
CLINICAL INVESTIGATION

Visual Outcome in Central Retinal and Branch Retinal Artery Occlusion

Daisuke Yuzurihara^{1,2} and Hiroyuki Iijima¹

¹Department of Ophthalmology, Faculty of Medicine, University of Yamanashi, Yamanashi, Japan; ²Department of Ophthalmology, Kanbara General Hospital, Shizuoka, Japan

Abstract

Purpose: To study retrospectively the presenting visual acuity and the visual outcome in patients with central retinal artery occlusion (CRAO) and in patients with branch retinal artery occlusion (BRAO).

Methods: We studied the visual acuity and outcome in 23 patients (23 eyes) with CRAO and in 30 patients (30 eyes) with BRAO that met the inclusion criteria: a fundusoscopic appearance of retinal whitening, a delay in arterial dye filling in a fluorescein angiogram, the first examination in our hospital within 7 days of onset, and a minimum follow-up period of 90 days.

Results: Both presenting acuity and final acuity were far worse in patients with CRAO than in patients with BRAO. A final acuity worse than 0.1 was observed in 14 of the 23 (61%) patients with CRAO and in only 1 of the 30 (3%) patients with BRAO. Only 5 of the 23 (22%) patients with CRAO and 24 of the 30 (80%) patients with BRAO showed a final acuity of 0.5 or better.

Conclusion: Visual acuity in patients with CRAO is poor at presentation, and the prognosis is generally poor, with a few exceptions. In contrast, the visual acuity in patients with BRAO is far better both at presentation and at the final visit. **Jpn J Ophthalmol** 2004;48:490-492 © Japanese Ophthalmological Society 2004

Key Words: branch retinal artery occlusion, central retinal artery occlusion, visual prognosis

Introduction

Ophthalmological textbooks typically claim that central retinal artery occlusion (CRAO) generally shows poor visual prognosis, except in those cases with a fovea-sparing cilioretinal artery, while the visual prognosis for branch retinal artery occlusion (BRAO) is quite good.^{1,2} However, there have been few reports comparing the visual prognosis for these two conditions in a single clinical study. We conducted a retrospective study of presenting visual acuity for both conditions and outcomes at 3 months or more after onset.

Patients and Methods

We retrospectively reviewed the medical charts of patients with CRAO or BRAO who were seen at the University of Yamanashi Hospital during the period from 1985 to 2002. The inclusion criteria were the fundusoscopic appearance of retinal whitening, a delay in arterial dye filling in a fluorescein angiogram, an initial examination in our hospital within 7 days of onset, and a minimum follow-up period of 90 days.

Twenty-three patients (23 eyes) with CRAO and 30 patients (30 eyes) with BRAO met the criteria for the study. The affected retina in each eye with BRAO included a part of the macular area. The median age was 64 and 67, respectively, for CRAO and BRAO. Two patients with CRAO and two with BRAO were younger than 40 years old. The follow-up period ranged from 97 to 4965 days (a median of 690 days). Two patients with CRAO showed a patent

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Correspondence and reprint requests to: Hiroyuki Iijima, Department of Ophthalmology, Faculty of Medicine, University of Yamanashi, Tamaho, Yamanashi 409-3898, Japan
e-mail: hijimar@yamanashi.ac.jp

Table 1. Demographic data for the subjects

Diagnosis (no. of patients)	M/F	R/L	Age range (median)	Mean days before initial examination
CRAO (23)	13/10	13/10	28–85 (64)	1.0
BRAO (30)	22/8	20/10	18–84 (67)	1.9
Total (53)	35/18	33/20	18–85 (65)	1.5

CRAO, central retinal artery occlusion; BRAO, branch retinal artery occlusion; M, male; F, female; R, right; L, left.

Table 2. Initial and final acuity in the subjects

	CRAO		BRAO	
	Initial VA no. of eyes (%)	Final VA no. of eyes (%)	Initial VA no. of eyes (%)	Final VA no. of eyes (%)
NLP, LP, HM, CF	16 (70)	11 (48)	0 (0)	0 (0)
0.01–0.09	4 (17)	3 (13)	5 (17)	1 (3)
0.1–0.4	1 (4)	4 (17)	14 (47)	5 (17)
0.5–2.0	2 (9)	5 (22)	11 (37)	24 (80)
Total	23 (100)	23 (100)	30 (100)	30 (100)

NLP, no light perception; LP, light perception; HM, hand motion; CF, counting fingers; VA, visual acuity.

cilioretinal artery partially perfusing the foveal area. The demographic data are shown in Table 1.

All patients with CRAO were hospitalized for systemic work-up and various medical or ophthalmological treatments, including ocular massage, anterior chamber paracentesis, stellate ganglion block, intravenous prostaglandins, intravenous fibrinolytic agents, or a combination of these. Patients with BRAO received a systemic work-up, including blood tests, an echocardiogram, and a cervical echogram to detect etiologic factors, and were followed up without any specific treatment.

To calculate the logMAR acuity, visual acuity in counting fingers, hand motion, light perception, and no light perception were set at 0.005, 0.002, 0.001, and 0.0005, respectively.

