

Original article

Lens induced glaucoma: An experience in tertiary eye care center in eastern Nepal

Rakshya Pant Sitoula¹, Indrajit Sarkar², Devdutta Nayak³, Sanjay Kumar Singh¹

¹Biratnagar Eye Hospital, Nepal

²Burdwan medical college, West Bengal, India

³Balasore Lions Eye Hospital, Odisha, India

Abstract

Introduction: Lens Induced Glaucoma (LIG), is one of commonest cause of secondary glaucoma due to senile cataracts. The purpose of this study was to see the outcome of cataract surgery in patients with LIG. **Methods:** This was a prospective case series of 40 patients with LIG who presented to our hospital between April to June 2014. The purpose of this study was to look into the age and sex distribution, causes for delayed presentation, immediate post-operative visual outcome and the reasons for poor visual outcome. **Result:** There were 23 phacomorphic cases and 17 phacolytic glaucoma patients included in our study. The mean age at presentation was 63±10 years. Female to male ratio was 2.1:1. The majority of patients 57% presented after 2 weeks of symptoms and the reason for late presentation in more than half of the patients (52.5%) was financial constraints. At presentation, mean preoperative intra ocular pressure was 39±10 mm Hg. Following surgery, 36 of 40 eyes (90%) had an IOP less than 21 mm Hg at discharge. Visual acuity was either hand-movement or just perception of light in all eyes before surgery. At discharge, 26 of 40 operated eyes (65%) achieved 6/60 or better, 2 (5%) had less than 6/60 and 12 (30%) less than 3/60. The reasons for poor VA in these 12 patients were optic atrophy in 5 patients, uveitis in 5 patients, macular cause in one and corneal edema in one. **Conclusion:** Cataract surgery proves to be effective in lowering the Intraocular pressure and visual recovery in patients with lens induced glaucoma.

Keywords: LIG, Phacomorphic glaucoma, Phacolytic glaucoma.

Introduction

Lens Induced Glaucoma (LIG), one of commonest cause of secondary glaucoma due to senile cataracts, mandates an early recognition and management to prevent blindness. It was first described independently by Gifford and Von Reuss. Gifford (Grifford

H, 1900) described it as glaucoma associated with hypermature cataract, while Reuss (Reuss V, 1900) described it as glaucoma associated with spontaneous absorption of lens substance through intact lens capsule. Various authors (Irvine SR, 1952; Flocks M, 1955; Chandler PA, 1958) have described the condition as under different names like LIG, lens-induced uveitis and glaucoma, phacotoxic glaucoma, phacogenic glaucoma, and phacolytic glaucoma.

Received: 08/03/16

Accepted: 15/06/16

Address for correspondence

Dr Rakshya Pant Sitoula, Assistant Professor
Head of Glaucoma Department, Biratnagar Eye hospital,
Atithi Margh, Biratnagar, Nepal
Email: rakshyasitoula@gmail.com



This preventable and curable condition though rare in developed countries is still prevalent in developing countries due to large backlog of cataract, poor health education, poor socioeconomic status, fear of operation (Chaterjee et al, 1982). Sah where he looked at the prevalence of glaucoma and in subjects 40 years and above in Sunsari district of eastern Nepal found lens induced glaucoma to be 0.25% (Sah et al, 2007). A study from South India they reported a prevalence of phacomorphic glaucoma of 3.9% of all cataract surgeries (Nirmalan et al, 2002). The sample prevalence for bilateral cataract blindness with BCVA < 3/60 in Nepal was 1% (Sapkota YD, 2012). The main cause for not seeking treatment was sought for, 23% of bilaterally blind (BCVA < 6/60) response was that they could not afford cataract surgery (Sapkota YD, 2012).

The definitive treatment for lens induced glaucoma is cataract extraction (Prajna, 1996; Pradhan, 2001; Rijal, 2006). The outcome following surgery in lens induced glaucoma is primarily related with the duration between the onset of symptoms and the treatment (Rohatgi, 1972; Jain, 1983) and the presence of optic atrophy, uveitis and corneal edema (Prajna, 1996; Pradhan, 2001; Rijal, 2006)

Hence detailed knowledge of LIG is necessary for early diagnosis and effective treatment to reduce the ocular morbidity and blindness. The present study comprises consecutive 40 cases of LIG for analysis of demographic profile, visual outcome, IOP control following cataract extraction at Biratnagar Eye Hospital, serving patients from Eastern Nepal and Northern part of neighbouring India. There are not many literatures on combining cataract surgery with trabeculectomy in lens induced glaucoma. In a recent study by Senthil et al where they compared cataract surgery alone versus cataract combined with trabeculectomy in phacomorphic glaucoma found that there

was similar IOP control at 6 months with faster and better visual recovery in the group that underwent only cataract extraction (Senthil et al, 2016).

