INTRODUCTION

As quoted in the Yiddish proverb “The eyes are the mirror of the soul,” they are considered to be a precious gift. The major curable cause of loss of vision in India is cataract which is defined as opacification of the crystalline lens. The long-term complication following cataract surgery is posterior capsule opacification (PCO) which has symptoms similar to that of cataract, leading to decreased vision, glare, and monocular diplopia. Sir Harold Ridley in his first case documented the complication of late capsule opacification following cataract surgery.

The incidence of PCO noted at the end of 5 years following cataract extraction is 33%. With the advent of phacoemulsification various materials and designs of intraocular lenses, the incidence of PCO has been reduced. Following pediatric cataract surgery, the incidence of PCO was found to be 100%. Nd: YAG capsulotomy is considered a safe, effective, and non-invasive technique to treat PCO. The aim of the study was to evaluate the visual acuity among the patients with PCO and to assess the complications following Nd: YAG capsulotomy.

Key words: Posterior capsule opacification; Visual acuity; Nd: YAG capsulotomy
LASER is an acronym for Light Amplification by Stimulated Emission of Radiation and Gordon Gould coined the term. Nd: YAG laser is a solid type of laser with a wavelength of 1064 nm which is invisible, requiring He-Ne laser red aiming beam and acts by the principle of photo disruption using infrared radiation. It is usually Q switched when it is used to treat the eye. Although Nd: YAG capsulotomy is considered a safe and effective procedure, it has its own complications associated with it. Transient raise in intraocular pressure, intraocular damage, and cystoid macular edema are the complications associated with it. Other rare complications include corneal endothelial damage, vitreous hemorrhage, retinal detachment, and endophthalmitis.

Aims and objectives
The aim of the study was to evaluate the visual gain among the patients with PCO and to assess the complications following Nd: YAG capsulotomy.

MATERIALS AND METHODS

Study design
The study design was an observational study.

Study setting
This study was conducted at Kasturba Medical College Hospital, Attavar and Government Wenlock Hospital, Mangalore.

Study participants
100 eyes of 100 patients with study period being 2 years from October 2015 to July 2017 were included in the study. The study was approved by the institutional human ethical committee. The participants were recruited using the following criteria.

Inclusion criteria
Pseudophakic/Aphakic patients of various age groups and either sex with PCO which is sufficient to cause decreased vision and normal IOP attending ophthalmology OPD were included in the study.

Exclusion criteria
Those with a history of active ocular infection, corneal pathology in whom assessment of PCO is difficult, any pre-existing rise in IOP, cystoid macular edema, and any individual less than the age of 8 years were excluded from the study.

After recruiting, the participants were divided into two case groups - pseudophakia and aphakia. A complete ophthalmological evaluation was done which included best-corrected visual acuity, torchlight and slit-lamp examination, and measurement of IOP which was followed by a fundus examination.

Methods
Under topical anesthesia with the help of Abraham posterior capsulotomy lens, with the patient head mounted on the slit lamp equipped with YAG laser, procedure was done with ZEIS VISULAS YAG II PLUS laser. In patients whose pupil diameter was <3 mm, dilation was done by 1% tropicamide drops.

Depending on the thickness of PCO, the energy and number of shots had been given to achieve adequate capsulotomy opening. Following YAG capsulotomy topical Bromofenac drops 0.09% was advised 3 times daily.

The patients then underwent Nd: YAG capsulotomy and measurement of IOP was done at the end of 1 h and 2 weeks following laser using Goldmann Applanation tonometry. The average pulse energy used for Nd: YAG laser posterior capsulotomy was 1.6 mj and energy was delivered as single pulse per burst and the number of pulses required for an adequate capsulotomy opening were 14 on average. Best-corrected visual acuity was noted on day 1, 4, and 6 weeks following laser capsulotomy. Complications following Nd: YAG capsulotomy were noted in the patients.

Ethical considerations
The present study protocol was approved by the institutional human ethical committee of Kasturba Medical College, Mangalore.

Statistical analysis
Statistical data analysis was performed with SPSS for Windows, version 17.5 using “Chi-square test,” P<0.05 was considered statistically significant.

