

# Complications after Nd YAG Posterior Capsulotomy

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## Abstract

**Background:** To analyse the rate of complications associated with Nd YAG posterior capsulotomy.

**Methods:** This prospective clinical study was conducted in Holy Family Hospital over a six-month period. It included five hundred and fifty patients in out door Eye Department, Holy Family Hospital treated with Nd YAG laser capsulotomy due to posterior capsular opacification after cataract surgery. The complications were noted.

**Results:** There was a transient rise of IOP in 27%, mild anterior uveitis in 7%, pits and cracks in 4%, macular edema in 3% and retinal detachment in 2% cases. Complications were managed accordingly and post YAG visual acuity improved in majority of cases.

**Conclusions:** Nd. YAG is an effective instrument used in non-invasive procedure of capsulotomy in patients who are having gross disturbances of vision such as decreased visual acuity, glare and uniocular diplopia. The posterior capsulotomy does have some serious complications after YAG. One can avoid these complications and get the best results.

## Introduction

Cataract is the chief cause of avoidable blindness in the world<sup>1</sup>. Extra capsular cataract extraction (ECCE) with posterior chamber intraocular lens implant (PCIOL) is the most frequent surgical technique since the past decade<sup>2</sup>. High quality, high volume cataract surgery is needed in community eye care centers to effectively manage the large back-log of cataract blindness<sup>2</sup>.

Cataract extraction with PCIOL is most frequent performed surgical technique and the most common complication is posterior capsular opacification which results in decreased visual performance of the patient. One should understand the factors contributing to the development of posterior capsular opacification by the help of retro

illumination photography<sup>3</sup>. Visual acuity restored by ECCE with PCIOL is threatened by posterior capsular opacification seen in 50% of eyes within 5 years. Posterior capsular opacification is characterized by proliferation, transformation, and migration of lens epithelial cells remaining on the margin of anterior capsule which form plaque on the non-epithelial posterior capsule<sup>4</sup>.

The posterior capsular opacification (plaque) has optical characteristics which often requires posterior capsulotomy with YAG laser although IOL materials and designs have been generated to avoid posterior capsular opacification<sup>5</sup>.

Because of the revival of ECCE with opacification of posterior capsulotomy, this has been the commonest cause of post operative reduction of vision following cataract surgery.

Nd YAG laser posterior capsulotomy can be associated with significant complications. Potential problems include IOL optic damage / pitting, post operative raised intra ocular pressure (IOP), uveitis, macular edema, retinal detachment and lens subluxation<sup>6,7</sup>.

In 1980 Aron Rosa first reported the use of YAG for posterior capsule. This procedure is associated with a number of complications. The purpose of this study was to analyze the rate of complications associated with YAG capsulotomy.

## Patients and Methods

The study included 550 patients selected from Eye Out-door Department of Holy Family Hospital or referred from other attached teaching hospitals of Rawalpindi Medical College. The inclusion criteria were post operative reduction of vision of more than one line, complaint of diplopia, glare and evident capsular thickening on examination with slit lamp plus other indications for YAG capsulotomy, as fundus examination, laser therapy in diabetics or other retinopathies and in vitreo retinal surgery.

For this procedure, pre YAG best corrected visual acuity, IOP, anterior and posterior segment

examination with slit lamp and indirect ophthalmoscopy were carried out. Pre and post YAG photographs were taken with anterior segment camera attached with slit lamp.

Topical anesthesia was given with 0.5% proparacaine hydroxide eye drops. Then with the help of Abraham's posterior capsulotomy lens, YAG capsulotomy was done. Abraham's lens provided proper focusing, stabilized the eye and proper delivery of Nd YAG. YAG laser of Zeiss Q. switched was used in all cases. The focus red dots of helium neon focusing beam was used so that one dot was found on posterior capsule to protect the IOL. Pulses with minimal energy level (0.5 - 1mj) were used initially and increased gradually. An opening in posterior capsule up to 2mm was produced. Where a large capsulotomy to 3mm or more was required the pupil was pre operatively dilated, as when vitreo retinal surgery or Argon laser treatment of retinopathies was desired.

Patients follow up was done on second day, at two weeks and then when required. On each follow up day visual acuity, IOP, anterior segment and posterior segment detailed examination was done and complications noted.

