Frequency of Retinal Detachment and Other Complications after Neodymium: Yag Laser Capsulotomy

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Abstract

Objective: To document the frequency of retinal detachment and other complications associated with Nd:Yag laser capsulotomy.

Methods: This prospective study was conducted among patients who underwent Nd:Yag laser capsulotomy in a tertiary care hospital in a period of one year. All patients had a thorough slit lamp biomicroscopic examination before and after the capsulotomy. A follow-up was done for one year and the patients were examined for retinal detachment and other complications at each visit.

Results: The study comprised 104 eyes subjected to Nd:Yag laser capsulotomy for the treatment of posterior capsular opacification. There were 55 males and 49 females with a mean age of 59.5 ± 6.2 years. Majority of the patients (93.3%) who underwent capsulotomy presented within 3 years after cataract surgery. The incidence of retinal detachment was 1.9% while that of cystoid macular oedema was 9.6%.

Conclusion: The incidence of retinal detachment after Nd:Yag laser capsulotomy in our institution was 1.9% which is similar to incidence rates worldwide. However, that of cystoid macular oedema was markedly higher at 9.6% when compared to incidence rates worldwide. (JPMA 58:550; 2008)

Introduction

Posterior capsular opacification (PCO) is the most common late post-operative complication of cataract surgery, occurring in up to one-third of patients in a period of five years.[1] PCO can obscure vision and consequently prompt the patient to seek treatment. The current treatment of choice is Neodymium doped: Yttrium-Aluminum-Garnet (Nd:Yag) laser capsulotomy. It gives instantaneous results and can easily be administered in an out-patient setting. However, it is associated with several complications.

The most common complication of Nd:YAG laser posterior capsulotomy is an elevation in intraocular pressure, but fortunately this is usually transient.[2] Other complications include retinal cystoid macular oedema[3], glaucoma[3], intra-ocular lens damage[4], iritis[4] and endophthalmitis.[4] Retinal detachment (RD) remains an infrequent but vision-threatening complication.[5]

Studies have indicated that myopia is a strong risk factor for retinal detachment following Nd:Yag laser capsulotomy.[6,7] It is also known that Asian populations suffer from a higher prevalence and greater severity of myopia than white populations.[8] This raises the concern that the incidence of retinal detachment may be high in Pakistan. To the best of our knowledge, no study has looked at the incidence of this serious complication post Nd:Yag laser capsulotomy. We conducted this study to document the incidence of retinal detachment and other complications associated with Nd:Yag laser capsulotomy.

Patients and Methods

This prospective study was conducted among patients at the Department of Ophthalmology, Liaquat National Hospital (LNH). We enrolled one hundred and eighteen patients who underwent Nd:Yag laser capsulotomy in the hospital between 2005 and 2006. The indication for the capsulotomy was secondary posterior capsular opacification after implantation of a posterior chamber intra-ocular lens (IOL). IOL implantation was done after phacoemulsification or extracapsular cataract extraction (ECCE). We excluded patients who had proliferative diabetic retinopathy, eyes with a previous history of retinal detachment and had undergone previous vitreoretinal surgeries, which were 14 in all.

The same Nd:Yag laser device was used for capsulotomy in each case. All Nd:Yag laser capsulotomies were done by consultant ophthalmologists.

All patients enrolled in the study received a thorough slit lamp biomicroscopic examination of anterior and posterior segments before and after the Nd:Yag laser capsulotomy. The intra ocular pressure reading, position of the IOL and state of PCO was also noted. On follow-up, the patients were examined for retinal detachment and other complications on the following dates after the capsulotomy: 1st week, 1st month, 3rd month and 12th months.

The data collection was done after taking informed consent from the patients. A structured proforma was filled before and after the capsulotomy. At the end of the study time period, the data was analysed using SPSS version 14.

Results

The study comprised 104 eyes which underwent Nd: Yag laser capsulotomy for the treatment of posterior capsular opacification. The ages of the patients ranged from 44 to 87 years with a mean age of 59.5 + 6.2 years. There were 55 males and 49 females.

The majority of patients (93.3%) who underwent laser capsulotomy presented within 3 years after cataract surgery. Table 1 shows the time interval between cataract surgery and laser capsulotomy for the patients. The frequency of retinal detachment was 1.9% while that of cystoid macular oedema was 9.6%. The figures of other complications are given in Table 2.

Table 1: Time interval between cataract surgery and laser capsulotomy.

Time difference	Number n = 104	Cumulative Percentage
1 month - 1 year	16	15.4
1 - 2 years	60	73.1
2 - 3 years	21	93.3
3 - 4 years	5	98.1
4+ years	2	100

Discussion

The frequency of retinal detachment after Nd:Yag laser capsulotomy was found to be 1.9%. Other complications were 9.6%, cystoid macular oedema, 27.9%, mild anterior uveitis and 46.2% transient rise in intraocular pressure.

