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Ophthalmology

OPHTHALMOLOGIST AS GATEKEEPERS FOR STROKE PREVENTION – A CASE STUDY '

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ABSTRACT Stroke is a major global public health problem and the prevalence ranged from 44.29 to 559/100,000 persons in different parts of India1. Ophthalmologists come across many patients with retinal artery occlusion who are unaware of harbouring a significant stenosis in the carotid arteries. In our case report, a 78-year old male having multiple associated systemic diseases presented to the outpatient department with the complaint of vision loss in one eye and was diagnosed with Branch Retinal Artery Occlusion (BRAO). We advised him to go immediately for carotid doppler study and systemic evaluation. Stenosis of carotid arteries were noted which was more on the same side of occlusion in the eye, we urgently referred him to a higher centre and he underwent angioplasty for the stenosis. As per our knowledge, despite the guidelines for referral there is no evident literature on the percentage of such cases being referred by Ophthalmologists to higher centres in India. This case study aims to promote research in this area and attract attention of Ophthalmologists in their critical role in dealing with patients with high risk of Stroke.

KEYWORDS : occlusive disease, carotid artery stenosis, stroke

Introduction:

Approximately 1.8 million people in India suffer from a stroke each year, making it one of the leading causes of death and disability in the country[2]. Despite the significant impact of this non-communicable disease on the population, treatment and rehabilitation efforts in India remain underdeveloped. Ischemic stroke patients commonly present with symptoms of hemiplegia and homonymous hemianopia[3]. Previous studies have estimated that up to 20-25% of ischemic strokes are caused by large-artery atherosclerosis, such as carotid artery disease[4].

The mechanism behind the ocular presentation is that anatomically, the retina and brain share the same blood supply, the internal carotid artery, and the retina is a component of the nervous system, representing an extension of the diencephalon. Developmentally, the retina originates from the neural tube, which is a part of the brain[7].

RAO and stroke share a common pathophysiological mechanism of thromboembolism[5] and share common risk factors, including hypertension, diabetes mellitus, and hyperlipidemia. Therefore, ICA stenosis leads to insufficient blood supply to the inner retina (Central Retinal Artery Occlusion) or part of inner retina (Branch Retinal Artery Occlusion), may result in decreased vision and visual field. This case report presents a patient diagnosed with BRAO and the role of an ophthalmologist to save him from form subsequent risk of stroke.

Case report:

A 78-year-old man presented with sudden onset of blurred vision in his right eye, along with a loss of the inferior field of vision. He had a history of Type 2 diabetes, hypertension, a previous coronary artery bypass surgery, Parkinsonism, and vocal cord paralysis, and was taking medication for these conditions.

Upon evaluation, the best corrected visual acuity in the right eye was 6/24, and in the left eye was 6/9. Ocular motility was full in both eyes. Intraocular pressure measured using a Goldman applanation tonometer was 12 mm Hg in the right eye and 14 mm Hg in the left eye. The pupil in the right eye measured 3 mm in the dark and showed a 0.3 log unit relative afferent pupillary defect; the pupil in the left eye measured 3 mm in the dark with no relative afferent pupillary defect. Confrontation visual fields (assessed by looking at the tip of a pen) showed an almost total inferior nasal deficit in the right eye, while the fields in the left eye were normal. Slit lamp examination revealed N1C1 in both eyes.

On dilated fundus examination, the vitreous was clear, the cup-to-disc ratio was 0.6:1, and there was peripapillary atrophy and a dull foveal reflex in both eyes. The right eye showed attenuation of the branch retinal artery in the supratemporal quadrant, with a whitish swelling of retinal tissue in an arcuate pattern along the superior arcade. No emboli were visible. The fundus in the left eye was within normal limits. Macula optical coherence tomography (OCT) on presentation showed a normal foveal contour, but OCT angiography (6x6 mm) revealed a loss of the superficial capillary plexus and disruption of the deep capillary plexus in the superior quadrant of the right eye involving the macular area, as shown in Figure 2(A). The patient was diagnosed with a branch retinal artery occlusion in the right eye.