61-80	164	30%
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## Results

Of the 550 patients included 46% were male (253) and 54% were female (297). The age ranged from 20 to 80 yrs (Table 1). The minimum period for posterior capsulotomy after surgery was four months and the maximum four years. Among the patients 440 (80%) were pseudophakic and 110 (20%) were aphakic.

Pre YAG visual acuity in 302 (55%) patients was 6/60 or less, 6/60 to 6/24 in 110 (20%) patients and 6/24 to 6/9 or 6/6 in 138 (25%) patients. Visual acuity improved to 6/60 in 49 (09%) cases, to 6/12 in 390 (71%) cases and 6/9 to 6/6 partial in 110 (20%) cases. (Table 2).

**Table 1: Age Range of Patients (n=550)**

Age (Years)	Patients	Percentage
20-40	106	19%
41-60	280	51%

**Table 2: Post YAG Visual Acuity**

Visual acuity	No. of cases	Percentage
6/60	49	9%
6/12	390	71%
6/6P	110	20%

Incidence of various complications after YAG capsulotomy were, mild anterior uveitis in 39 (07%) cases, raised IOP in 149 (27%) cases, pits and cracks of IOL in 22 (04%) cases, macular edema in 17 (03%) cases and retinal detachment in 11 (02%) cases (Table 3).

Transient non-infective anterior uveitis after YAG capsulotomy was seen in 29 cases which responded with mild steroids topically along with diclofenac sodium eye drops. Raised IOP was seen in 149 cases (27%) and controlled with beta blocker eye drops 0.5% levobunolol and in some cases tablet acetazolamide (diamox) four times daily for at least two days and up to one week in a few cases.

Post YAG cystoids macular edema was observed in 17 cases (03%). We used topical steroid along with diclofenac sodium eye drops and that improved.

**Table 3: Complications of YAG Capsulotomy**

Complications	No. of cases	Percentage
Increased IOP > 5mm Hg	149	27%
Anterior Uveitis	39	7%
Pits / Cracks	22	4%
Macular Edema	17	3%
Retinal detachment	11	2%

In 11 cases there was retinal detachment out of which 5 were high myopic and 3 cases were due to advanced diabetic retinopathy. Only one had prolapsed vitreous through the capsulotomy hole resulting in retinal detachment in later stages.

In 22 patients there were pits due to out focusing of YAG laser beam but these were not associated with decreased visual acuity or visual problems. In some cases surgeons applied increased power due to the thick posterior capsule or quality of IOL. There were cracks in IOL. This resulted in glare and decreased visual acuity in some cases.

## Discussion

Transient rise of IOP after YAG has been reported and well documented in literature which is 0.5% to 03%<sup>6</sup>. Immediate rise of IOP after YAG capsulotomy in previous studies was due to absence of posterior chamber IOL and use of high energy YAG laser which caused prolapse of vitreous<sup>8</sup>. In our study transient rise of IOP was seen in 27% including mild to severe rise of IOP in patients after YAG where simple cataract extraction without PCIOL was due to the prolapse of vitreous in anterior chamber.

Potential risk factors for glaucoma after YAG capsulotomy are due to the ECCE without PCIOL and use of high energy YAG for capsulotomy<sup>8</sup>. PCIOL creates a barrier in anterior chamber and posterior chamber even after posterior capsulotomy. In this study rise of IOP was observed in majority of aphakic patients.

Mild uveitis was seen in 39 cases (07%) and managed with topical steroid and diclofenac sodium eye drops. This is comparable with the study of Latif who reported a 5.5% incidence of uveitis<sup>9</sup>.

Pits and cracks on PCIOL were seen in 22 patients (4%) due to the faulty focus and increased power of YAG and is comparable to the study by Latif where the same percentage of pits and cracks of PCIOL were noted<sup>9</sup>.

One of the serious complications of YAG capsulotomy is its leading to cystoid macular edema and retinal detachment. In our study macular edema was seen in 17 cases (3%) and retinal detachment in 11 cases (2%) which is less compared

to a previous study where these were 4.9% and 3.6% respectively<sup>10</sup>.

## Recommendations

Minimum period for posterior capsulotomy after surgery should not be less than four months. Optimum energy / pulses required at the to start is 0.5 - 4mj. Use of Abraham's lens is recommended. The beam should be focused behind the lens. Opening of posterior capsulotomy should not be more 2 to 3mm in diameter. Use of topical steroids and beta blocker eye drops is usually required. Follow up should be regular and meticulous fundus examination should be done before and after posterior capsulotomy.

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