

Original Article

**“RACQUET SHAPED” YAG LASER
POSTERIOR CAPSULOTOMY: A LONG TERM
FOLLOW UP**

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ABSTRACT

Aims of Study: to document the short term and long term complications of Racquet shaped Nd: YAG laser posterior capsulotomies.

Study Design: Prospective observational study:

Place and Duration: Department of Ophthalmology Dow University of Health Sciences, eye Unit 1, Civil Hospital Karachi from October 2005 and September 2008.

Patients and methods: The study comprises 730 patients recruited from OPD ,from October 2005 to September 2008, who underwent ND. YAG laser posterior capsulotomy in a Racquet shaped pattern. Abraham capsulotomy contact lens(Ocular instruments) was placed onto the eye. The aiming beam was focused on the superior capsule 1 mm inside the IOL edge. Nd:YAG laser was applied to create a racquet shaped opening in the posterior capsule.

Result: In this study there were 419 males and 311 females with mean age of 61.4 year. The mean duration between cataract surgery and capsulotomy was 1.4 years. At last follow up the visual acuity improved in 86.3 % cases. Mean laser shots applied were 22.3 (SD=6.5) with a mean power 1.3 mJ SD(.04). Acute complications in first week included bleeding from iris, pitting to the IOL, hanging flap, transient rise in intraocular pressure, transient anterior chamber reaction, cystoid macular edema which resolved over a period of six months. Retinal detachment was noted in six cases after a period of at least three year follow up.

Conclusion: Racquet shaped Nd:YAG laser poster capsulotomy is a safe and effective procedure which can be adopted by skilled and novice ophthalmologists without any significant harm to the patients.

Key words: Nd: YAG laser, capsulotomy, posterior capsular opacification

INTRODUCTION

Posterior Capsular Opacification (PCO) is one of the major causes of blindness all over the World^{1, 2}. According to the Pakistan Nation Blindness and visual impairment survey posterior capsular opacifications ranked fourth among the treatable causes of blindness.³ Posterior capsular opacifications can be treated by surgical methods as well as by using Neodymium YAG Laser^{4, 5}. Different Strategies are used to perform YAG Laser capsulotomies. Most of the surgeons prefer to aim the laser beam at the centre of the opacified capsule thus treating at the axial zone of the IOL through undilated pupils. Prevalence of IOL damage has been reported as being between 40% to 81%⁶. Additionally a small opening in the posterior capsule is associated with various complications and drawbacks⁷. To avoid these complications and drawbacks we adopted the technique of racquet shaped capsulotomy originally described by Thorin and Archila⁸. In this article we present the short term and long term complications in patients who

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**“RACQUET SHAPED” YAG LASER POSTERIOR CAPSULOTOMY:
A LONG TERM FOLLOW UP**

underwent Nd: YAG laser posterior capsulotomies creating a racquet shaped opening in the posterior capsule.

PATIENTS AND METHODS

An observational prospective cohort study conducted at the department of Ophthalmology Dow University of Health Sciences, eye Unit 1, Civil Hospital Karachi after obtaining informed consent from all the participants and following the tenet of declaration of Helsinki between October 2005 and September 2008. Patients with visually significant posterior capsular opacification were recruited from the outpatient department of Ophthalmology unit 1 Civil hospital Karachi. Patient were excluded from the study if there was a history of uncontrolled glaucoma, advanced glaucoma, hazy cornea, very dense posterior capsular opacification , any posterior segment pathologies likely to cause decreased vision after treatment. Baseline data was obtained for each patient before initiation of treatment on a prescribed performa and each patient underwent complete workup which included a full ocular and medical history, best corrected Snellen’s visual acuity, slit lamp biomicroscopy, Goldmann’s applanation tonometry, gonioscopy, and funduscopy.

Pupils were dilated with Tropicamide 1% and Phenylephrine

10% eye drops. Immediately before the laser procedure a single application of Proparacaine 0.5% was instilled onto the eye scheduled for Nd:YAG capsulotomy. All the capsulotomies were performed by a qualified ophthalmologist. Twelve hundred and forty eyes of eight hundred and fifty five patients underwent the procedure with a pulse duration of 4 nanosecond, a spot size of 8 Micron, and pulse energies ranging from 0.5–2.0 mJ, coupled to a slit lamp delivery system with a dual 635 nm diode aiming beam. With the patient seated at the slit lamp system, Abraham capsulotomy contact lens (Ocular instruments) was placed onto the eye. The aiming beam was focused on the superior capsule 1 mm inside the IOL edge. Nd:YAG laser (LightMed LPULSA SYL 9000 Nd: YAG) was applied with a 8.0 micron spot size and a power of 0.5 to 2.0 mJ and pulse duration of 4.0 nanosecond, to create small openings in the capsule from 12 to 7 ‘o’clock position and then from 12 to 5 ‘o’clock position. A stalk was created by applying few laser shots vertically downward from 5 and 7 ‘o’clock position.

