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Spontaneous Head Turn in Central Retinal Artery Occlusion With Nasal Cilioretinal Artery Sparing: A Case Report

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Patient: Male, 55-year-old
Final Diagnosis: Central retinal artery occlusion with nasal cilioretinal artery sparing
Symptoms: Sudden painless monocular vision loss
Clinical Procedure: Fluorescein angiography • optical coherence tomography
Specialty: Ophthalmology

Objective: Unusual clinical course

Background: Central retinal artery occlusion (CRAO) is an ophthalmic emergency and a retinal ischemic stroke. Cilioretinal arteries may remain perfused during CRAO because they arise from the posterior ciliary circulation. Most reported cilioretinal sparing involves papillomacular or foveal preservation; nasal sparing is atypical. We report CRAO with nasal retinal sparing and spontaneous head-turn behavior during screening.

Case Report: A 55-year-old man presented with a 2-day history of sudden, painless vision loss in the right eye. He had newly diagnosed hypertension and was an active smoker. Visual acuity was 1/200 in the right eye and 20/20 in the left. During emergency-room screening, he spontaneously turned his head left while attempting to read a tumbling-E chart. Examination showed a right relative afferent pupillary defect. Fundus examination revealed a cherry-red spot, diffuse retinal whitening, and a nasally preserved sector. Fluorescein angiography confirmed nasal perfusion from a patent nasal cilioretinal artery. Nasal optical coherence tomography (OCT) showed preserved retinal architecture, whereas vertical macular OCT showed inner retinal thickening and hyperreflectivity. Bedside confrontation testing suggested gross temporal field preservation.

Conclusions: Multimodal imaging documented atypical nasal retinal sparing in acute CRAO. Because the nasal retina subserves the temporal visual field, the leftward head turn was anatomically compatible with possible compensatory eccentric viewing toward residual temporal field function. However, formal perimetry was unavailable, and this observation remains hypothesis-generating rather than diagnostic. Correlating patient behavior with multimodal imaging may help localize residual retinal function while reinforcing the need for urgent systemic vascular evaluation.

Keywords: Fluorescein Angiography • Retinal Artery Occlusion • Tomography, Optical Coherence

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Introduction

Central retinal artery occlusion (CRAO) is an ophthalmic emergency and a retinal ischemic stroke syndrome that warrants urgent systemic evaluation because it is associated with concurrent and subsequent cerebral and cardiovascular ischemic events [1]. Visual outcomes are often poor in routine practice, especially with conservative treatment; however, some eyes retain partial function when residual perfusion is preserved in a favorable location [2]. Cilioretinal arteries are common anatomic variants arising from the posterior ciliary circulation rather than the central retinal artery; therefore, they may remain patent when the central retinal arterial circulation is occluded [3,4]. A patent cilioretinal artery can preserve retinal function within the supplied territory, although the clinical benefit depends on whether the spared vessel perfuses the papillomacular bundle, the fovea, or a more peripheral retinal region [4]. Eccentric viewing refers to the use of a nonfoveal retinal locus to perform a visual task when central vision is impaired. Patients may adopt compensatory viewing strategies, including head or eye position changes, to place the target into a better seeing area. Because the nasal retina subserves the temporal visual field, nasal retinal sparing could plausibly correspond to residual temporal field function.

Most published examples of cilioretinal artery sparing in CRAO involve preservation of central macular or papillomacular function, often maintaining good central visual acuity on testing, which may remain normal or even 20/20 when the fovea is spared [4]. Atypical sparing patterns have been reported only sporadically, including a nasal-origin cilioretinal artery, image-based reports of cilioretinal sparing, and triple cilioretinal sparing [5-7]. In that context, the value of the present report lies in illustrating an uncommon pattern of nasal retinal sparing together with a contemporaneous bedside behavioral observation and supportive multimodal imaging in acute CRAO. Recent studies have shown that multimodal imaging is highly informative in acute CRAO: optical coherence tomography (OCT) demonstrates inner retinal thickening and hyperreflectivity that vary with ischemic severity and disease stage and may carry prognostic information [8,9], whereas fluorescein angiography and OCT angiography can delineate preserved versus ischemic vascular territories [10,11]. We present a case of acute CRAO with nasal retinal sparing from a patent nasal cilioretinal artery to demonstrate how spontaneous patient behavior during bedside testing may provide a real-time clue to residual visual function, provided that such behavior is interpreted cautiously and corroborated with examination and imaging findings.