The aim of our study was to see the outcome of cataract surgery in subjects with phacomorphic and phacolytic glaucoma and measure the outcomes in terms of visual acuity and IOP control.

Materials and methods

This is a retrospective analysis of prospectively collected data. Forty two patients diagnosed as LIG were included in the study from 1st April 2014 to 30th June 2014 at Glaucoma Clinic of Biratnagar Eye Hospital after taking proper informed consent. Traumatic cataract with lens particle glaucoma, LIG due to subluxation or dislocation of lens, patient with no perception of light was excluded from the study.

The data recorded were in terms of age, sex, eye involved, visual acuity, slit lamp examination for corneal edema, anterior chamber depth, pre and post operative IOP and visual acuity. The duration between symptoms and surgery was also noted.

Diagnosis of phacomorphic glaucoma was made when patients presented with symptoms of pain, redness of involved eye, headache, IOP above 21 mmHg and on slit lamp examination shallow anterior chamber (both centrally and peripherally), conjunctival injection, and intumescent lens. Diagnosis of phacolytic glaucoma was made in patient presenting with raised IOP of above 21mmHg, hypermature cataract, deep anterior chamber and flare and cells in anterior chamber.

Initially, control of IOP was done with acetazolamide 500 mg oral three times a day and topical timolol maleate 0.5% 12 hourly. Intravenous mannitol 20% with a dose of 5 ml/kg was given over 30 minutes in cases where intraocular pressure (IOP) was above 40 mmHg prior to the cataract surgery. Topical

dexamethasone sixtimes a day was given to reduce inflammation in phacolytic glaucoma.

After obtaining informed consent and explanation of relatively guarded prognosis for surgery, the patients (irrespective of the diagnosis of either phacomorphic or phacolytic glaucoma) were subjected to Small Incision Cataract Surgery (SICS) with fish hook technique. Under aseptic precaution the eye to be operated was draped after peribulbar anesthesia. Conjunctival peritomy was done and then frown shaped partial thickness scleral tunnel made 1-2 mm into the clear cornea. Viscoelastis substance was injected into the anterior chamber. Linear capsulotomy was done with the cystitome and then the nucleus delivery was done with fish hook technique after hydrodissection. After irrigation and aspiration of the cortical matter posterior chamber lens was inserted in the bag. Viscoelastics was removed from anterior chamber with a simcoe and intracameral cefuroxime (0.1 mL of 10.0 mg/mL) was given after formation of anterior chamber. Subconjunctival injection of dexamethasone (2 mg) and gentamicin (20 mg) was given at the end of the procedure.

All the patients were examined daily post operatively and discharged on second post operative day. Topical medication comprising of a combination of ciprofloxacin and dexamethasone was started six times daily and tapered over six weeks. A short acting cycloplegic and topical timolol were given if necessary. During the discharge, a complete ophthalmological examination was performed.

Follow up was carried out in OPD at 2nd weeks and 4th weeks from the day of discharge at Glaucoma department. A careful and detailed history and complete ophthalmological examination was performed in every case.

The demographic data, predisposing risk factors, clinical details, prior treatment modalities, laboratory results, and visual outcomes were analyzed using STATA. Study

was approved from the Institutional review board. We performed summary statistics for both continuous (mean and SD) and categorical variables (frequency and percentage).

Results

Over three months period 42 cases of lens induced glaucoma were enrolled. We excluded 2 patients due to incomplete data. In our study, phacomorphic glaucoma was found to be more common 23(57.5%) than phacolytic 17(42.5%). The mean age of the cohort was 63±10 years. There was a female preponderance (67.5%) compared to the male (32.5%) with female to male ratio of 2.07:1.

At presentation all patient in the affected eye had visual acuity hand movement or perception of light in the affected eye. Examination of the fellow eye revealed that 40% had immature cataract, 57.5% were pseudophakic and 2.5% were aphakic. As many as 57.5% of patients presented after 2 weeks and only 5% presented within a week of their symptoms (Table 1). When asked specifically 52.5% said monetary constraints as the reason for delay in presentation while other reasons being distance to the hospital, nobody to accompany (Table 2).

