

Original Research Article

Central retinal artery occlusion in patients with cerebrovascular accident in a teaching hospital in rural Telangana, India

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ABSTRACT

Background: Central retinal artery occlusion (CRAO) is a stroke of the eye caused by obstruction of the central retinal artery, usually by a thrombus or embolus that results in painless, disabling vision loss, hence it is an ocular emergency. This study was done to know the visual outcomes in patients with CRAO.

Methods: An observational study was conducted on the patients admitted with cerebrovascular accident at MediCiti Institute of Medical Sciences over a period of 2 yrs i.e. from January 2015 to December 2016. The study included 75 patients with Cerebro-Vascular Accident (CVA) that met the inclusion criteria for diagnosis of CRAO.

Results: A total of 75 cases with CVA admitted to the hospital were included in the study. The age group ranged from 50 to 80 years (median age 65 years). Among these, 64 cases were associated with hypertension and 46 cases with diabetes. Six patients (8%) had CRAO with sparing of cilio-retinal artery.

Conclusions: CRAO has a diverse etiology. It can vary from hypertension to even snake bite. As it is an ocular emergency, Identification of underlying cause is essential during follow-up for better intervention.

Keywords: Diabetes, Emboli, Hypertension, Stroke, Thrombus, Vision loss

INTRODUCTION

An obstruction of central retinal artery usually by thrombus or embolus result in stroke of eye which is also known as Central retinal artery occlusion (CRAO) which in turn results in painless, disabling vision loss. It is an ocular emergency.^{1,2}

Retinal artery occlusion (RAO) mostly affects elderly patients and is commonly associated with atheromatous emboli.³ A high prevalence is reported (estimated 0.85/10,000) in patients over the age of 40 years.

A short closure of central retinal artery may cause permanent ischemic damage of retina. Various

therapeutic modalities available are systemic anticoagulation, systemic venous thrombolysis, catheter-guided intra-arterial fibrinolysis, ocular massage and reduction of intraocular pressure.^{1,4-8}

Both acute and secondary preventive therapies are problematic as most studies are observational based studies rather than randomized controlled trials. The incidence of CRAO is low of 1 in 10,000 ophthalmic outpatient visits which could also be a contributing problem.⁹

Hence randomized controlled trial involving multiple centres is required to achieve a sufficient number of subjects needed to demonstrate efficacy of any proposed

therapy. This study was done to know the visual outcomes in patients with CRAO.

METHODS

An observational study was conducted on the patients admitted with cerebrovascular accident at MediCiti Institute of Medical Sciences over a period of 2yrs i.e. from January 2015 to December 2016. This study was approved by Institutional ethics committee. The study included 75 patients with CVA that met the inclusion criteria for diagnosis of CRAO. An informed consent was obtained from the patients.

Inclusion criteria

- Patient presenting with acute, painless, severe vision loss.
- Fluorescein angiography shows retinal whitening.

Exclusion criteria

All patients with:

- Inadequate information or
- Doubtful diagnosis.

Diagnostic criteria for CRAO

These were, principally:

- A history of sudden loss of vision in one eye.
- On initial ophthalmic evaluation, evidence of acute retinal ischemia, i.e. retinal opacity with cherry red spot or, in eyes with transient CRAO, multiple scattered patches of retinal opacity all over the posterior pole with or without intervening retina showing whitening or even a faint cherry red spot.
- The presence of “box-carring” (“cattle trucking”) of the blood column in the retinal vessels, except in those with transient CRAO.
- Fluorescein fundus angiography performed at first consultation after the sudden onset of visual loss (either at the local referring ophthalmologist or in our clinic), showing evidence of absence or marked stasis of the retinal arterial circulation, except in eyes with transient CRAO.
- No treatment, other than ocular massage in a few eyes by the local ophthalmologist.

A detailed ocular and medical history and a detailed ocular evaluation was done. The ocular examination included a careful testing of the visual acuity, visual field, anterior segment examination, intraocular pressure recording with a Goldmann applanation tonometer, relative afferent pupillary defect, detailed fundus evaluation by indirect and direct ophthalmoscopy. Carotid evaluation and echocardiographic study were done to determine the source of embolism.

Statistical analysis

Descriptive statistics, mean±standard deviation and frequency and percentages, were obtained. For the comparisons involving the carotid Doppler/angiography and echocardiography findings, the Pearson Chi-square test was used. Comparison of amount of carotid occlusion was done using the Wilcoxon rank-sum test.

RESULTS

A total of 75 cases with CVA admitted to the hospital were included in the study. The age group ranged from 50 to 80years (median age 65 years). Among these, 64 cases (84%) were associated with hypertension and 46 cases (61.2%) with diabetes. All the patients had unilateral involvement. The visual acuity ranged from counting fingers at 2m to light perception. Six patients (8%) had CRAO with sparing of cilioretinal artery.