Table 2: Incidence of complications.

Complication	Number n = 104	Percentage
Transient rise in IOP	48	46.2
Mild anterior uveitis	29	27.9
Pitting of IOL	20	19.2
Cystoid macular edema	10	9.6
Retinal detachment	2	1.9

Percentages will not add up to 100 because one person can have more than one complication.

The frequency of retinal detachment in our study was similar to that in other studies, both prospective and retrospective. Table 3 shows the figures vary from 0.5% to 4.2% in other studies, which are comparable to our study. No published studies from Pakistan were available. There is a paucity of literature on the topic from neighboring developing countries. It was presumed that retinal detachment would be higher in our population because the severity and prevalence of myopia is higher in Asian population.[8] We did not know the status of myopia in the patients in our study. Therefore, we cannot comment on any relationship between the degree of myopia and retinal detachment. Other risk factors for development of retinal detachment after Nd:Yag laser capsulotomy are: presence of lattice degenerations, history of retinal detachment in the fellow eye, posterior capsular rupture during surgery and male gender.[9-11] No retinal breaks or lattice degenerations were found before the application of the Nd:Yag laser. Also, there were no patients in our study with a history of retinal detachment in the other eye. It must be noted that effective evaluation of risk factors requires a larger sample size.

Table 3: Comparison of frequency of retinal detachment after Nd:Yag laser capsulotomy with other studies.

Study	Study design	Frequency of RD
Jahn CE et al (2003) 15	Prospective	0.5%
Ranta P (2004) 16	Prospective	2.0%
Dardenne MU (1989) 7	Retrospective	1.6%
Steinhart RF (1991) 3	Retrospective	0.9%
Glacet-Bernard A (1993) 9	Retrospective	4.2%
Powell SK (1995) 17	Retrospective	0.8%
Present study	Prospective	1.9%

RD: Retinal Detachment

Two cases of retinal detachment in our study had developed it 8 and 10 months after laser capsulotomy. It is well-established that the majority of retinal detachments occur in the first year after application of the Nd:Yag laser.[10] In fact, the short interval between capsulotomy and onset of retinal detachment strongly suggests that the Nd:Yag laser plays a causal role in development of this complication. It is uncertain at present whether this effect is caused by the laser application itself or is a secondary complication of rupturing the posterior capsule. It has been postulated that removal of the posterior capsule leads to posterior vitreous detachment (PVD). The PVD causes retinal detachment via vitreous traction on the retina.[12] Alternative theories suggest that there are risk factors present that cause posterior capsular opacification and also cause retinal detachment. Because patients with significant posterior capsular opacification are likely to opt for Nd:Yag laser capsulotomy, an exogenous factor that increased the incidence of both posterior capsular opacification and retinal detachment would lead to a statistically significant, although non-etiologic, association.[5]

In addition to retinal detachment, the other vision threatening complication was cystoid macular oedema. It is interesting to note that the frequency of this complication was quite high in our study (9.6%). Most studies have reported figures of 0.8% to 2.5%.[3,13,14] It is unclear why

this particular complication was so frequent. Because precapsulotomy fluoroscein angiography was not done, it is possible that these patients had ongoing post cataract surgery cystoid macular oedema in addition to the posterior capsular opacification. The application of the Nd:Yag laser could have exacerbated the pre-existing cystoid macular oedema.

The other complications included transient increase in intraocular pressure, mild anterior uveitis and pitting of the intraocular lens. These are relatively benign. Pitting of the intraocular lens does not cause any significant deterioration of visual acuity. Mild anterior uveitis responds well to a course of corticosteroids. In most cases, the increase in intraocular pressure is self-limiting. However, it is known that some patients develop new glaucoma after Nd:Yag laser capsulotomy.[3] The patient needs to be followed for a longer time period than one year to detect this complication.

The present study had a few limitations. It is possible that the figures are under-estimated because the length of follow-up was one year. Although it is known that the majority of the retinal detachments occur within the first year, a few can occur after a year also. However, we believe that the underestimation will not be very large. Multiple published studies have done a one year follow-up and stated the results. This study was conducted at one institution and this somewhat restricts the generalisibility. Prospective multi-centre studies with longer follow up periods are required to establish the true occurrence of retinal detachment and additional complications like new glaucoma.

Conclusion

The frequency of retinal detachment after Nd:Yag laser capsulotomy in our institution was 1.9% which is similar to the rates worldwide. However, cystoid macular oedema, another vision threatening complication, was markedly higher at 9.6% when compared to worldwide figures. Although the Nd:Yag laser is an effective device to improve vision hindered by posterior capsular opacification, it must be recognized that it carries a low but definite risk of serious complications. In the light of these facts, it would be prudent to defer capsulotomy until the patient's impairment due to capsular opacification warrants the increased risk of retinal complications associated with the capsulotomy. Physicians should assess the patients' risk for developing a retinal detachment and select them accordingly for the procedure.

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