Thirty eight out of 40 patients underwent small incision cataract surgery with PCIOL implantation, one patient had Intracapsular cataract extraction with ACIOL implantation and one Intracapsular cataract extraction without IOL due to lack of capsular support and irregular anterior chamber . At discharge, 26 of 40 operated eyes (65%) had 6/60 or better and 14 (35%) had less than 6/60 (Table 3). Cause of low vision in these cases was due to anterior uveitis, corneal edema or optic atrophy. The IOP at presentation ranged from 21-60 mm Hg and the total mean preoperative intraocular pressure was 39±10 mm Hg. 35% had IOP more than 40 mm Hg at presentation. Following surgery, 32 of 40 eyes (90%) had an IOP of 21 mm Hg or less at discharge without any antiglaucoma medication.

Intraoperative complications encountered in this study are as shown in (Table 4). While performing the surgery, shallow anterior chamber due to posterior vitreous pressure was seen in three patients. Posterior capsular tear resulting in loss of the vitreous occurred in two patients. Postoperative uveitis was seen in 24(60%) patients. At discharge, 26 of 40 operated eyes (65%) achieved 6/60 or better, 2 (5%) had less than 6/60 and 12 (30%) less than 3/60. The reasons for poor VA in these 12 patients were optic atrophy in 5 patients, uveitis in 5 patients, macular cause in one and corneal edema in one.

Discussion

There were 42 case of lens induced glaucoma that underwent cataract extraction in our hospital over a period of three months out of total of 6057 senile (>50 years) cataract operated during the same time period. Lens Induced glaucoma accounted for 0.7% of all senile cataract operated. Nirmalan et al reported a prevalence of phacomorphic glaucoma of 3.9% of all cataract surgeries. Mean age of our cohort was 63±10 years similar to the study by other authors (Angara, 1991; Prajna, 1996; Ramakrishnan R, 2010). In a population based study by Sah et al in eastern part of Nepal LIG accounted for all cases of secondary glaucoma. Similarly in another hospital based study by Sarkar et al LIG accounted for 10% of total glaucoma patients. Monetary problem was the main cause of delay in seeking medical treatment in as much as 52% of the cohort. Moreover these patients do not have access to health care facility and have to travel long distances which further add on to the gravity of the situation.

In our study, females seemed to have a significant increased risk of having these glaucomas. The female to male ratio in our cohort was 2.07:1; it was 1.7:1 in the study by Pradhan et al and almost three times in a study by Angra et al. The reason for more number of

female presenting with LIG may be due to the fact that older females are given less attention to and they are dependent on other family members financially and physically. Secondly, prevalence of cataract itself is more common in females than males (Chaterjee et al). Moreover females having shallower anterior chamber depth thus making them more prone for angle closure due to phacomorphic glaucoma.

Of the two groups of glaucomas, phacomorphic was more common (57.5%) than phacolytic (42.5%) similar to in study by Prajna et al whereas in study by Pradhan et al percentage of Phacomorphic was as high as 72%. We also documented the status of the lens in the fellow eye, more than half of the patients were pseudophakic (57.5%) in contrast to previous studies where only 3.8% and 6% were pseudophakic (Pradhan, 2001; Prajna, 1996). This statistic points towards improving eye care service. The cataract surgical coverage in Nepal has increased from 35% to 58% in year 1981 and 1995 respectively. Similarly the cataract surgical rate has increased from 543 to 3092 in the year 1995 to 2010 (Sapkota YD, 2012).

At discharge, 26 (65%) attained VA 6/60 or better and 12 (30%) were blind (less than 3/60). In our study the VA at discharge was better compared to Lahan study (Pradhan et al, 2001), but (Prajina et al, 1996) reported that higher than 50% of their cohort attained VA 6/12 or better. IOP after cataract surgery was below 21 mm of Hg in 90% of our cohort. Reasons of IOP returning to normal after cataract extraction are the removal of the lens which is the offending cause. In case of phacomorphic glaucoma the anterior chamber deepens following lens extraction thereby relieving the angle closure. Similarly in phacolytic glaucoma the leaked lens protein that are responsible for blocking the trabecular meshwork are removed from the eye following cataract surgery. Angra et al have recommended combined surgery in patients

with longer duration of attack (>7 days) but a recent study (Senthil et al, 2016) has shown that 97% of their cohort had IOP <21 mmHg at 6 months follow up following cataract surgery alone and had a faster visual than combined group and hence recommends cataract surgery alone.

There were two cases of PCR requiring ACIOL implantation. Postoperative uveitis was the most frequently encountered occurring in about 26% of postoperative patients. Uveitis resulting in poor visual outcome was seen in 5 patients (12.5%). Elevated IOP resulting in optic atrophy was seen in 5 patients (12.5%).