Case Report

A 55-year-old man presented with a 2-day history of sudden, painless vision loss in the right eye. His medical history was notable for newly diagnosed systemic hypertension, and he was an active smoker. Best-corrected visual acuity was 1/200 in the right eye and 20/20 in the left eye. During visual acuity screening in the emergency department, he spontaneously turned his head to the left while attempting to read the tumbling-E chart. Intraocular pressure was 15 mm Hg in the right eye and 13 mm Hg in the left eye. A relative afferent pupillary defect was present in the right eye. Extraocular motility was full. The eyes were orthotropic in primary position, eyelid position was normal, and no abnormal head posture was present at rest. Slit-lamp examination showed a mid-dilated, nonreactive pupil in the right eye, with otherwise unremarkable anterior segment findings. Bedside confrontation visual field testing of the right eye was performed with the fellow eye occluded and by finger counting in the tested quadrants. The patient was able to count fingers in the temporal field but not in other tested quadrants, suggesting gross preservation of temporal field function only. Detailed kinetic mapping, repeated standardized testing, and formal fixation monitoring were not available in the emergency setting. Formal automated or Goldmann visual field testing was not performed.

Dilated fundus examination of the right eye revealed a cherry-red spot, diffuse retinal whitening, and 2 flame-shaped hemorrhages, with a nasal sector that appeared normally perfused (**Figure 1A**). No definite visible embolus or box-carring was noted. Fluorescein angiography showed delayed arm-to-retina and arteriovenous transit time and confirmed nasal retinal perfusion from a patent nasal cilioretinal artery, consistent with CRAO with nasal cilioretinal artery sparing (**Figure 1B**). Vertical macular OCT showed acute inner retinal thickening and hyperreflectivity involving the ischemic posterior pole, with hyporeflective foveal cystic changes and no OCT evidence of foveal sparing (**Figure 1C**). Horizontal nasal OCT demonstrated preserved retinal thickness and architecture in the spared nasal sector (**Figure 1D**).

The patient was referred urgently to a stroke center for systemic vascular evaluation. Results of the systemic workup, including carotid imaging, neuroimaging, cardiac rhythm assessment, echocardiography, vascular risk profile, secondary-prevention treatment, final presumed etiology, and subsequent follow-up, were not available.

Discussion

CRAO is now widely framed as a stroke of the eye, and current management emphasizes urgent neurologic and cardiovascular workup together with secondary prevention [1]. In contemporary cohorts, overall visual prognosis remains guarded, but the phenotype and outcome can be modified by residual cilioretinal perfusion [2,4]. In the present case, the spared