Clinical course :

The patient was treated with eyedrops (Nepafenac 0.1%, one drop three times a day for 2 weeks) upon presentation to the clinic, 24 hours after the onset of symptoms. Given the evidence linking retinal artery occlusion to an increased risk of stroke, the patient was advised to undergo a Carotid Doppler study. The study revealed hypoechoic and calcified atherosclerotic plaques in both carotid arteries, with a significant stenosis noted at the origin of the right internal carotid artery (ICA). The patient's blood pressure was measured at 124/78 mmHg, and their lipid profile was within normal limits. The right ICA had an intima-media thickness of 0.8 mm, while the left had a thickness of 0.6 mm. A significant blockage was observed at the beginning of the right internal carotid artery (ICA), as shown in Figure 1.

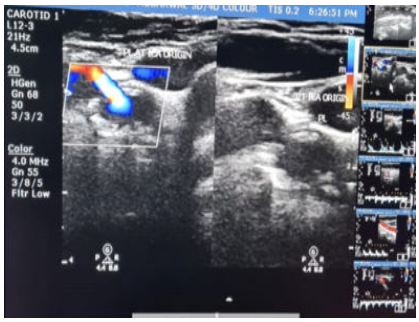

Figure 1: Artheromatous plaque causing significant narrowing in the right proximal ICA causing turbulent flow in the stenosed segment with high PSV and colour aliasing artefact.

The patient was referred to a neurologist at a higher medical center for further evaluation, which included a CT angiography of the cerebral and neck arteries. The results showed significant narrowing in a small segment of the proximal part of the right ICA. The patient was admitted for a right ICA stenting procedure, during which a long sheath (Neuron Max) was inserted into the ICA origin. The recovery from the procedure was uneventful. Upon the patient's return to our clinic, the recorded best corrected visual acuity (BCVA) in the affected eye was 6/9, and the field defects had resolved. An optical coherence tomography angiography (OCT Angiography) was performed, showing restoration of blood supply in the ischemic area in both the superficial and deep capillary plexus involving the macular region, as shown in Figure 2(B).

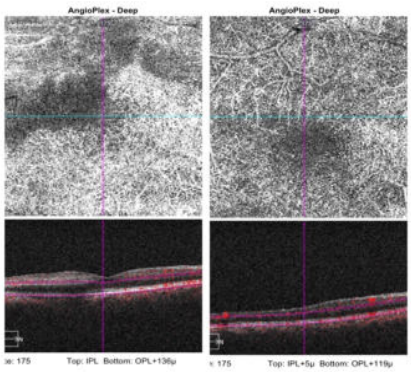

Figure 2(A): OCT angiography of the right eye showing loss of deep capillary plexus and 2(B) restoration of blood supply in the deep capillary plexus; with normal macular contour on B scan OCT.

Discussion:

Stroke is a major health issue worldwide, with rates ranging from 44.29 to 559 cases per 100,000 people in India1. The number of stroke cases in India has been steadily rising in recent years, according to the Indian Stroke Association.

It is known that the brain and retina share a common blood supply and embolisms from the carotid artery can cause both ischemic brain stroke and retinal artery occlusion. Stroke is life threatening and retinal artery occlusion is considered an ocular emergency as well that can lead to severe vision loss. Because the retinal vessels can be examined non-invasively using ophthalmoscopy6, an can take a lead in early identification of stroke at the level of retina.

However, despite guidelines from National Stroke Association recommending the referral of patients with retinal artery occlusion, to higher medical centers, only 18-35% of ophthalmologists worldwide report making such referrals8. There is a lack of published studies on the referral rates of these cases by ophthalmologists in India. This case report highlights the importance of research in this area and the crucial role that ophthalmologists play in the management of patients at high risk for stroke.

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