Conclusion

This study highlights the importance of educating the community about timely cataract surgery and the dangers of lens induced glaucoma. As a result, people in the community would break away from popular belief that cataract should not be operated unless it is matured. Removal of the cataractous lens is the definite and best management of LIG. As more than 50% were pseudophakic it is best to counsel the patients about timely surgery in the second eye at the time of discharge after the first eye surgery.

Table 1: Duration between onsets of symptoms to initial presentation at the hospital

Duration (days)	Number	Percentage
0-7	2	5
8-15	15	37.5
16 - 30	18	45
>30	5	12.5

Table 2: Reasons for delay in seeking treatment

Cause of delay	Number	Percentage
Unaware	2	5
Distance to hospital	8	20
Monetary constrains	21	52.5
Nobody to accompany	8	20
Others	1	2.5

Table 3: Post op visual outcome

Visual acuity	Number	Percentage
6/6 - 6/18	8	20
6/24 - 6/60	18	45
5/60 - 3/60	2	5
< 3/60	12	30

Table 4: Intra operative complications

Complications	Number	Percentage
Posterior capsular rent	2	5
Shallow AC	3	7.5

References:

Angra SK, Pradhan R, Garg SP (1991). Cataract induced glaucoma—an insight into management. *Indian J Ophthalmol*;39:97–101.

Chandler PA (1958). Problems in the diagnosis and treatment of lens-induced uveitis and glaucoma. *Arch Ophthalmol*; 60(5):828–841.

Chatterjee A, Milton R, Thyle S (1982). Prevalence and aetiology of cataract in Punjab. *Br J Ophthalmol*;66:35-62.

Dhar GL, Bagotra S, Bhalla A (1984). Lens induced glaucoma-a clinical study. *Indian J Ophthalmol.*;32:456-9.

Flocks M, Littwin CS, Zimmerman LE (1955). Phacolytic glaucoma; a clinicopathologic study of one hundred thirty-eight cases of glaucoma associated with hypermature cataract. *Arch Ophthalmol*;54(1):37–45.

Gifford H (1900). The dangers of the spontaneous cure of senile cataract. *Am J Ophthalmol*;17:289–293.

Irvine SR, Irvine AR., Jr (1952). Lens-induced uveitis and glaucoma. Part III. Phacogenetic glaucoma: lens-induced glaucoma; mature or hypermature cataract; open iridocorneal angle. *Am J Ophthalmol*;35(4):489–499.

Jain IS, Gupta A, Dogra MR, Gangwar DN, Dhir SP. Phacomorphic glaucoma-management and visual prognosis (1983). *Indian J Ophthalmol*;31:648-53.



Nirmalan PK, Thulasiraj RD, Maneksha V, et al (2002). A population based eye survey of older adults in Tirunelveli district of south India: blindness, cataract surgery, and visual outcomes. *Br J Ophthalmol*; 86:505–512.

Rohatgi JN (1972). Lens induced glaucoma. A clinical study. *Indian J Ophthalmol*; 20: 88-93.

Prajna NV, Ramakrishnan R, Krishnadas R, Manoharan N (1996). Lens-induced glaucomas-visual results and risk factors for final visual acuity. *Indian J Ophthalmol*; 44: 149–55.

Pradhan D, Hennig A, Kumar J, Foster A. A prospective study of 413 cases of lens-induced glaucoma in Nepal. *Indian J Ophthalmol*. 2001; 49:103-7.

Ramakrishnan R, Maheshwari D, Kader MA, et al (2010). Visual prognosis, intraocular pressure control and complications in phacomorphic glaucoma following manual small incision cataract surgery. *Indian J Ophthalmol*; 58:303–306.

Rijal AP, Karki DB (2006). Visual outcome and IOP control after cataract surgery in lens induced glaucomas. *Kath Univ Med J*; 4:30-3.

Sah RP, Badhu BP, Pokharel PK, Thakur SK, Das H, Panda A (2007). Prevalence of glaucoma in Sunsari district of eastern Nepal. *Kathmandu Univ Med Journ*; Vol 5(3): 343-8.

Sarkar S, Mardin C, Hennig A. profile of the glaucomas and intervention in a large eye care centre in south-east Nepal. *Nepal J of Ophthalmol*. (2010);vol 2(1): 3-9.

Sapkota YD. The Epidemiology of Blindness in Nepal: 2012. Kathmandu: Nepal Netra Jyoti Sangh; 2012

Senthil S, Chinta S, Rao HL et al (2016). Comparison of cataract surgery alone versus cataract surgery combined with trabeculectomy in the management of phacomorphic glaucoma. *J Glaucoma*; 25:3 209-13.

von Reuss (1900). *Centralblatt für Praktische Augenheilkunde*; 24:33.

Source of support: nil. Conflict of interest: none