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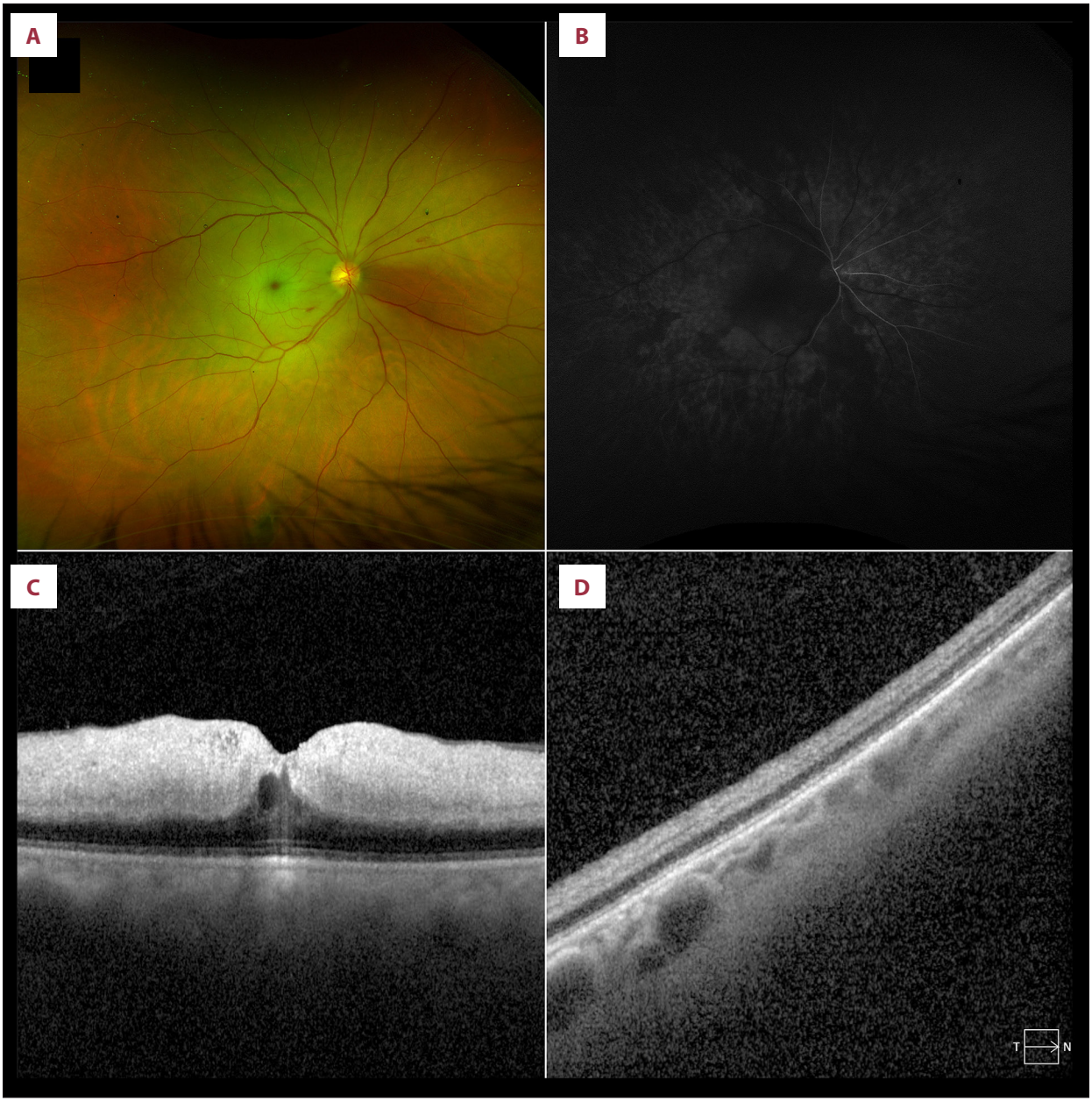

Figure 1. (**A**) Color fundus photograph of the right eye showing a cherry-red spot, diffuse retinal whitening, 2 flame-shaped hemorrhages, and a nasally preserved sector. (**B**) Fluorescein angiography confirming nasal retinal perfusion from a patent nasal cilioretinal artery arising from the nasal side of the optic disc. (**C**) Vertical macular optical coherence tomography (OCT) scan demonstrating inner retinal thickening and hyperreflectivity with hyporeflective foveal cystic spaces. (**D**) Horizontal nasal OCT scan demonstrating preserved retinal thickness and architecture in the spared nasal sector.

territory was not the classic papillomacular bundle but a nasal retinal sector, extending the spectrum of previously reported cilioretinal-sparing patterns [5-7]. The contribution of this report is therefore not the existence of nasal cilioretinal sparing alone, but the contemporaneous correlation of this atypical sparing pattern with a spontaneous bedside behavior observed during emergency department visual acuity screening and supported by multimodal imaging.