Sudden loss of vision was seen in 6 patients, 1 case was reported to hospital immediately, Previous transient loss of vision in 2 cases, High intraocular pressure along with CRAO was seen in 1 case, No perception of light in 4 cases. Carotid Doppler was performed on all 6 patients who showed atheromatous plaques. 2 cases had critical 80% stenosis.

DISCUSSION

CRAO is considered a "stroke" of the eye. Studies show that most common risk factor is underlying high blood pressure followed by significant carotid artery disease (plaque with narrowing of the artery lining), cardiac valvular disease or diabetes.

CRAO most commonly affects the age group of 60–65 years and predominantly males, in our study too most common age group was 65 years. Over 75% of patients with CRAO suffer from generalized atheromatous disease, which is frequently associated with hypertension or diabetes mellitus, or both.⁸

In our study, 83% were males similar to earlier report by Ratra et al, Kanchi Sawant et al in contrast to Western literature which showed female preponderance.⁹⁻¹¹ The most common affected age group was 50-80 yrs. Demographic profile of various studies is shown in Table 1.^{10,12-14}

In present study, 46 cases (61.2%) were diabetics and 64 cases (84%) were hypertensives while in the study conducted by Shilpa et al, 8 (21.1%) cases were diabetics and 6 (15.8%) were hypertensives.¹² Systemic conditions were under normal limits in all cases. In our study 66% showed no light perception while Brown et al. 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.¹³

Table 1: Demographic profile in central retinal artery occlusion in various studies. [10, 12-14].

	Brown et al ¹³	Greven et al ¹⁴	Duppar R et al ¹⁰	Shilpa et al ¹²	Our study
Total cases	27	21	32	38	6
Age of presentation	9-29	23-38	11-39	25-65	50-80
Sex ratio male:female	14:13	7:14	21:11	27:11	5:1
Hypertension %	0	14.3	6.2	15.8	84
Diabetes %	No data	No data	No data	21.1	61.2
Smoking	0	23.8	6.2	55.6	0

Von Graefe first described CRAO in 1859 as an embolic event in a patient of endocarditis. Retinal emboli are usually of three types: calcific, cholesterol, and platelet-fibrin.¹¹ In majority of the cases atherosclerosis is the causative factor, more than 50% of patients who experience retinal arterial occlusions, had underlying cardiovascular disease. In our study too, the carotid Doppler revealed a right-sided plaque in carotid bulb. There are various triggering factors for atherosclerosis; in our case, the patient was found to be hypertensive and diabetic both. Another triggering factor could be smoking which was not reported in our study.¹⁵

Systemic diseases pathophysiologically may cause obstruction of the central retinal artery primarily through one or a combination of the following processes embolism, vascular narrowing, thrombosis, arterial spasm, vascular narrowing caused by extravascular disease, and reduction in blood flow caused by carotid or ophthalmic artery obstruction, lowered systemic blood pressure, or elevated intraocular pressure.¹⁶

Emboli from the heart and carotid artery has a direct access to the eye as ophthalmic artery is the first branch of internal carotid artery. There is higher prevalence of systemic hypertension, diabetes mellitus, cerebrovascular accidents, and cardiac valvular disease in patients presenting with CRAO.^{17,18} The most common causes of ophthalmic artery and/or CRAO are embolization from ulcerated plaques of the carotid artery and atherosclerotic occlusion of the internal carotid artery.¹⁹

An acute ophthalmic artery obstruction may also present with retinal opacification. It is usually more pronounced both in the severity and in the extent of the area involved. The presence of a cherry-red spot with an acute ophthalmic artery obstruction is variable. With an ophthalmic artery obstruction, the presence or absence of a cherry-red spot is determined by the degree of choroidal hypoperfusion, the rapidity of onset of vascular compromise, and the duration of the ischemia.^{17,18}

CRAO is an ocular emergency, which is a challenge to any ophthalmologist. Even today, there is no guideline for its treatment.

CONCLUSION

CRAO has a diverse etiology. It can vary from hypertension to even snake bite. As it is an ocular emergency, Identification of underlying cause is essential during follow-up for better intervention. In conclusion, visual prognosis is generally poor in eyes with CRAO. More effective interventional treatments to improve visual prognosis in eyes with CRAO should be investigated.

Due to the difficulties in preventing and treating CRAO reliably, this ophthalmological emergency continues to be an unpredictable and tragic event for anyone affected by it. Therefore, special emphasis and care should be dedicated to the interdisciplinary collaboration between general practitioner and ophthalmologist following a CRAO. The primary goal must be a comprehensive investigation of a patient's individual risk factors for CRAO and their subsequent treatment. This should contribute to reducing mortality after CRAO and prevent the occurrence of CRAO in the unaffected eye.

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