Visual Acuity of Patients after Neodymium:Yttrium-Aluminium-Garnet Laser at Cicendo Eye Hospital in 2013-2014

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Abstract

Background: Indonesia ranks the second highest in blindness worldwide. One of the factors that may cause blindness is posterior capsule opacification (PCO), a secondary cataract that developed after cataract surgery. PCO eventually leads to visual impairment. The common management for PCO is neodymium:yttrium-aluminium-garnet (Nd:YAG) laser posterior capsulotomy. It is an effective, non-invasive, and painless procedure. The aim of this study was to describe the visual acuity of PCO patients after Nd: YAG laser posterior capsulotomy.
Methods: A descriptive study was conducted based on simple randomized secondary data from Cicendo Eye Hospital, Bandung from January 2013 to August 2014.
Results: Out of 102 patients, 53 patients (51.96%) were male and 49 (48.04%) were females. The male to female ratio was 1:1. The maximum number of patients was at age group of 60–69 years (33.33%). Sixty–nine patients (67.65%) presented mild or no visual impairment uncorrected visual acuity (UCVA) post-laser. Eighty-nine patients (87.25%) presented mild or no visual impairment best-corrected visual acuity (BCVA) post-laser. Generally, 94 patients (92.16%) showed improvement of visual acuity after Nd:YAG laser posterior capsulotomy. Three patients (2.49%) were suffering from blindness UCVA post-laser and 1 patient (0.98%) falls at blindness BCVA post-laser respectively.
Conclusions: Improvement of visual acuity is achieved after Nd:YAG laser posterior capsulotomy in PCO patients. **[AMJ.2016;3(1):99–102]**

Keywords: Nd:YAG laser, posterior capsule opacification, visual acuity

Introduction

According to the World Health Organization (WHO), approximately 285 million people in the world are visually impaired. This includes 39 million people are blind and 246 million people are having low vision. Globally, cataract is the second major cause of visual impairment, which occupied 33%.[1,2] Indonesia is the second country with the highest rate of blindness in the world, which is around 1.5 percent of the population, or 3.5 million people , who are listed as legally blind. Cataract is an opacity of the crystalline lens of the eye or its capsule.[3] To remove the opacification a cataract surgery is needed. However, there is a common complication for this surgery, the posterior capsule opacification (PCO).[4]

The PCO is a development of opacity or clouding at the posterior part of the capsule. It obstructs the light passage, and causes visual impairment. The incidence of PCO around the world is 20% within a year after cataract surgery and 50% five years after surgery. The risk factors of PCO are the type of lens and young age. Some studies show the growth of the epithelial cells of young people is more than elderly.[4] There is a simple and effective procedure, neodymium:yttrium-aluminium-garnet (Nd:YAG) laser posterior capsulatomy, which is indicated to treat posterior capsule opacification. This Nd:YAG laser is focus at the center of the opacified posterior capsule, and an opening is formed, therefore the light can pass though the capsule, and lead to a clear vision.[5] Therefore, a study was conducted to describe the visual outcome of Nd:YAG laser posterior capsulatomy in posterior capsule opacification patients at Cicendo Eye Hospital

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from January 2013 to August 2014.

Methods

A descriptive study was conducted and data collected from January 2013 to August 2014 by using the retrospective method at Cicendo Eye Hospital Bandung. The study population was the patients who were admitted to Cicendo National Eye Hospital Bandung with posterior capsule opacification and were treated with Nd:YAG laser posterior capsulatomy from January 2013 to August 2014. The samples were selected using the simple random sampling method.

The samples were taken from the medical records with certain inclusion and exclusion criteria. Inclusion Criteria were such as the medical records of posterior capsule opacification patients with completed visual acuity data and completed with 1 week postoperative follow up. The medical records of posterior capsule opacification patients with eye diseases other than posterior capsule opacification or treated with operations other than Nd:YAG laser posterior capsulatomy were excluded from the study.

The variables included gender, age, and visual acuity. Thus, the patients were categorized into male and female. For the age group, the patients were categorized into age 0–9, 10–19, 20–29, 30–39, 40–49, 50–59, 60–69, 70–79, and 80–89 years old. Meanwhile, the visual acuity of the patients was categorized according to the WHO visual acuity classification, no light perception, 0–0.02, 0.02–0.05, 0.05–0.1, 0.1–0.3, 0.3–1.

The study instrument was the medical records of posterior capsule opacification patients who were treated with Nd:YAG laser posterior capsulatomy at Cicendo Eye Hospital from January 2013 to August 2014.

Furthermore, the medical records that met the inclusion and exclusion criteria were categorized into variables and calculated to obtain the percentage. Data collected from the medical records included the gender, age, preoperative UCVA, preoperative BCVA, postoperative UCVA, and postoperative BCVA. Then, the percentage of each variable in the total of patients was calculated.

Additionally, the information of patients taken from medical records was confidential to protect the patients' privacy.

Results

Out of 102 patients, 53 patients (51.96%) were male and 49 (48.04%) were females. The male to female ratio was 1:1.

The maximum number of patients was at the age group of 60-69 years, which occupied by 34 patients (33.33%).