Results

Figure 1 shows the initial and final visual acuities in both disease groups. Many eyes with CRAO had extremely poor visual acuity both initially and finally. Some eyes with CRAO and very poor initial acuity recovered to a point of fairly good or very good final acuity. Most eyes with BRAO had good visual acuity both at presentation and at the final visit. Table 2 shows the number of eyes at each level of visual acuity. The initial mean logMAR acuity was 2.19 (decimal acuity: 0.0065) for eyes with CRAO and 0.38 (decimal acuity: 0.41) for eyes with BRAO. The final mean logMAR acuity was 1.77 (decimal acuity: 0.017) for eyes with CRAO and 0.16 (decimal acuity: 0.70) for eyes with BRAO. Fourteen of the 23 (61%) eyes with CRAO and only

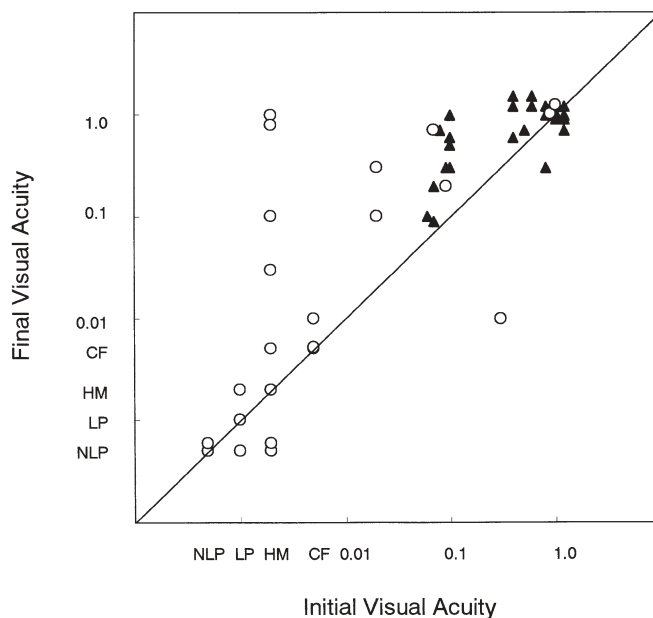


Figure 1. Initial and final visual acuity of the subjects. *Open circles* represent central retinal artery occlusion eyes, and *black triangles* represent branch retinal artery occlusion eyes. *NLP* (no light perception), *LP* (light perception), *HM* (hand motion), and *CF* (counting fingers) are plotted at 0.0005, 0.001, 0.002, and 0.005, respectively.

1 of the 30 (3%) eyes with BRAO showed a final acuity worse than 0.1. Only 5 of the 23 (22%) eyes with CRAO and 24 of the 30 (80%) with BRAO showed a final acuity of 0.5 or better.

Discussion

The present study indicates that the initial visual acuity for patients with CRAO is generally poorer than 0.1 and that for many it is even worse (lower) than 0.01. After a follow-up study of at least 3 months, those with relatively good visual acuity at initial presentation tended to show a relatively good final acuity, while those with acuity worse than 0.01 remained with very poor acuity, worse than 0.01, despite various treatments. Very exceptionally, those with poor visual acuity at the initial examination recovered good acuity better than 0.5. However, more than 60% of patients with CRAO showed poor final visual acuity, worse than 0.1, and nearly half showed very poor acuity, worse than 0.01.

Brown et al.³ studied visual acuity in eyes with CRAO and reported that 69 of 73 (95%) showed acuity equal to or worse than counting fingers at the time of presentation, and 40 of 60 eyes (66%) showed the same level of final acuity. Augsburger and Magargal⁴ reported visual prognostic results in eyes with CRAO that received various medical treatments. Thirteen of 34 eyes (38%) with CRAO recovered final acuity equal to or better than 0.1, a figure very similar to our own result. They mentioned that the efficacy of treatment could not be confirmed by their results because their study was uncontrolled, but that some cases of CRAO may recover relatively good acuity with or without treatment.

The present study disclosed far better visual acuity for eyes with BRAO than for those with CRAO, both at the initial presentation and at the final visit. More than 80% of eyes with BRAO showed visual acuity equal to or better than 0.1 at the initial examination, and 80% of the total cases showed a final acuity equal to or better than 0.5. Some eyes (5 of the 30 BRAO eyes) showed a poor initial acuity worse than 0.1, but few showed a final acuity worse than 0.1. These good results for final visual acuity in eyes with BRAO were achieved without any of the specific treatments used for eyes with CRAO. The generally

accepted protocol for the management of BRAO, which includes only a systemic work-up for coagulation tendency and emboli in the heart and carotid artery accompanied by observational follow-up, seems to be warranted based on the present results.

Ros et al.⁵ studied the visual acuity of 201 eyes with BRAO and reported that more than three-fourths of the subjects showed an initial acuity of 0.5 or better. One-fourth of these subjects were seen only initially, but it was estimated that 12% of the total cases had a final visual acuity of less than 0.5.

The present study included two patients with CRAO and two with BRAO who were younger than 40 years old. Greven et al.⁶ reported retinal artery occlusion in young adults under 40 years of age and obtained results with regard to initial and final acuity similar to those we obtained in eyes with BRAO or CRAO in the older population of the present study.

In conclusion, visual prognosis is generally poor in eyes with CRAO and good in those with BRAO. More effective interventional treatments to improve visual prognosis in eyes with CRAO will be investigated.

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