The spontaneous left head turn observed during visual acuity screening in the emergency department was notable but should be interpreted cautiously. As the patient attempted to identify the tumbling-E optotypes with the right eye, he repeatedly adopted a leftward head position. Because the nasal retina subserves the temporal visual field, preservation of a nasal retinal sector could explain residual temporal field function. The observed behavior was therefore anatomically compatible

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with an attempt to place the target into a preserved temporal visual field subserved by the spared nasal retina. This interpretation was supported by bedside confrontation visual field testing, which suggested gross temporal field preservation in the right eye. However, the lack of formal perimetry is a major limitation, and the extent, density, and exact location of residual field function could not be quantitatively confirmed.

Alternative explanations for the observed head turn should also be considered, including poor fixation, nonspecific searching behavior during low-vision testing, anxiety during emergency department assessment, nonspecific discomfort, neck pain, or habitual head movement. All these alternative explanations were considered less favored because no abnormal head posture was present at rest, and the behavior was observed specifically during monocular visual acuity testing. Nevertheless, the observation remains hypothesis-generating rather than a diagnostic sign of compensatory eccentric viewing.

Kim et al identified a temporal island as one of the characteristic visual field patterns in acute CRAO [12]. In eyes with cilioretinal artery sparing, remnant visual function depends on the distribution of the spared artery and whether the papillomacular bundle is involved [4]. In this patient, the bedside behavior, confrontation findings, and imaging pattern were mutually consistent, but formal visual-field testing would have been required to establish the structure-function relationship more rigorously. Future similar cases should include automated perimetry, Goldmann or kinetic perimetry, or carefully documented bedside kinetic field testing when feasible.

The imaging findings also support the diagnosis and provide a useful structure-function correlation. Recent OCT studies have shown that acute CRAO is characterized by inner retinal thickening and hyperreflectivity, and that these changes vary by disease stage and may carry prognostic information [8,9]. In our patient, the ischemic posterior pole, including the foveal region, showed the expected acute inner retinal changes, whereas the nasal retina retained near-normal architecture. Fluorescein angiography directly demonstrated preserved filling of the nasal cilioretinal artery. Complementary OCT angiography studies in retinal artery occlusion have shown microvascular abnormalities in the superficial and deep capillary plexuses, supporting the role of vascular imaging in defining preserved and infarcted retinal zones [10,11].

The systemic etiology could not be determined because the results of the stroke center workup and follow-up data were unavailable. In a 55-year-old patient with acute CRAO, potential mechanisms include embolic disease from carotid atherosclerosis or cardiac sources, cardiac rhythm abnormalities, and vascular risk factors such as hypertension, diabetes, and dyslipidemia. Although these possibilities cannot be adjudicated in this report, the case reinforces that ocular documentation of sectoral sparing does not reduce the urgency of systemic stroke evaluation and secondary prevention.

This case has several practical implications. First, in suspected CRAO, clinicians should actively search for perfused sectors, especially when the patient's visual behavior seems better than expected from the fundus appearance. Second, visual field testing, even by confrontation, may help correlate preserved function with retinal anatomy and explain adaptive behaviors such as head turning. Third, documentation of sectoral sparing by OCT and fluorescein angiography can improve communication with stroke teams and patients by showing that residual function may persist despite severe overall ischemia. Recent prognostic work further suggests that the presence and extent of cilioretinal perfusion can influence visual outcome [4,13].

Conclusions

Central retinal artery occlusion with nasal retinal sparing from a patent cilioretinal artery may be associated with a residual temporal visual field island. In this case, the spontaneous left head turn was anatomically compatible with possible compensatory eccentric viewing toward this preserved field, and bedside confrontation testing provided supportive but unquantified evidence. Because formal visual field testing and systemic follow-up data were unavailable, the behavioral interpretation should be regarded as hypothesis-generating rather than confirmatory. Careful correlation of patient behavior with multimodal imaging may improve clinical interpretation in atypical CRAO presentations, but urgent vascular workup remains essential.

Department and Institution Where Work Was Done

King Fahd Hospital of the University, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia.

Informed Consent

Written informed consent for publication of the patient's clinical information and images was obtained.

Declaration of Figures' Authenticity

All figures submitted have been created by the author who confirms that the images are original with no duplication and have not been previously published in whole or in part.

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