Sixty-nine patients (67.65%) presented mild or no visual impairment uncorrected visual acuity (UCVA) post-laser. Eighty-nine patients (87.25%) presented mild or no visual impairment best-corrected visual acuity (BCVA) post-laser. Three patients (2.49%) were suffering from blindness UCVA post-laser and 1 patient (0.98%) falls at blindness BCVA post-laser respectively. Generally, 94 patients (92.16%) showed improvement of visual acuity after Nd:YAG laser posterior capsulotomy.

Discussion

The emergence of Nd:YAG laser in the management of PCO, has improved the visual outcome of cataract surgeries. Fifty three patients (51.96%) were males and 49 patients (48.04%) were females (Table 1). The male to female ratio was 1:1. Based on a previous study, there were 47 male patients (52.2%) and 43 females patients (47.8%), the male to female ratio was equal to 1:1, these results were the same as in this study. Another study also showed almost similar sex ratio.[6] This is due to the leading cause of blindness worldwide, that cataract occurs equally among male and

Table 1Gender of Patients who had Undergone Nd: YAG Laser Posterior Capsulotomy from January 2013 to August 2014.

Gender	Frequency	%
Male	53	51.96
Female	49	48.04
Total	102	100.00

Table 2 Age of Patients who had Undergone Nd: YAG Laser Posterior Capsulotomy from January 2013 to August 2014.

Age (in years)	Frequency	%
0–9	3	2.94
10–19	6	5.88
20–29	3	2.94
30–39	1	0.98
40–49	10	9.80
50–59	22	21.57
60–69	34	33.33
70–79	17	16.17
80–89	6	5.88
Total	102	100.00

female, thus when routine cataract surgeries are performed, complications such as PCO can also occur in equal proportions.[7]

The maximum number of patients was in the age group of 60–69 years (33.33%), the second was in the age group of 50–59 years (21.57%) with 22 patients, then in the age group of 70–79 years (16.17%) with 17 patients. A total 71.07% of patients were at the range of 50-79 years, this may due to these patients had consulted the Ophthalmologist with age related cataract (Table 2). Based on a previous study, most patients (77.8%) were in the 41–80 years age range. It showed a wider age range, this was due to wider setting of age range (20 years) in the previous study, whereas this study applied a smaller age range (10 years) to show more accurate and precise results.[7] At the same time, another previous study showed that the average age of patients was 76.49 years.[8]

After the treatment of Nd: YAG laser posterior capsulotomy, both number of patients in mild and no visual impairment of BCVA and UCVA were the highest numbers, which were 69 patients (67.65%) and 89 patients (87.25%) respectively. In general, 94 patients (92.16%) had significant improvement of vision outcome after Nd: YAG laser capsulotomy (Table 3). Based a on previous study, 97% patients were having improved visual acuity, which was higher than in this study, this was probably due to the threemonth follow-up after the Nd: YAG laser capsulotomy. Meanwhile, the data available for this study was limited, which was one week follow-up after the Nd: YAG laser capsulotomy.[9] Based on another previous study, most of the patients (86%) showed improved visual acuity, which was lower than in this study (92.16%), but this may be due to

Table 3 UCVA dan BCVA 1 Week Pre-laser and Post-laser

UCVA	Frequency (%)			
	UCVA		BCVA	
	Pre-laser	Post laser	Pre-laser	Post-laser
NLP	0	0	0	0
0–⍰0.02	0	0	0	0
0.02–⍰0.05	12 (11.76)	3 (2.49)	7 (6.86)	1 (0.98)
0.05–⍰0.1	14 (13.73)	4 (3.92)	7 (6.86)	2 (1.96)
0.1–⍰0.3	38 (37.52)	26 (25.49)	25 (24.51)	10 (9.80)
0.3–1.0	38 (37.52)	69 (67.65)	63 (61.76)	89 (87.25)
Total	102 (100.00)	102 (100.00)	102 (100.00)	102 (100.00)

Note: *UCVA=uncorrected visual acuity, *BCVA=best-corrected visual acuity

the larger sample size, the 86% means 160 patients out of 200 patients.[10]

However, 3 patients (2.49%) were having BCVA blindness and 1 patient (0.98%) was having UCVA blindness respectively, even though they were treated with the laser. These non-improvements in vision outcome may be attributable to the presence of media opacities or other ocular pathology which were not detected earlier before the procedure. Based on a previous study, 5 patients (5.6%) presented with visual acuity of blindness post laser procedure, which was higher than in this study, which probably means currently, Indonesia can provide doctors with better skills, environments for better healing, or increase awareness of public the importance of eyes caring.[7]

Due to lack of time and the great number of uncompleted medical records data may cause the limitations of this study.

A few recommendations are suggested after conducting this study. The time assigned for data collection can be prolonged for the sake of adequate sample size. Follow up by the patients after treatment should be demanding to assess the condition of recovery phase, since a lot of patients did not return to the hospital for a follow up in this study. A computerized storage of medical records will provide a lot benefit, such as saving space, easy to look for, neat and tidy.

In conclusion, the improvement of visual acuity is achieved after the Nd:YAG laser posterior capsulotomy in PCO patients at Cicendo Eye Hospital from January 2013 to August 2014.

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