RESULTS
89 patients were pseudophakic and 11 patients were aphakic. Total number of males who underwent YAG capsulotomy was 56 (56%) and the number of females was 44 (44%). There was slight male preponderance observed in our study (Table 1). The minimum and maximum age of the patient observed in our study was 34 and 88 years. Most of the study population was in the age group of 51–60 years (Table 2). Majority of patients presented with PCO with an interval of 25–36 months following cataract surgery and was noted in about 52% of study population (Table 3). Majority of the patients had visual acuity 6/36-6/18 and observed in 36% of study population (Table 4). Table 5 presents the comparison between pre-YAG and post-YAG day 1 visual acuity was done using significance test and P=0.000 which was highly significant (Table 6).
Following YAG capsulotomy, visual acuity was compared on day 1, 4, and 6 weeks and comparisons done were statistically significant (Table 7). Post YAG capsulotomy, visual acuity at 4th week was compared to that of 6th week and it was significant (Table 8).

**DISCUSSION**

Several studies have been done around the world in various groups to prove the visual benefits and the complications following Nd: YAG capsulotomy. In our study, 100 patients were studied out of which 56% were males and 44% were females. There was slight male preponderance observed in our study similar to earlier studies where 200 patients were studied, and 59% were males and 41% were females. This result was similar to other study where 70 patients were studied, out of which 40 were males and 30 were females. Case groups were made into pseudophakic and aphakic out of which 89% were pseudophakic and 11% were aphakic similar to previous study.\(^{15,16}\) 95% of the patients were in the age group of 41–80 years, perhaps this is the age at which the senile cataract patients present to the ophthalmologist. It was observed that PCO was more in the age group of 51–60 years. The study agrees with earlier studies.\(^{11,12}\) The interval between the cataract surgery and development of PCO was noted between 25 and 36 months in about 52% of the study population which was similar to earlier studies.\(^{13}\) It was reported that the incidence of PCO noted was about 50%, 2 years postoperatively.\(^{14}\) Before intervention, 36% of patients were having poor best-corrected visual acuity that is 6/60 and <6/60, and 46% of patients were having best-corrected visual acuity between 6/36 and 6/18, and 18% of patients were having best-corrected visual acuity between 6/12 and 6/9. After intervention, 8% of the patients were having best-corrected visual acuity 6/60, 6/36–6/18 best-corrected visual acuity was noted in 20% of the patients, 6/12-6/9 visual acuity was noted in 32% of the patients, and 40% of the patients were having 6/6 vision. In our study, 92% of the patients showed improvement after Nd: YAG capsulotomy similar to earlier studies.\(^{11,12}\) Most of the studies showed good visual acuity after Nd: YAG capsulotomy. It was also observed that no one had further deterioration of visual acuity after YAG capsulotomy and it was supported.\(^{7}\) After 6 weeks, 8% of the patients had shown no improvement in the best-corrected visual acuity. Raised IOP after Nd: YAG capsulotomy has been documented in different studies 36-56. In our study, raised IOP at the end of 1 h was seen in 17% of the patients similar to earlier study.\(^{17}\) At the end of 2 weeks, raised IOP was noted in 8% of the study population. The rise in IOP after YAG capsulotomy could be due to deposition of debris in the trabecular mesh work, pupillary block, and inflammatory swelling of the ciliary body or iris root associated with angle closure. In earlier studies, rise in IOP was noted but subsequent studies proved the rise in IOP.\(^{14}\) There were 6% in 100 eyes and none of them accounted for significant visual impairment. Studies have proven that retro-focusing of laser aiming beam can reduce the risk of damage to IOL.\(^{59}\) The incidence of cystoid macular edema noted in our study was 2% which was high as compared to earlier studies.\(^{15,56}\) The incidence of cystoid macular edema noted was 4.4% in earlier study. The mechanism of CME is unclear, but it is suggested that, in response to YAG laser, the prostaglandin released from anterior segment reached the retina through the vitreous which alters the permeability of paramacular capillaries to develop CME.\(^{17,20}\)

**Limitations of the study**

Sample size of the study was less to generalize the results.
CONCLUSION

The loss of vision due to PCO is a distressing complication for a patient who has spent time and money getting their surgery done and finds that their vision is dropping again. YAG laser capsulotomy is a simple, outpatient solution that will bring the smile back on the patient's face instantly.

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ARK - Concept and design of the study, results interpretation, review of the literature, and preparing the first draft of the manuscript; RG - Concept and design of the study, statistical analysis and interpretation, revision of the manuscript.

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