered. This finding was consistent with data from Punjab study in India[5] and Framingham eye study.

Clinical Presentation

The majority of the fellow eyes were pseudophakic (58%) with satisfactory vision. So, it is possible that they ignore the cataract in the other eye which has become hyper mature. This is consistent with the findings of previous studies.[4] All patients (100%) presented with a deep anterior chamber and a variable amount of flare. In 92% of patients, the pre-operative IOP was <60 mmHg. The mean pre-operative IOP was 44 mmHg. 7 (14%) patients had a defective projection of light.

Surgery

46 (92%) patients underwent ECCE with posterior chamber intraocular lens implantation. The remaining 4 (8%) patients underwent ECCE alone (because of aphakia in the other eye in 3 cases and posterior capsular rent with a vitreous disturbance in 1 case). There was a significant increase in the incidence of post-operative iritis in phacolytic glaucoma patients.[6] The inflammation was controlled with frequent topical corticosteroids and cycloplegics. The iritis cleared completely within 4 weeks in all the cases without any sequalae.

Visual Outcome

A best corrected visual acuity of 6/12 or better was taken as good visual outcome. 66% of patients had a good visual outcome. The post-operative visual prognosis in phacolytic glaucoma was good which correlates with previous studies.[4] One patient had poor visual recovery (<6/60) due to glaucomatous disc damage.

Pre- and Post-operative Visual Acuity

There was no significant correlation between pre-operative and post-operative visual acuity. Out of 7 patients presenting with the defective projection of light, 3 patients attained ≥6/12, 3 patients attained 6/18-6/24. Only one patient had poor visual recovery (<6/60) due to glaucomatous disc damage. The defective projection of light may be due to sudden rise in IOP that caused optic nerve ischemia leading to conduction defects.[7] Thus, even in patients with the defective projection of light, there is still a good chance of excellent visual recovery post-operatively provided the patient presents early. This correlates with previous studies.[8] 28 (56%) patients who presented within 5 days and 5 (10%) patients who presented between 6 and 10 days had a good post-operative visual outcome (≥6/12). All the patients who presented after 10 days attained a post-operative visual outcome of 6/18 or worse. This shows a definite correlation between duration of symptoms and final visual outcome which is in agreement with previous studies.[4,6] So, if a patient arrives at a late stage, guarded visual prognosis must be explained to the patient before surgery.[9,10]

Post-operative IOP

The mean post-operative IOP was 14 mmHg. The IOP showed a dramatic decline in all the cases after surgery and none of the patients required any anti glaucoma medication. This is in accordance with previous studies.[8]

CONCLUSION

Phacolytic glaucoma occurs mainly in the age group of 50-70 years with a female preponderance. The fellow eye is pseudophakic (58%) in the majority of cases. 46% of patients presented with hand movements, 40% with perception and projection of light, and 14% with the defective projection of light. All cases (100%) presented with deep anterior chamber and flare, 8% presented with milky fluid in the anterior chamber, and 4% with lens matter in the anterior chamber. The mean pre-operative IOP was 44 mmHg. Posterior capsular rent with vitreous disturbance occurred in 2% of patients. The most common post-operative complication was iritis (34%) followed by hyphema (2%). Iritis was managed successfully with topical corticosteroids and cycloplegics. 66% of patients attained a good post-operative visual acuity of 6/12 or better. There is no definite correlation between pre-operative and post-operative visual acuity. Out of 7 patients presenting with the defective projection of light, only 1 patient had poor visual recovery (<6/60) due to glaucomatous disc damage. The defective projection of light does not indicate a poor visual prognosis and is not a contraindication for surgery. There is a definite correlation between duration of symptoms and final visual acuity. 66% of patients who presented within 10 days of onset of acute symptoms had a good visual outcome of 6/12 or better. All patients (100%) who presented after 10 days of onset of symptoms attained a final visual acuity of 6/18 or worse. There is good post-operative control of IOP in all the cases with a mean post-operative IOP of 14 mmHg. Visual rehabilitation is better with posterior chamber intraocular lens implantation. Hence, planned ECCE with posterior chamber intraocular lens implantation is the surgery of choice in phacolytic glaucoma. The few intraoperative and post-operative complications which occurred in this study could be reduced by doing small incision cataract surgery.

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