Postoperatively, patients were prescribed Prednisolone 0.1% eye drops four times a day for 5 days and timolol maleate eye drops 0.5% two times a day for one week. Patients were examined at 1 hour, 1 day, one week, two weeks and 1, 3, 6, months, one

**TABLE 1:
VISUAL OUTCOME**

S.no	Visual acuity	Number	Percent
	Decrease two lines or more	25	3.4
	No improvement	68	9.3
	Two line improvement	156	21.4
	More than two line improvement	481	65.9

**TABLE II:
SHORT- TERM COMPLICATIONS AFTER PAN-RETINAL PHOTOCOAGULATION**

S. no	complications	frequency	Percentage
1	Bleeding from the iris	06	0.8
	Pitting of IOL	163	22.3
	Hanging Flap	25	3.5
	Transient IOP rise	254	34.8
	Transient anterior chamber reaction	186	25.5
	Cystoid macular edema	86	11.7
	Retinal detachment	13	1.7

**TABLE III:
INCIDENCE OF RETINAL DETACHMENT AFTER ND:YAG LASER CAPSULOTOMY**

S.No	Study Population	follow up period	Type of capsulotomy	Incidence of RD	Author
	314	Four week	Racket shaped	None	Shaikh et al ⁹
	460	6 months	Central	0.87 %	Dawood et al ¹⁰
	104	1 year	Central	1.6	Burq & Taqi ¹¹
	341	5 years	Central	2.0	Ranta Et al ¹²
	789	3years	Central\	0.86	Steinert et al ¹³
	2110	6 months\	Central	0.5	Stark et al ¹⁴
	500	4 week	Central	None	Khazada et al ¹⁵
	730	3 years	Racket shaped	1.7	Ahmed& Quraihsy

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year and then every six months. Patients were advised to report any visual complaint to the principal investigator after the laser process. At each visit patients were invited to report any symptoms of ocular morbidity and an ophthalmic examination was performed, which included visual acuity measurement, slit lamp biomicroscopy, and Goldman applanation tonometry. In addition gonioscopy, and funduscopy were also performed.

Short term complications were defined as intraoperative and during first week after treatment. Long term complications were defined as the abnormal findings at last follow up which was at least three years after which patient was censored. Patients were also censored if a complication like retinal detachment took place. Statistical analysis was performed on SPSS version 15 for windows. Frequency distribution tables were used to present the data. Mean and standard deviation were used for continuous variables. Categorical variables were presented as proportions and percentages.

RESULTS

In this study there were 419(57.4%) males and 311(42.6%) females with mean age of 61.4 year(SD=12.26). The mean duration between cataract surgery and capsulotomy was 1.4 years. 167 (22.8 %) patients were from rural area of Sindh 65(8.9%)from Baluchistan and 498(68.2%) from different areas of Karachi. Initial visual acuity ranged from 6/18 to 6/36. At last follow up the visual acuity outcome is shown in table 1. Mean laser shots applied were 22.3 (SD=6.5) with a mean power 1.3 mJ (SD=0.04). Acute complications in first week included bleeding from iris, pitting to the IOL, hanging flap, transient rise in intraocular pressure, transient anterior chamber reaction, cystoid macular edema which resolved over a period of six months. Retinal detachment was noted in thirteen cases after a period of at least three year follow up (table 2)

DISCUSSION

In this study we have included in analysis only those cases who have completed the follow-up of at least three years to document the retinal complication of YAG laser capsulotomy by employing racquet shaped methodology as a higher amount of total energy is required in this method. Incidence of retinal detachment observed by different observers is shown in table 3. In our series incidence of retinal detachment is 1.7 which is not different from finding of other researchers for the same follow up period. When we perform a Capsulotomy by using a Racquet shaped method we focus the light on the capsule as there is a little danger of intraocular lens damage. This makes less disruption to anterior vitreous face. In addition we have used less amount of energy not more than 2.0 mJ in any case and usually less than 1.0 mJ. At a lesser amount of energy settings laser act on cutting mode rather than disruptive mode¹⁶.

CONCLUSION

Racquet shaped Nd:YAG laser poster capsulotomy is a safe and effective procedure which can be adopted by skilled and novice ophthalmologists without any significant harm to the patients.

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